



**State of Michigan**  
Department of Technology, Management and Budget  
State Facilities Administration  
**Design and Construction Division**

File No. 751/24078.SMD  
Department/Agency: DNR

## **HVAC & Fire Protection Improvements Belle Isle Athletic Shelter**

330 Vista Drive  
Detroit, Michigan 48207

Construction Documents -Rev  
August 7, 2025

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This is a Cover Sheet to the State's Owner and Contractor Standard Construction Contract, known as the *MICHSPEC™* Division 0 Specifications. The *MICHSPEC™* Division 0 Specifications have been developed from the FORMSPEC™ Michigan Model, 1997 Edition. Although the State's 2008 Version of the Division 0 Specifications are written as simply as practical, it is nonetheless advisable to consult with companion Guide to Specifiers when preparing specifications for a specific project. These Division 0 Specifications were developed by incorporating provisions and requirements furnished by the State into the FORMSPEC™ Michigan Model. These Division 0 Specifications have undergone detailed technical reviews by Department of Technology, Management and Budget, **State Facilities Administration** representatives and detailed legal reviews by the Department of the Attorney General for the State of Michigan. Specifiers are encouraged to consult with a Division 0 specifications specialist or an attorney knowledgeable in public contracts when preparing specifications for a specific project.

**STATE OF MICHIGAN**

**DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET**

**STATE FACILITIES ADMINISTRATION**

**MICHSPEC™ 2008 VERSION, OWNER AND CONTRACTOR**

**STANDARD CONTRACT FORMS AND CONDITIONS OF THE CONTRACT**

**MICHSPEC™ No. 97.0820 – 00020 THROUGH 97.0820 – 00440**

**RELEASED ON NOVEMBER 1, 1997.**

Developed from  
Contract Forms and Conditions of the Contract  
FORMSPEC™ Michigan Model  
and suggested for use with  
Bidding Requirements

**File No. 751/24078.SMD  
State of Michigan, DTMB  
Belle Isle Athletic Shelter  
HVAC Replacement and Fire Protection  
Improvements**

**330 Vista Ave.  
Detroit, MI 48207**

**August 7<sup>th</sup>, 2025**

**1997 Edition/R 03/25 Version**

**MICHSPEC™ DTMB 00210 –  
2(R 03/25)**

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**SECTION 00020 GLOSSARY**

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**1.1 Defined Terms:**

1.1.1. The following terms or relative pronouns used in Division 0 of the Specifications have these intent and meanings:

*Activity*– An element in the Progress Schedule establishing a requisite step, or the time and resources required, for completing the part of the Work associated with that Activity.

*Addenda*– Written instruments that are used by the **Owner** and/or **Professional** to incorporate interpretations or clarifications, modifications, and other information into the Bidding Documents. An Addendum issued after Bid opening to those Bidders who submitted a Bid, for the purpose of rebidding the Work without readvertising, is referred to as a post-Bid Addendum.

*Agreement*– The written agreement between the **Owner** and **Contractor** covering the Work to be furnished and performed.

*Alternate*– Refers to Work specified in the Bidding Documents for which the Bidder shall bid a Bid Price in the space provided in the Schedule of Alternates in Section 00300 Bid Form.

*Apparent Low Bidder*– Those Bidders whose Base Bid, when added to those specific Alternates the Owner intends to accept, yields the three lowest sums of Base Bid and Alternates. Additional Bidders may be considered Apparent Low Bidders if their Base Bid, when added to those specific Alternates the Owner intends to accept, yields a sum within 10% of the lowest of the Apparent Low Bidder's sum. If a qualified disabled veteran meets the requirements of the contract solicitation and with the veteran's preference is the lowest Bidder is considered the Apparent Low Bidder.

*Archaeological Feature*– Any prehistoric or historic deposit of archaeological value, as determined by a representative of a State agency that is duly authorized to evaluate such findings and render such judgments. An Archaeological Feature deposit may include, but is not limited to Indian habitations, ceremonial sites, abandoned settlements, treasure trove, artifacts, or other objects with intrinsic archaeological value and that relate to the history and culture of the State of Michigan.

*As-Planned Schedule*– The **Contractor's** Revision 0 Progress Schedule returned to the **Contractor** as "Resubmittal Not Required," with or without comments or objections noted.

*Authorized Technical Data*– Information and data contained in a report of exploration and tests of subsurface conditions that are expressly designated in paragraph 2.0 of Section 00210 Information for Bidders. Also, any physical data (dimension, location, conditions, etc.) contained in those drawings of physical conditions of existing surface and subsurface facilities identified in paragraph 3.0 of Section 00210 Information for Bidders.

*Bar Chart Schedule*– Activity schedule, in a bar chart format, that accounts for the entire Work at a level of detail commensurate with the Progress Schedule requirements of the Contract Documents.

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**STATE OF MICHIGAN MODEL**  
Developed from FORMSPEC™ Michigan Model.

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*Bid*– Written offer by a Bidder for the Work, as specified, which designates the Bidder's Base Bid and Bid Prices for all Alternates. The term *Bid* includes a *Rebid*.

*Bidder*– The Person acting directly, or through an authorized representative, who submits a Bid directly to the **Owner**.

*Bidding Documents*– The proposed Contract Documents as advertised, and all Addenda issued before Bid opening, and after Bid opening, if the Work is rebid without readvertising.

*Bid Price*– The Bidder's price for a lump sum item of Work, or the product of the Bidder's unit price for an item of Unit Price Work times the quantity given on the Bid Form for that item.

*Bid Security*– A security serving as a guarantee that the Bidder will conform to all conditions requisite for its return or as liquidated damages in the event of failure or refusal to conform.

*Bidding Requirements*– The Advertisement, Instructions to Bidders (including Attachment A), Supplementary Instructions, Information for Bidders, Bid Form, Bid Form Attachments and Qualification Submittals, as advertised and as modified by Addenda, and any other Section included within Division 0 of the Bidding Documents for the purpose of governing bidding and award of the Contract.

*\*AD Board*– The Administrative Board of the State of Michigan.

*Bonds*– Section 00310 Bid Bond, Section 00610 Performance Bond and Section 00620 Payment Bond are security furnished by the **Contractor**, as required by the Contract Documents.

*Business Day*– Any Day except Saturdays, Sundays and holidays observed by the **Owner**.

*Bulletin*– A standard **DTMB or other PSC** form used by the **PSC & Owner** to describe a change in the Work under consideration by the **Owner** and to request the **Contractor** to submit a proposal for the corresponding adjustment in Contract Price and/or Contract Time, if any.

*Calendar Day*– Every day shown on the calendar, Saturdays, Sundays, and holidays included.

*Cash Allowance*– An **Owner**-specified sum included within the Contract Price to reimburse the **Contractor** for the actual purchase/furnished cost of materials and/or equipment or other designated items, as specifically provided in the Contract Documents. Although the scope (e.g., the required quantity) of any Work covered by a Cash Allowance is sufficiently detailed in the Contract Documents for the purposes of bidding the required labor costs, Subcontract costs, construction equipment costs and general conditions costs and Fee, it is understood that the required materials, equipment or other designated items are of uncertain purchase cost at the time of Bid or are yet to be specified in more detail by the **Professional** as to quality, appearance, durability, finish and such other necessary features affecting purchase price.

*Change Authorization*– A written order issued and signed by the **Professional**, which directs changes in the Work that require no adjustment in Contract Price or Contract Time, or which allows for variations in the quantities of Unit Price Work.

*Change Order*– A written order issued and signed by the **Owner**, which amends the Contract Documents for changes in the Work or an adjustment in Contract Price and/or Contract Time, or both.

*Construction Mechanic*– A skilled or unskilled mechanic, laborer, worker, helper, assistant, or apprentice working on a state project but shall not include executive, administrative, professional, office, or custodial employees

*Contact Person*– Individual in the employ of the **Professional** or the **Owner** who is designated as the sole point of contact for prospective Bidders for requests or inquiries concerning the Work and/or the Bidding Documents.

*Contract*– Refer to the definition in paragraph 1.1 of Section 00500 Agreement. The term “Contract” encompasses the legal obligations of the **Owner** and **Contractor**, as defined by the Contract Documents.

*Contract Award*– The official action of the **Board**, the **Director-SFA** or the **Director-DCD** awarding the Contract to the **Contractor**.

*Contract Documents*– Those documents itemized or designated in paragraphs 2.2 through 2.4 of Section 00500 Agreement.

*Contract Float*– Calendar Days between the **Contractor's** anticipated date for early completion of the Work, or of a specified portion of the Work, if any, and the corresponding Contract Time.

*Contract Price*– The Contract price for the Work, or a designated portion of the Work, as designated in Section 00500 Agreement or elsewhere in the Contract Documents, is the total compensation, including authorized adjustments, payable by the **Owner** to the **Contractor** (subject to provisions for Unit Price Work).

*Contract Times*– The Contract Times for the entire Work are the periods allowed, including authorized adjustments, for Substantial Completion and final completion of the Work. The Contract Times for a designated portion of the Work are the periods allowed for Substantial Completion and final completion of any such portion of the Work, as specified in the Contract Documents.

*Contractor*– Person named “the **Contractor**” in Section 00500 Agreement with whom the **Owner** has entered into the Contract.

*Correction Period*– The period during which the **Contractor** shall, in accordance with the Contract Documents, (a) correct or, if rejected, remove, and replace Defective Work, and (b) maintain warranties for materials and equipment in full force and effect.

**Cost of the Work Involved**– The sum of all costs that would be, or were, necessarily incurred by the **Contractor** in providing any Work Involved with the related change, less the costs that would be, or would have been, incurred by the **Contractor** to provide such Work without the related change.

**CPM Schedule**– Computerized, Activity-based Progress Schedule, using Critical Path Method (CPM) techniques, and accounting for the entire Work at a level of detail commensurate with the Progress Schedule requirements of the Contract Documents.

**Critical Path Method (CPM)**– The Critical Path Method of planning and scheduling. The term “Critical Path” denotes a sequence of Activities controlling achievement of a specified Contract Time.

**Date of Commencement of the Contract Time**– The date when the Contract Time starts to run.

**Defective**– An adjective which when referring to or when applied to the term “Work” refers to (a) Work not conforming to the Contract Documents or not meeting the requirements of any inspection, test, or approval, or (b) Work itemized in a Punch List which the **Contractor** fails to complete or correct within a reasonable time after issuance of the Punch List by the **Professional**.

**Defective Work/Non-Compliance Notice** – A DTMB-0499 form or equivalent issued to identify defective or non-compliant conditions requiring response and remedy by the **Contractor**.

**Delay**– Any act or omission or other event that in any manner adversely affects or alters the schedule, progress or completion of all or any part of the Work. Delay is a generic term intended to include deferral, stoppage, slow down, interruption and extended performance, and all related hindrance, rescheduling, disruption, interference, inefficiency and productivity and production losses.

**\*Department (DTMB)**– Department of Technology, Management and Budget of the State of Michigan. **Director** is the Director of the Department.

**Director-SFA**– The Director of DTMB State Facilities Administration.

**Director-DCD**– The Director of DTMB State Facilities Administration, **Design and Construction Division**

**Division**– Each of the numbered, distinct parts (starting with Division 0) into which the Specifications are divided.

**Drawings**– Part of the Contract Documents showing the Work. Drawings shall neither serve nor be used as Shop Drawings.

**Early (Late) Dates**– Early (late) times of performance for the Activities.

**Emergency**– A condition affecting the safety or protection of persons, or the Work, or property at or adjacent to the site.

**Fee for the Work Involved (Fee)**– A negotiated, percentage mark-up on the Cost of the Work Involved which is allowed to the **Contractor** for (a) reasonable administrative costs, and (b) negotiated, reasonable profit on the Cost of the Work Involved.

**General Requirements**– Division 1 of the Specifications.

**Hazardous Material**– Asbestos, ACBMs, PCBs, petroleum products, such construction materials as paint thinners, solvents, gasoline, oil, etc., and any other like material the manufacture, use, treatment, storage, transportation, or disposal of which is regulated by federal, State, or local Laws governing the protection of public health, natural resources, or the environment.

**State Facilities Administration**– Entity in the **Department** of Technology, Management and Budget responsible for design, construction, and operations and maintenance of facilities and capital renewal.

**State Facilities Administration Representative**– Designated DTMB-SFA **Design and Construction Division Project Director** (a) Responsible for directing and supervising the **Professional's** services during the period allowed for completion of the Work; and/or (b) Acting as representative for the **Owner** and for the enforcement of the Contract Documents, approving payment to the **Contractor** and coordinating the activities of the State, **Owner**, **Professional** and **Contractor**.

**Law(s)**– Means federal, state, and local statutes, ordinances, orders, rules and/or regulations.

**MCL**– The Michigan Compiled Laws of the State of Michigan.

**Means and Methods**– Includes means, methods, techniques, sequences and/or procedures applicable to the Work.

*Notice of Award*– Written notice accepting the Bid to the lowest responsive, responsible Bidder and designating the Contract Price (and establishing the Alternates accepted by the **Owner**).

*Notice to Proceed*– Written notice authorizing the **Contractor** to proceed with the Work, or a designated portion of the Work, and establishing the Date of Commencement of the Contract Time.

*On-Site Inspection*– The **Professional's** on-site examination of the **Contractor's** completed or in progress Work to determine and verify to the **State Facilities Administration** Representative that the quantity and quality of all Work is in accordance with the requirements of the Contract Documents.

**Owner**– The State of Michigan, named "the **Owner**" in Section 00500 Agreement, with whom the **Contractor** has entered into the Contract and for whom the Work is to be provided. The State of Michigan includes its departments, agencies, boards, commissions, officers, employees, and agents.

*Partial Use*– The use, by the **Owner**, of a designated portion of the Work before accomplishing Substantial Completion of the entire Work. Partial Use does not implicate or refer to Substantial Completion of the portion of the Work placed in use by the **Owner**.

*Person*– Individuals, partnerships, corporations, receivers, trustees, joint ventures, and any combinations of any of them.

*Political Subdivision*– Any county, city, village, or other local unit of the State, including any agency, department, or instrumentality of any such county, city, village, or other local unit.

*Pre-Award Schedule*– A Qualification Submittal required of the Apparent Low Bidder before Contract Award, and which is used by the **Owner** in the evaluation of the Apparent Low Bidder's Bid.

**Professional Services Contractor (Professional)**– The Person or its authorized representative licensed to practice architecture and/or engineering, named as "**Professional**" in Section 00500 Agreement, who has the right and authority assigned in the Contract Documents. The term **Professional** includes the **Professional's** consultants practicing the disciplines required by the Contract Documents. If the **Owner** will function as the **Professional**, such information will be noted in Section 00800 Supplementary Conditions or at the pre-construction conference.

*Progress Schedule*– Work Schedule that shows the **Contractor's** approach to planning, scheduling, and execution of the Work and that accurately portrays completed Work as to sequencing and timing, as provided in the Contract Documents.

*Project*– The total construction, which includes the Work and possibly other work, as indicated in the Contract Documents.

*Project Field Representative*– A **DTMB-SFA** Design and Construction employee or consultant, acting in collaboration and with direction from the **DTMB-SFA-DCD Project Director**, providing on-site, periodic observation and documentation of the Work for compliance with the Contract Documents.

*Project Manual*– The Book of Specifications, containing Division 0 of the Specifications and the technical Specifications.

*Provisionary or Contingency Allowance*– An amount included within the Contract Price to reimburse the **Contractor** for the cost to furnish and perform Work that is uncertain, i.e., may not be required, or is of indeterminate scope, i.e., design information and quantities, complexity, etc. are neither shown nor detailed in the Contract Documents. Work authorized under any Provisionary Allowance may consist of (a) changes required by actual conditions, as determined by the **Professional**, that are incorporated into the Work in accordance with Section 00700 General Conditions, and (b) any other Work authorized and completed under the pertinent provisions of the Contract Documents. Unlike a Cash Allowance, payments under a Provisionary Allowance shall include not only the purchase/furnished cost of the materials and equipment involved, but also all related labor costs, Subcontract costs, construction equipment costs, general conditions costs and Fee, provided they are calculated in accordance with the requirements of Articles 10 and 11 of Section 00700 General Conditions.

*Public Utility*– Any utility company, utility department or agency of a Political Subdivision, natural gas pipeline company, cable TV company, or any other owner/operator of utilities that are operated or maintained in, on, under, over or across public right-of-way or public or private easements and which is defined as "Public Utility" under the provisions of 2013 PA 174, as amended, MCL 460.721.

*Punch List*– A list of minor items to be completed or corrected by the **Contractor**, any one of which do not materially impair the use of the Work, or the portion of the Work inspected, for its intended purpose. A Punch List shall be prepared by the **Professional** upon having decided that the Work, or portion of the Work inspected, is substantially complete and shall be attached to the respective certificate of Substantial Completion.

*Qualification Submittals*– Data concerning a Bidder's qualifications and eligibility, as specified in the Bidding Requirements.



*Rebid*– A revised or new Bid submitted by a Bidder on the Section 00300 Bid Summary and Bid Form and the Bid Form Attachments made available through post-Bid Addenda, in the event the Work is rebid without readvertising, as allowed by post-Bid Addenda.

*Record Documents*– Drawings, Specifications, Addenda, Change Orders, Change Authorizations, Bulletins, inspection, test and approval documentation, photographs, written clarifications and interpretations and all other documents recording, or annotated to show, all revisions and deviations between the as-built installation and the Contract Documents, all approved Submittals and all clarifications and interpretations.

*Records*– Books, reports, documents, and other evidence relating to the bidding, award and furnishing and performance of the Work.

*Record Schedule*– A Progress Schedule Revision Submittal returned to the **Contractor** as "Resubmittal Not Required," with or without comments or objections noted.

*\*Recycled Material*– Recycled paper products, structural materials made from recycled plastics, refined lubricating oils, reclaimed solvents, recycled asphalt and concrete, recycled glass products, retreaded tires, ferrous metals containing recycled scrap metals and all other materials that contain (a) waste materials generated by a business or consumer, (b) materials that have served their intended purpose, and/or (c) materials that have been separated from solid waste for collection, recycling and disposition in the percentage determined by the State as provided by Law.

*Request for Payment*– The form provided by the **Owner** (Payment Request DMB-440) to be used by the **Contractor** in requesting payment for Work completed, which shall enclose all supporting information required by the Contract Documents.

*Resident Project Representative*– The authorized representative of the **Professional** who is assigned to the site.

*Schedule of Values*– A schedule of pay items, which subdivides the Work into its various parts and which details, for each itemized part, cost and pricing information required for making payments for Work performed. The sum of all pay item costs in the Schedule of Values shall equal the Contract Price for the Work.

*Shop Drawings*– Includes drawings, diagrams, illustrations, standard schedules, performance charts, instructions and other data prepared by or for the **Contractor** to illustrate some part of the Work, or by a Supplier and submitted by the **Contractor** to illustrate items of material or equipment.

*Soil Erosion and Sedimentation Control*– The planning, design and installation of appropriate Best Management Practices designed and engineered specifically to reduce or eliminate the off-site migration of soils via water runoff, wind, vehicle tracking, etc. Soil erosion and sedimentation control in the State of Michigan is regulated under The Natural Resources Environmental Protection Act; Soil Erosion and Sedimentation Control, 1994 PA 451, Part 91, as amended, MCL 324.9101 et seq. Soil erosion and sedimentation control associated with this Contract is monitored and enforced by the **Department** of Technology, Management and Budget, State Facilities Administration.

*Specifications*– Parts of the Contract Documents organized into Divisions. "Technical Specifications" means Divisions of the Specifications consisting of technical descriptions of materials, equipment, construction systems, standards, and workmanship.

*State*– The State of Michigan in its governmental capacity, including its departments, agencies, boards, commissions, officers, employees, and agents. Non-capitalized references to a state refer to a state other than the State of Michigan.

*\*State Construction Code*– The Michigan State Construction Code Act, 1972 PA 230, as amended, MCL 125.1501 et seq.

*Sub agreement*– A subcontract or purchase order awarding a part of the Work to a Subcontractor or Supplier.

*Subcontractor*– A Person having a Sub agreement for providing labor at the site, or for providing labor at the site and furnishing materials and/or equipment for incorporation into the Work.

*Submittals*– Includes technical Submittals, Progress Schedules and those other documents required for submission by the Contract Documents. The term "technical Submittal" includes Shop Drawings, brochures, samples, Operation and Maintenance (O&M) Manuals, test procedures and any other Submittal the Contract Documents require the **Contractor** to submit to demonstrate how the items covered, after installation or incorporation into the Work, will conform to the information given in the Contract Documents and be compatible with the design of the completed Work as a functioning whole as indicated in the Contract Documents.

*Substantial Completion*– The Work, or a portion of the Work designated in the Contract Documents as eligible for separate Substantial Completion, has been completed in accordance with the Contract Documents, to the extent that the **Owner** can use or occupy the entire Work, or the designated portion of the Work, for the use intended without any outstanding, concurrent Work at the site, except as may be required to complete or correct Punch List items. Prerequisites for Substantial Completion, over and above the extent of

Work completion required, include (a) receipt by the **Owner** of operating and maintenance documentation, (b) all systems have been successfully tested and demonstrated by the **Contractor** for their intended use, and (c) the **Owner** having received all required certifications and/or occupancy approvals from the State and those Political Subdivisions having jurisdiction over the Work. Receipt of all certifications and/or occupancy approvals from those Political Subdivisions with jurisdiction in and of itself does not necessarily connote Substantial Completion.

*Supplementary Conditions*– Section 00800 within Division 0 of the Specifications that amends and/or supplements Section 00700 General Conditions and other designated Contract Documents.

*Supplementary Instructions*– Section 00120 within Division 0 of the Specifications that amends and/or supplements Section 00100 Instructions to Bidders and any other designated Bidding Requirement.

*Supplier*– A manufacturer or fabricator, or a distributor, material man or vendor representing a manufacturer or fabricator, who has a Sub agreement for furnishing materials and/or equipment.

*Target*– A point of progress for a key part of the Work, which is identified for monitoring progress of the Work. Target Times are not Contract Times.

*Total Float*– Number of Calendar Days by which the Work or any part of the Work may be delayed from its Early Dates without necessarily causing an overrun in a pertinent Contract Time. Total Float is by definition at least equal to Contract Float.

*Underground Utilities*– Pipelines, piping, conduit, duct, cables, wells, tanks, tunnels and appurtenances, or other similar facilities, installed underground to convey or support conveyance of potable water, sprinkler or irrigation water, fire protection systems, electricity, gases, steam, petroleum products, sewerage and drainage removal, telephone, communications, cable TV, traffic, or control systems.

*Unit Price Work, Contingent*– Work involving specified but undefined quantities (i.e., related Work quantities are not detailed in the Contract Documents) which when performed is measured by the **Professional** and paid using the measured quantities and unit prices contained in the Contract Documents. Performance of such Unit Price Work is contingent upon conditions encountered at the site, as determined, and authorized by the **Professional**.

*Unit Price Work, Specified*– Work of specified and defined quantities (i.e., quantities are detailed in, and can be taken-off from, the Contract Documents) that when performed is measured by the **Professional** and paid based on the measured quantities and unit prices contained in the Contract Documents.

*Work* (as in “the Work,” “the entire Work”)– The entire *completed Construction* required by the Contract Documents. The Work results from furnishing and performing all services, obligations, responsibilities, management, supervision, labor, materials, equipment, construction equipment, general conditions, permits, taxes, patent fees and royalties, testing, inspection and approval responsibilities, warranties, temporary facilities, small tools, field supplies, Bonds, insurance, mobilization, close-out, overhead and all connections, devices and incidental items of any kind or nature required and/or made necessary by the Contract Documents.

*Work Involved, any Work Involved*–Existing or prospective Work (a) reflected in any notice, proposal, or claim, or (b) reflected in changes ordered or in process, or (c) affected by Delay.

1.1.2. Other defined terms used in Division 0 but not assigned intent and meanings in this Section 00020 Glossary have the intent and meanings set forth in MCL or Section 00800 Supplementary Conditions.

1.1.3. Terms defined in this Section 00020 Glossary and used in other Specifications and/or in the Drawings in lower cases, or as capitalized terms, have the intent and meanings assigned to them in this Section 00020 Glossary if the context will permit.

## 1.2 Division 0 Rules of Construction:

1.2.1. Each Article in a Section in Division 0 contains “sub-articles,” numbered as this sub-article 1.2 is numbered; “parts,” numbered as this part 1.2.1 is numbered, and “sub-parts,” all of which are considered “paragraphs.” A reference to a paragraph means a reference to the sub-article, part or sub-part, or any combination of any of them, if the context will permit.

1.2.2. Any reference to an Article or a paragraph in a Section within Division 0 means a reference to an Article or a paragraph in the very Section in which the reference is made, unless that reference specifically names another Section.

1.2.3. Whenever the context of any provision requires, the singular number includes the plural number and vice versa, and the use of any gender includes all genders

## END OF SECTION 00020

**SECTION 00030 ADVERTISEMENT**

**1. Invitation to Bid (ITB)** – Your firm is invited to submit a Bid. The State of Michigan as the Owner will receive **bids electronically through the SIGMA VSS website at <https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>** until 2:00 p.m., ET, on 9/17/2025. The State reserves the right to cancel this Invitation to Bid (ITB) or change the date and time for submitting Bids by announcing same at any time before the established date and time for Bid opening. Bids must remain open for acceptance by the Owner for no less than the Bid hold period. Contractor may agree to extend the Bid hold period. However, any such extension must be based upon no increase in the Bid Price and/or Contract Time.

**2. Work Description** – The Work, Belle Isle Athletic Shelter HVAC & Fire Protection Improvements, File No. 751/24078.SMD includes, but is not necessarily limited to new furnaces and hot water heater. A new complete fire alarm and fire suppression system throughout the first and second floor will be provided. The site is located at 330 Vista Ave. Detroit, MI 48207, as shown on the Drawings.

**3. Bidding Documents** – Sets of Bidding Documents may be obtained at:  
<https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>

**4. Bid Security** – Each Bid shall enclose Bid Security, as specified in Section 00100 Instructions to Bidders (and as specified in Section 00310 Bid Bond, if a Bid Bond is enclosed), in the amount of five percent (5%) of the Bidder's Base Bid. **If Bid Security is by check or money order, such certified or cashier's check or money order must be delivered in original copy before the Bid Due Time to:**

State Facilities Administration  
Design & Construction Division  
3111 W. St. Joseph Street  
Lansing, Michigan 48917

*All other Bid information must be submitted via SIGMA as per standard bidding procedure.*

**5. Pre-Bid Conference** – A mandatory ☒ voluntary ☐ pre-bid conference will be held at 330 Vista Ave. Detroit, MI 48207, MI on 8/25/2025 at 10:00 am ET. A tour of the project area will ☒ will not ☐ be held on the same day, starting at 10:30 am ET. All prospective Bidders and other parties interested in the Work are required ☒ encouraged ☐ to attend the tour, if held. Addenda may be issued, in response to issues raised at the pre-bid conference and tour, or as the **Owner** and/or **Professional** may otherwise consider necessary.

An individual is only permitted to represent one bidder at a mandatory Pre-Bid Conference.

**6. SIGMA VENDOR NUMBER:** If you are bidding a State job for the first time, visit the State of Michigan SIGMA website, <https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>, and follow the "SOM VSS User Guide for New Vendors" instructions, located under Forms and Reference Documents. Registration is required for bid submission. **Do not wait until the last minute to submit a proposal**, as the SIGMA system requires the creation of an account and entry of certain information, in addition to uploading and submitting the materials. The SIGMA system **will not** allow a proposal to be submitted after the proposal deadline, even if a portion of the proposal has been updated.

Questions on how to submit information or how to navigate in the SIGMA VSS system can be answered by calling **(517) 373-4111 or (888) 734-9749**.

**7. Equal Employment Opportunity** – Covenants not to discriminate in employment by contractors, subcontractors and suppliers required by Law are contained in paragraph 14.12 of Section 00100 Instructions to Bidders and paragraph 7.12 of Section 00700 General Conditions and are applicable to the Work and any Sub agreement under the Contract.

**8. Contract Times** – The Contract Times and the associated liquidated damages are specified in Article 4 of Section 00500 Agreement.

**9. Contact Person** – All requests or inquiries concerning the Bidding Documents, or the Work shall be addressed to Theresa Scherwitz at [tscherwitz@ghfaa.com](mailto:tscherwitz@ghfaa.com) and Jamie Rudisill at [jrudisill@ghfaa.com](mailto:jrudisill@ghfaa.com). Subject line: BI Athletic Shelter HVAC and Fire Protection.

**10. Award** – Subject to any agreed extension of the period for holding Bids, Bids shall remain valid for acceptance by the **Owner** for 90 (Ninety) Calendar Days after the date of Bid opening. In addition, the **Owner** expressly reserves the right, within the **Owner's** sole discretion, to reject any or all Bids, to waive any irregularities, to issue post-Bid Addenda and rebid the Work without re-advertising, to re-advertise for Bids, to withhold the award for any reason the **Owner** determines and/or to take any other appropriate action. **END OF SECTION 00030**

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**STATE OF MICHIGAN MODEL**

Developed from FORMSPEC™ Michigan Model.

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**ARTICLE 1 BIDDING DOCUMENT INTERPRETATIONS**

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1.1. Section 00020 Glossary assigns specific intent and meanings to capitalized terms and to other defined terms used in Section 00030 Advertisement, this Section 00100 Instructions to Bidders and Section 00210 Information for Bidders. The Glossary also provides specific rules for construing any reference to any Article or paragraph that is made in this Section 00100.

1.2. The deadlines and submission requirements imposed on the Bidders by the provisions of Articles 3 and 4 also shall apply to any prospective subcontractor or supplier seeking access to the site or needing to submit written questions or inquiries.

1.3. Except as otherwise noted, the deadlines and other requirements imposed upon the "Apparent Low Bidder" by the provisions of Articles 2, 5, 8 and 13 also shall apply to any other Bidder remaining or wishing to remain in contention for the award.

1.4. Neither the **Owner** nor **Professional** assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents in preparing Bids. The **Owner** and **Professional** make Bidding Documents available only for obtaining Bids, and neither the **Owner** nor **Professional** grants a license for any other use of the Bidding Documents.

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**ARTICLE 2 QUALIFICATIONS OF BIDDERS**

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2.1. The Apparent Low Bidder shall submit to the **Professional**, within two (2) Business Days after receipt of the **Professional's** request, Section 00430 List of Subcontractors. The Apparent Low Bidder also shall submit to the **Professional**, within five (5) Calendar Days after the **Professional's** request, a Pre-Award Schedule and those other Qualification Submittals noted in Sections 00410, 00420 and 00440. The Apparent Low Bidder(s) may be required to attend a pre-award conference(s).

2.2. The Pre-Award Schedule shall consist of a time-scaled CPM Schedule or a Bar Chart Schedule, as designated by the **Professional**. The Pre-Award Schedule shall (a) identify start and completion dates for the Work in summary form, (b) show the sequencing in which the Bidder plans to perform the Work to conform to the Contract Times and sequences of Work indicated in or required by the Bidding Documents, and (c) include a plot with percentages of completion for the Work correlating to the start and completion dates.

2.3. Unless otherwise determined by the **Owner**, in its sole discretion, failure, neglect or refusal by the Apparent Low Bidder to submit Qualification Submittals when and as requested justifies the **Owner's** refusal to consider the Apparent Low Bidder's Bid and the Apparent Low Bidder's Bid Security will be forfeited to the **Owner** as liquidated damages. However, in the case of any other Bidder remaining or wishing to remain in contention for the award, such failure, neglect, or refusal will not constitute grounds for forfeiting that other Bidder's Bid Security.

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**ARTICLE 3 BIDDING DOCUMENTS; SITE CONDITIONS. SAFETY REQUIREMENTS; LAWS**

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3.1. It is the responsibility of each Bidder, before submitting a Bid, to: (a) examine the Bidding Documents thoroughly; (b) visit the site and, if necessary, record conditions at the site (through logs/notes, photographs, video or any other means); (c) study and correlate the Bidder's observations with the Bidding Documents; and (d) submit written questions or inquiries about the Bidding Documents or the Work, as provided in Article 4, immediately after discovering any conflicts, ambiguities, errors or omissions in the Bidding Documents.

3.2. It is also the responsibility of each Bidder, in the preparation of its Bid, to take those steps that are reasonably necessary to (a) ascertain and satisfy itself of the physical conditions under which the Work will be performed and the condition of existing facilities, including those which may not be a part of the Work, but could be affected by the performance of the Work, and (b) account for all general, local and prevailing conditions at or near the site that may in any manner affect the cost, schedule, progress, performance or furnishing of the Work. Examples of such conditions include, but are not limited to: (a) the nature and location of the Work; (b) conditions related to the transportation, disposal, handling and storage of materials; (c) the availability and suitability of labor, materials, water, electric power, telephone, sanitary services and roads; (d) daily and monthly weather variations, including any related subsurface conditions, river stages, or similar conditions; (e) the character, quality and quantity of surface and subsurface conditions at the site, including but not limited to ground water table variations, and the location, configuration and condition of existing facilities and Underground Utilities; (f) the character of equipment and facilities needed preliminary to and during Work performance; (g) conditions related to maintaining the uninterrupted operation/occupancy of existing services or facilities; and (h) the extent to which the nature, characteristics and use of any adjacent or nearby lands, rights-of-way and easements, and facilities (in all cases, inclusive of real and personal property) may affect the Bidder's activities.

3.3. It is the responsibility of each Bidder to inform itself of, and the Bidder awarded the Contract shall comply with, all applicable Laws, including, but not limited to Laws affecting cost, schedule, progress, performance or furnishing of the Work. Examples of those Laws include, but are not limited to, those relating to nondiscrimination in employment, prevailing wages, protection of public and

employee health and safety, environmental protection, building codes, fire protection, grading and drainage, use of explosives, vehicular traffic, restoration of lands and property under the control of the State or a Political Subdivision, taxes, permits and licensing.

3.4. Section 00210 Information for Bidders identifies (a) reports of explorations and tests of subsurface conditions, and (b) drawings of physical conditions of existing surface and subsurface facilities that have been used by the **Professional** in the preparation of the Bidding Documents. Bidders may rely upon such expressly stated technical information and data contained in those reports which are expressly designated as Authorized Technical Data in Section 00210 Information for Bidders, but those reports and drawings are not part of the Bidding Documents.

3.4.1. Any conclusions or interpretations made by any Bidder based on such Authorized Technical Data shall be at the Bidder's own risk. Reliance by any Bidder on any Non-technical Information or Data, interpretations or opinions contained in those reports or drawings also shall be at the Bidder's own risk. The **Owner**, **Professional** and their respective consultants assume no responsibility for any understanding reached or representation made about subsurface conditions and physical conditions of existing facilities, except as otherwise expressly shown in or represented by the Authorized Technical Data made available.

3.4.2. Section 00210 Information for Bidders also identifies additional reports of explorations and tests of subsurface conditions and reference documents reflecting physical conditions of existing surface and subsurface facilities that have not been used by the **Professional** in the preparation of the Bidding Documents. Any such reports and documents are not part of the Bidding Documents and are made available solely to allow Bidders to have access to the same information available to the **Owner** and **Professional**. Neither the **Owner** nor **Professional** warrants the accuracy or completeness of any such information nor do they warrant that Section 00210 Information for Bidders identifies all such existing relevant reports and/or documents.

3.5. Section 00210 Information for Bidders also identifies information and data shown or indicated in the Bidding Documents or Underground Utility drawings about Underground Utilities. Such information and data about existing Underground Utilities is based on information and data obtained from record documents of previous construction or furnished to the **Owner** by the owners of those Underground Utilities or by others.

3.6. Section 00700 General Conditions contain provisions concerning (a) responsibilities for Underground Utilities, (b) changes that may be ordered because of incidents with differing site conditions, and (c) the adequacy and completeness of the Authorized Technical Data of subsurface conditions and existing subsurface and surface facilities made available to Bidders.

3.7. To the extent that any Bidder considers that additional Authorized Technical Data is necessary for determining its Bid, it is the responsibility of that Bidder to request from the **Owner** the necessary additional Authorized Technical Data. In the event the **Owner** does not have the requested additional Authorized Technical Data, it shall be the responsibility of the Bidder, at the Bidder's sole cost, to undertake reasonable examinations of the site and any other pertinent available information and data that the Bidder considers necessary for determining its Bid.

3.8. If requested by a Bidder at least seven (7) Calendar Days before the date of Bid opening (or as otherwise agreed to by the **Owner**), the **Owner** will provide access to the site, when and as designated by the **Owner**, to allow that Bidder to conduct those reasonable explorations and tests that Bidder considers necessary for preparation and submission of the Bidder's Bid. Any such explorations and/or tests conducted by that Bidder shall comply with the requirements of the **Owner**, any Public Utilities involved and any Political Subdivisions with jurisdiction. If access to the site is granted, that Bidder shall fill all holes and clean up and restore the site to its former condition, to the **Owner's** satisfaction, upon completion of those explorations and/or tests.

3.9. The Bidder awarded the Contract shall be responsible for obtaining any lands, areas, properties, facilities, rights-of-way, and easements, in addition to those furnished by the **Owner**, that the Bidder considers necessary for temporary facilities, storage, disposal of spoil or waste material or any other similar purpose. Neither the **Owner** nor **Professional** assumes any responsibility for site conditions at any lands, areas, properties, facilities, rights-of-way, and easements obtained by any Bidder.

\*3.10. With respect to any earth disturbance associated with this Contract, the Bidder awarded the Contract shall comply with The Natural Resources and Environmental Protection Act; Soil Erosion and Sedimentation Control, 1994 PA 451 Part 91, as amended, MCL 324.9101 et seq. **State Facilities Administration** is the designated "Authorized Public Agency" under the provisions of Section 9110 of 1994 PA 451, Part 91 as amended.

3.11. Each Bid shall include and be deemed to have included all (a) Michigan sales and use taxes and other similar taxes applicable to the Work that are required by Law as of the date of Bid opening, and (b) the cost of all permits, approvals, licenses, and fees necessary for the commencement, prosecution, and completion of the Work. Section 00700 General Conditions contain provisions concerning responsibilities of the Bidder for sales and use taxes and other similar taxes and for obtaining permits, approvals, licenses, and fees applicable to the Work.

3.12. To the extent the **Owner** or **Professional** has knowledge of other work at the site, which may be ongoing during the period allowed for the Work, the Bidding Documents shall identify such other work. Before submitting a Bid, each Bidder shall evaluate: (a) the effect that any such other work operations (e.g., dewatering, blasting, etc.) may have on the Work, (b) related conditions and

sequences of Work contained in the Bidding Documents, (c) the requirements for coordination and cooperation between the Work and other work, and (d) related Contract Times.

3.13. The submission of a Bid constitutes a binding representation by the Bidder that: (a) the Bidder has complied with every requirement of this Article and the Bidding Documents; (b) the Bidder has examined and agrees with the Progress Schedule requirements contained in the Specifications, including, but not limited to, requirements concerning the administration of early completion schedules; (c) without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and in accordance with those Means and Methods indicated in or required by the Bidding Documents; and (d) the Bidder considers the Bidding Documents to be sufficient in scope and detail to indicate a clear understanding of all terms and reasonably foreseeable conditions applicable to the Work, and how such terms and conditions may affect the cost, schedule, progress, performance and furnishing of the Work.

3.14. Any failure of a Bidder to take the actions described and acknowledged in this Article will not relieve that Bidder of the responsibility for (a) properly estimating the difficulty, cost of and schedule for successfully performing and furnishing the Work, or (b) upon award, performing and furnishing the Work successfully at no increase in Contract Price or Contract Time.

3.15. Neither the **Owner** nor **Professional** assumes any responsibility for any conclusions or interpretations made by any Bidder based on the information made available by the Bidding Documents. Nor does the **Owner** or **Professional** assume any responsibility for any understanding reached or representation made about conditions that may in any way affect cost, schedule, progress, furnishing or performance of the Work, unless that understanding, or representation is expressly stated or indicated in the Bidding Documents (including written Addenda).

#### ARTICLE 4 INTERPRETATIONS; ADDENDA

4.1. All requests for clarification or interpretation of the Bidding Documents, all proposals for any modifications to the Bidding Documents, all requests for information and all other questions or inquiries about the Bidding Documents and/or the Work shall be submitted in writing to the Contact Person identified in Section 00030 Advertisement, Article 8. Requests or inquiries received less than seven (7) Calendar Days before the date of Bid opening will be answered only if (a) the response can be given through Addenda made available at least seventy-two (72) hours before Bid opening (counting Business Days only), (b) the Bid opening is postponed by Addendum, or (c) the Work is rebid without readvertising following the issuance of post-Bid Addenda.

4.2. Any interpretation or clarification, modification to the Bidding Documents (whether by correction, addition, deletion, or other revision) and/or information given will be binding only if given by Addenda. Interpretations, clarifications, corrections, additions, deletions or other revisions or information given orally or in any other manner are not binding on the **Owner** and if relied upon by any Bidder, shall be relied upon at the Bidder's own risk. Addenda will be provided by posting to and may be obtained by bidders at: <https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>

4.3. In the **Owner's** sole discretion, subsequent to the opening of Bids, post-Bid Addenda may be issued setting a new date for the receipt and opening of sealed Rebids.

4.4. Any quantities of Unit Price Work given on the Bid Form, whether detailed in the Drawings or Specifications or contingent upon actual conditions, are approximate only, and are to be used solely for comparing Bids and establishing the Contract Price. Neither the **Owner** nor **Professional** represents that the actual quantity for any item of Unit Price Work performed will equal the quantity given. Payments will be made only for actual quantities of Unit Price Work completed in accordance with the Contract Documents. Actual quantities of Unit Price Work may overrun or underrun those in the Bid Form without necessarily invalidating the unit prices bid (except as provided in paragraph 10.6 of Section 00700 General Conditions).

#### ARTICLE 5 BID SECURITY

5.1. Bid Security shall be made payable to the "State of Michigan" in the form of a certified or cashier's check or money order drawn upon a bank insured by an agency of the Federal Government or consist of a duly executed Bid Bond. A Bid Bond shall be duly executed by the Bidder and by a surety authorized to do business in the State by the Department of Energy, Labor and Economic Growth and listed on the current U.S. Department of the Treasury Circular 570. Bidders shall attach a certified copy of Power of Attorney to sign Bid Bonds as the Attorney-in-Fact. Copies of the current Circular listing of approved bonding/insurance companies and interim changes may be obtained through the Internet web site <https://www.fiscal.treasury.gov/fsreports/ref/suretyBnd/c570.htm>.

5.2. Failure by a Bidder to enclose with its Bid a certified or cashier's check or money order or a duly executed Bid Bond signed by Bidder and Surety shall disqualify that Bidder from any consideration for the award. *If Bid Security is by check or money order, such certified or cashier's check or money order must be delivered in original copy before the Bid Due Time to:*

State Facilities Administration  
Design & Construction Division

3111 W. St. Joseph Street  
Lansing, Michigan 48917

*All other Bid information must be submitted via SIGMA as per standard bidding procedure.*

5.3. The Bid Security of the Bidder recommended for award will be retained until that Bidder has fulfilled all the following: (a) submitted Qualification Submittals and required information, (b) executed and delivered Section 00500 Agreement, (c) delivered evidence of insurance, and (d) furnished the required Section 00610 Performance Bond and Section 00620 Payment Bond (including separate certifications). If that Bidder fails to do so when and as specified, the **Director-DCD or his/her designee**, may annul the Notice of Award recommendation, and the Bid Security of that Bidder will be forfeited to the **Owner** as liquidated damages. If the **Owner** incurs any collection costs in the enforcement of the Bid Security requirement, that Bidder and its surety, if any, agree jointly and severally to reimburse the **Owner's** costs of collection, which shall include reasonable fees and charges of attorneys and others, court or hearing costs incurred with or without suit and interest.

5.4. If the Apparent Low Bidder gives a certified or cashier's check or money order as Bid Security, and the **Owner** requests a certification by an acceptable surety stating that the Bidder will furnish the Section 00610 Performance Bond and Section 00620 Payment Bond if awarded the Contract, that Bidder shall furnish such certification within seven (7) Calendar Days after the **Owner's** request.

5.5. The Bid Securities of the Apparent Low Bidder and of any other Bidder remaining in contention for the award will be retained by the **Owner** until the end of the period during which Bids shall remain open, or seven (7) Calendar Days after the **Owner** executes Section 00500 Agreement, whichever last occurs.

## ARTICLE 6 CONTRACT TIME; LIQUIDATED DAMAGES

6.1. The Contract Times, i.e., the number of Calendar Days within, or dates by, which the Work or any part of the Work shall be completed, are specified in Section 00500 Agreement, and may be supplemented, as provided in Section 00500 Agreement. As stated in Section 00500 Agreement, the Contract Times are of the essence of the Contract. If any Bidder believes that any of the Contract Times are insufficient or excessive, that Bidder shall advise the **Owner** in accordance with the requirements of Article 4.

6.2. Liquidated damages are specified in Section 00500 Agreement and may be supplemented, as provided in Section 00500 Agreement.

## ARTICLE 7 MATERIALS AND EQUIPMENT

7.1. Named or Specified Materials and Equipment – Materials and equipment described in the Specifications by naming a brand, make, supplier or manufacturer or by using a specification shall establish a standard and shall be intended to convey function, necessary design features, general style, type, materials of construction, character and quality, serviceability, and other essential characteristics. A number of Specifications, if any, using named or specified materials and equipment are *listed* in Schedule 1.6 of Section 00440 Schedule of Materials and Equipment.

7.2. Proposal for Adding Products by Addenda – For those Specifications *listed* in paragraph 1.6 in Section 00440 Schedule of Materials and Equipment, the **Professional** will, up to ten (10) Calendar Days before the date of Bid opening stated in Section 00030 Advertisement, accept written proposals from non-named manufacturers and suppliers seeking to have the **Professional** add their products to Schedule 1.6. The **Professional** will consent to any such proposal by Addendum if, in the **Professional's** judgment, the proposed material or equipment also may be used as a named or specified product. Lack of adequate time or information needed to evaluate a proposal, as determined in the sole discretion of the **Professional**, may justify its rejection.

7.2.1. Any such proposal shall clearly identify differences between the proposed and named or specified material or equipment and demonstrate objectively that the proposed material or equipment: (a) has the same essential characteristics of the item named or specified, (b) will equally perform the functions and achieve the results called for by the general design concept, (c) is suited to the same use as the item named or specified, (d) is at least of equal materials of construction, quality and necessary essential design features to the material or equipment named or specified, (e) conforms substantially to the desired detailed requirements, including, but not limited to durability, strength, appearance and aesthetics (if aesthetics are significant), safety, service, life, reliability, economy of operation and ease of maintenance, and (f) offers a proven record of performance and service for at least three (3) years before the date of Bid opening.

7.2.2. Any such proposal shall further include (a) a list of installations that have been in service for at least three (3) years before the date of Bid opening (including the name, address, and telephone number of a person familiar with and at the installation), and (b) sufficient drawings, diagrams, brochures, schedules, performance charts, instructions, samples, and other data as may be necessary to allow the **Professional** to make a determination.



7.3. Each Bidder is responsible for notifying the **Professional** in writing if the Bidder knows or has reason to know that any material or equipment *listed* in Section 00440 Schedule of Materials and Equipment, which the Bidder intends to bid requires changes in the Work. Any such notice shall be provided no later than seven (7) Calendar Days before Bid opening. This requirement applies but is not limited to changes in any testing requirements or Means and Methods indicated in or required by the Bidding Documents. However, this requirement is not intended to make the Bidder responsible for correcting design errors or omissions.

7.3.1. If any Bidder fails to provide such notice, and is awarded the Contract, that Bidder assumes responsibility for its proportionate share of any excess costs and Delay. Excess costs and Delay are those resulting from changes in the Work that would not have been incurred had that Bidder not failed to provide written notice to the **Professional**.

7.4. Bidding Requirement – For those Specifications *listed* in paragraph 1.6 of Section 00440 Schedule of Materials and Equipment, each Bidder shall bid one of the *listed* materials and equipment only. This requirement to not bid "or equal" or substitute materials and/or equipment for the *listed* Specifications applies even if the Bidding Documents state that an "or equal" or substitute may be furnished or used for any *listed* Specification.

7.5. Contract Condition – For those Specifications *listed* in paragraph 1.6 of Section 00440 Schedule of Materials and Equipment, the Contract will be awarded on the basis that only *listed* named or specified materials and equipment will be furnished. If an "or equal" or a substitute may be furnished for any *listed* Specification, if acceptable to the **Professional**, application for acceptance will not be considered until after Contract Award.

7.6. Section 00700 General Conditions contains provisions requiring each Supplier (a) to be bound to the requirements of the Contract Documents, (b) to assume toward the **Contractor** all obligations that the **Contractor** assumes toward the **Owner** and **Professional**, and (c) to furnish Work under a Sub-agreement containing waiver of rights of subrogation provisions.

## ARTICLE 8 SUBCONTRACTORS

8.1. For each Division, Section of the Specifications and/or trade itemized in Section 00430 List of Subcontractors, the Apparent Low Bidder shall, when requested by the **Professional**, nominate the Subcontractor(s) to be awarded a Sub-agreement(s). When completing Section 00430, the Apparent Low Bidder shall provide licensing data for trades for which contractors' licensing is required and, if applicable, indicate minority, woman, or handicapped status. One Subcontractor shall be nominated for each Specification or trade, unless the Apparent Low Bidder, directly or through a Subcontractor, intends to award more than one Sub-agreement for the listed Specification or trade.

8.1.1. For any asbestos abatement projects, Contractor must comply with MCL 338.3375(4) and complete the Bid Form Attachment Section 00330 Asbestos Abatement Attestation. Notwithstanding anything to the contrary, the Owner has the right to object, regardless of cause, to any asbestos abatement Subcontractor nominated by the Contractor to be awarded a Sub-agreement that has 5 or more notices of violation of environmental regulations or has been subject to an administrative consent order or a consent judgment involving environmental regulations, within the immediately preceding 5 years.

8.2. If the **Owner** objects, for good cause, to any nominated Subcontractor, the **Owner**, before issuing the Notice of Award, may request replacement of that Subcontractor. In that event, the Apparent Low Bidder shall nominate a substitute Subcontractor or the Bidder itself, if qualified for the Work involved. In such case, there will be no extension in the Bid hold period nor any increase in the Bidder's Bid or Alternates. If the Bidder declines, that Bidder shall not be recommended for the award; however, such declining will not constitute grounds for forfeiting the Bidder's Bid Security.

8.3. Except as provided in paragraph 8.2, no removal or replacement of a nominated Subcontractor will be considered by the **Owner**, except for good cause. Before Contract Award, any removal, replacement, or addition of a nominated Subcontractor shall be responsive to the requirements of the Bidding Documents only to the extent it permits the timely evaluation of the newly nominated Subcontractor. After Contract Award, if the Apparent Low Bidder, as the **Contractor**, nominates *for the first time* a Subcontractor for any Division, Specification and/or trade listed in Section 00430 List of Subcontractors, and the **Owner** objects for good cause to any such newly nominated Subcontractor, the **Contractor** shall provide a replacement Subcontractor at no increase in Contract Price and/or Contract Time.

8.4. Section 00700 General Conditions contains provisions requiring each Subcontractor (a) to be bound to the requirements of the Contract Documents, (b) to assume toward the **Contractor** all obligations that the **Contractor** assumes toward the **Owner** and **Professional**, and (c) to provide Work under a Sub-agreement containing waiver of rights of subrogation provisions.

8.5. These provisions shall not be construed to create any third-party beneficiary or joint employer status with respect to the **Owner** and/or **Professional** and any Subcontractor. Furthermore, these provisions shall not be construed to create or impose any duty or liability on the **Owner** to exercise this authority for the benefit of any Bidder, nominated or newly nominated Subcontractor or any other third party.

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**ARTICLE 9 BID FORM AND BID FORM ATTACHMENTS**

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9.1. All bid forms should be uploaded as attachments to SIGMA, including the Section 00300 Bid Summary, Section 00300 Bid Form and Bid Form Attachments (Section 00310 Bid Bond Form, Section 00320 Non-collusion Affidavit, and if applicable, Section 00330 Asbestos Abatement Attestation). If any forms are revised by Addendum, the latest revision of the appropriate Bid Summary, Bid Form and/or Bid Form Attachment shall be used. All blank spaces shall be legibly and properly printed in ink or typed as required in these Instructions to Bidders and each form. All Bid prices shall be printed or typed in both words and figures.

9.2. Bids by individuals shall be signed by the person making that Bid, or the Bid shall enclose a Power of Attorney evidencing authority to sign the Bid in the individual's name.

9.3. Bids by partnerships shall be signed in the name of the partnership. The partner authorized to sign shall be named and sign where indicated. A certified copy of power of attorney authorizing that partner to bind all partners shall be attached to Section 00300 Bid Form. If a certified copy of the partnership's certificate attached to Section 00300 Bid Form indicates that all partners have signed, no separate authorization is required.

9.4. Bids by corporations shall be signed in the legal corporate name. The signature of the president or authorized officer shall be entered below the corporate name, followed by the attesting signature of the corporation secretary or of an authorized officer other than the officer signing the Bid. A certified copy of a pertinent Board Resolution authorizing that individual to bind the corporation shall be attached to Section 00300 Bid Form.

9.5. Bids by joint ventures shall be signed by all or one of the joint venturers. If not all joint venturers sign, a certified copy of Power of Attorney authorizing the individual(s) signing to bind all joint venturers shall be attached to Section 00300 Bid Form. If a certified copy of the joint venturer's certificate attached to Section 00300 Bid Form indicates that all joint venturers have signed, no separate authorization is required.

9.6. The Bidder shall acknowledge receipt of all Addenda by completing the blank spaces in the table provided for that purpose in paragraph 2.1 of Section 00300 Bid Form.

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**ARTICLE 10 PREPARATION AND SUBMISSION OF BIDS**

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**10.1. Prevailing Wage and Asbestos Abatement Project Requirements:**

10.1.1. The Bidding Documents include either the attached Schedule of prevailing rates of wages and fringe benefits for all classes of Construction Mechanics called for in the Bid and resulting Contract, if any, or the attached current prevailing wage determination issued by the U.S. Department of Labor, as applicable depending on the funding source(s).

10.1.2. To the extent MCL 401.1101 et seq. is applicable, Contractor shall include in a bid for a state project a copy of the state project registration for the Contractor and for each Subcontractor of the Contractor that has been selected at the time the Contractor submits the Bid.

10.1.3 For any project with asbestos abatement, Contractor must complete the Bid Form Attachment, Section 00330 Asbestos Abatement Attestation, to be considered a responsive Bidder.

**10.2. Bids must be submitted electronically through the SIGMA VSS website at <https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>**

10.3. Each bid requesting the Qualified Disabled Veterans (QDV) preference, in accordance with Public Act 22 of 2010, MCL 18.1241(3), shall include a DD 214 Proof of Service and Discharge, a Veterans Administration rating decision letter, proof of disability (if the disability is not indicated on the DD 214), and appropriate legal documents setting forth the 51% natural persons QDV ownership.

10.4. If Unit Price Work is specified, the Bidder shall, for each Unit Price Work item listed separately on Article 6 of Section 00300 Bid Form, bid a unit price, and enter, in the appropriate column, the computation of the respective quantity multiplied by the respective Bidder's bid unit price. Bid prices for each lump sum or "One Each" item listed on the Bid Form shall be printed or typed only in the appropriate "Bid Price" column. The Bidder shall show the sum representing the Bidder's Base Bid and, if Alternates are listed, the Bid prices for all Alternates, in the spaces provided for those purposes.

10.5. For each Cash Allowance, the Bidder shall include, within the Bid, all labor costs, construction equipment costs, insurance and Bond premiums and other general conditions costs and Fee (Bidder's and Subcontractors') to complete Work associated with the material, equipment, or other designated item to be furnished under the Cash Allowance. For each Provisionary/Contingency Allowance, the Bidder shall include, within the Bid, insurance premiums (not recoverable as labor burden) and Bond premiums required to complete Work that may be ordered under the Provisionary/Contingency Allowance. Cash Allowances and

Provisionary/Contingency Allowances are defined in Section 00020 Glossary and are further described in paragraph 10.7 of Section 00700 General Conditions.

10.6. The Bidder's Base Bid and Alternate Bid prices shall include, and payment for completed Work shall be compensation in full for, all services, obligations, responsibilities, management, supervision, labor, materials, devices, equipment, construction equipment, general conditions, permits, patent fees and royalties, testing, inspection and approval responsibilities, warranties, temporary facilities, small tools, supplies, Bonds, insurance, taxes, mobilization, close-out, overhead and profit and all connections, appurtenances and any other incidental items of any kind or nature, as are necessary to complete the Work, in a neat, first quality, workmanlike and satisfactory manner in accordance with the Drawings and Specifications and as otherwise required to fulfill the requirements of the Bidding Documents.

10.7. Neither the Section 00300 Bid Form nor any Bid Form Attachment made available to the Bidders and submitted with the Bid shall be altered in any way. Bids shall not contain any qualifications or conditions or any recapitulations of the Work whatsoever. No Alternate will be considered, unless any such Alternate is itemized in paragraph 6.2 Schedule of Alternates in Section 00300 Bid Form and specified in the Bidding Documents.

10.8. Before and after Bid submission, and before the time for receiving Bids has expired, any Bidder may alter or revise any price or information the Bidder has entered on its Bid Form or any Bid Form Attachments by: (a) crossing out the entry, (b) legibly printing in ink or typing the new price or information, and (c) placing the initials of the person who signs the Bid adjacent to each change. After Bid opening, the **Owner** may require a Bidder to verify any such alteration or revision. Ambiguities arising from any alterations or revisions made by any Bidder may be resolved against that Bidder, in the **Owner's** sole discretion.

10.9. Neither the **Owner** nor **Professional** assumes any responsibility for any costs any Bidder incurs, however caused, in preparing and submitting its Bid, in withdrawing its Bid, or in objecting to the award or to being disqualified for the award.

10.10. In the event of any conflict between Attachment A to Section 00100–Bidder's Checklist and any requirements specified in any other parts of the Bidding Documents; the requirements of the Bidding Documents taken as a whole shall be binding on the Bidders.

10.11. All bonds, insurance, and other required documents shall be issued in the name of the bidder.

## ARTICLE 11 BID WITHDRAWAL

11.1. Any Bidder may withdraw its Bid before Bid opening by submitting to the **Owner** a document requesting the withdrawal in the manner in which a Bid shall be signed and submitted to the **Owner**. Withdrawal of a Bid before Bid opening will not prejudice the right of that Bidder to submit a new, modified Bid. After the time for receiving Bids has expired, the following will apply: (a) no Bid may be modified, altered, or reformed, except to resolve irregularities on the Bid Form or Bid Form Attachments, as provided in paragraph 14.6, and (b) no Bid withdrawal will be accepted by the **Owner**, except as provided in paragraphs 11.2 through 11.6.

11.2. After the time for receiving Bids has expired, no Bid may be withdrawn, unless that Bidder lodges a written claim of a mathematical or clerical error in the Bidder's Bid with the **Owner** within two (2) Business Days after the date of Bid opening. The claim shall describe in detail the mathematical or clerical error, include a signed affidavit stating the facts of the alleged error and request that the Bidder be released from the Bidder's Bid.

11.3. If any Bidder's claim to withdraw its Bid due to an alleged mathematical or clerical error is timely filed, the **Director-DCD**, or his/her designee, will determine the validity of the claim and, as he/she deems necessary within his/her sole discretion, will provide an opportunity to the Bidder making the withdrawal to present its verification claim at a hearing/review session within ten (10) Calendar Days after the **Owner** received the claim.

11.4. At the Bid withdrawal claim review, the **Director-DCD**, or his/her designee shall, within his/her discretion, informally hear testimony and receive evidence as to whether (a) the Bid contains an obvious mathematical or clerical error not involving lack of good faith or fair dealing, (b) the error is subject to objective certification and is of such grave consequences that to enforce the Contract would be unconscionable, (c) the error relates to a material feature of the Contract, and (d) the error was not caused in any way by the Bidder's violation of positive legal duty or culpable negligence.

11.5. Upon completion of the claim review process and before any award recommendation, the **Director-DCD**, or his/her designee, will enter findings and render a determination on the Bidder's withdrawal claim. The **Owner** will notify the Bidder within a reasonable time after such determination.

11.6. If the **Director-DCD**, or his/her designee, concurs with the Bid withdrawal claim and the **Owner** suffers no serious prejudice, except loss of bargain, the **Owner** will allow the Bidder to withdraw its Bid will return the Bidder's Bid Security within a

reasonable time. However, that Bidder will not be allowed to submit another Bid for the Work. The decision of the **Director-DCD**, or his/her designee, shall be final and binding on any such Bidder.

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## ARTICLE 12 BID OPENING; OBJECTION TO THE AWARD

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12.1. Each Bidder bears sole responsibility to submit their bid electronically through the SIGMA VSS website at <https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>

12.2. Within reasonable time after the date of Bid opening, the **Owner** will make available a "Bid tabulation" listing the Bids opened and the Apparent Low Bidder. If any Bidder listed in the Bid tabulation has any objection to the Apparent Low Bidder, the objecting Bidder shall file a written protest with the **Owner** within seven (7) Calendar Days after the date of Bid opening. The protest shall describe in detail the basis for the protest and request a determination under this Article.

12.3. If a written protest is timely filed, the **Director-DCD**, or his/her designee, will review the protest and if he/she determines in his/her sole discretion that a claim review process is necessary, such proceeding shall be conducted within ten (10) Calendar Days after receipt of the written protest.

12.4. The **Owner** will notify the Bidders involved within a reasonable time of the **Director-DCD's**, or his/her designee's, recommendation to dismiss or uphold the protest. If the protest has been denied, the **Owner** will notify those Bidders of the time and date on which the **Board's** Building Committee will meet to consider the **Director-DCD's**, or his/her designee's recommendation of award. The objecting Bidder and the Apparent Low Bidder will be given an opportunity to be heard at the Building Committee meeting and, at the discretion of the **Board**, at any subsequent **Board** meetings. The Building Committee and **Board**, at its discretion, will review or hear the protest under such terms and conditions as either deems proper.

12.5. Upon reviewing the protest, the Building Committee and/or the **Board** will either (a) dismiss the protest, or (b) uphold the protest and send the Bid back to the **Director-DCD**, or his/her designee, for a new Bid evaluation or rebid, consistent with the determination of the Building Committee or **Board's** findings. The decision of **Board** as to the protest shall be final and binding.

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## ARTICLE 13 BIDS TO REMAIN OPEN

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13.1. Bids shall remain open for acceptance by the **Owner** for no less than the period during which Bids shall remain valid (i.e., the Bid hold period) stated in Section 00030 Advertisement.

13.2. The **Owner**, by written notice, may elect to request the Apparent Low Bidder and any other Bidder remaining or wishing to remain in contention for the award to hold their Bids beyond the Bid hold period. Any such Bidder who fails or refuses to agree to the **Owner**-requested extension may be disqualified for further consideration for the award. However, no such Bidder shall forfeit the Bidder's Bid Security due to its failure or refusal to hold its Bid.

13.3. Any such Bid hold extension request by the **Owner** and consent by any Bidder shall be based upon no increase in (a) the Bidder's Base Bid, (b) any of the Bidder's Alternate Bid Prices, and (c) any Contract Times stated in Calendar Days. However, in the event none of the Bidders involved consent to extending their Bids, as conditioned in this paragraph, the **Owner** will issue a post-Bid Addendum specifying an additional Alternate for the sought extension in the Bid hold period.

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## ARTICLE 14 AWARD OF THE CONTRACT

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14.1 If the Owner elects to award the Contract, the Owner will make the award to the responsive and responsible best value bidder except as provided below relative to veteran's preference.

14.1.1 The Apparent Low Bidders will be evaluated for responsiveness and responsibility based on the following:

- Compliance with the bid specifications and requirements.
- The Bidder's financial resources.
- The Bidder's technical capabilities.
- The Bidder's technical experience.
- The Bidder's past performance.
- The Bidder's insurance and bonding capacity.
- The Bidder's business integrity.

If a qualified disabled veteran meets the requirements of the contract solicitation, provides acceptable responses to both Part One and Part Two of the Best Value Construction Bidder Evaluation to achieve a Best Value recommendation and with the veteran's preference is the lowest responsive, responsible, best value Bidder the Owner will award the contract to the qualified disabled veteran bidder.

A determination as to whether the requirements of the bid solicitation have been met will be based solely on the Owner's and Professional's evaluation of the Section 00300 Bid Form, Bid Form Attachments, Bidder-provided documents, Best Value Evaluation by the PSC, interview, and Bidder Qualification Submittals received in a timely basis. Each bid requesting the Qualified Disabled Veterans (QDV) preference, in accordance with Public Act 22 of 2010, MCL 18.1241.3 shall include a DD 214 Proof of Service and Discharge, a Veterans Administration rating decision letter, proof of disability (if the disability is not indicated on the DD 214), and appropriate legal documents setting forth the 51% natural persons QDV ownership.

The bids will be evaluated for best value based on price and qualitative components by comparing the qualitative components of the three lowest responsive and responsible Bidders. The comparison may also include other Bidders whose bids are within 10% of the lowest responsive and responsible Bidder. Determination of the lowest three Bidders shall be based on the sum of the Base Bid and any additive and deductive Alternates the Owner accepts. Alternates shall be accepted in the order listed in paragraph 6.2 Schedule of Alternates in Section 00300 Bid Form only. The Owner will accept an Alternate only if all other previously listed Alternates are also accepted unless acceptance by the Owner of Alternates in a different order does not affect determination of the lowest three bidders in any way.

Some qualitative components that may be evaluated are:

- Technical approach.
- Quality of proposed personnel.
- Management plans.
- Past performance of any nominated asbestos abatement subcontractor(s).
- ADD ANY OTHER PROJECT SPECIFIC

For contracts under \$250,000, best value will primarily be based on the lowest responsive and responsible bid.

14.1.2. For determining the lowest, responsive, and responsible bid, when a Qualified Disabled Veterans (QDV) preference is requested, 10% of the lowest responsive and responsible bid (the bid that would otherwise receive the contract award if the preference were not being considered) will be deducted from all QDV bids. If the low responsive and responsible QDV bid, less the 10% preference, is less than the lowest responsive and responsible bid, then the QDV bid will be declared the official lowest responsive and responsible bid. The original QDV bid amount will be the basis of the contract award.

14.1.3. Bid irregularities with respect to the Bidding Documents, for which corrective action is not already provided in paragraph 14.6 or elsewhere in the Bidding Documents, may be waived at the sole discretion of the **Owner**, unless the irregularity was due to the Bidder's lack of good faith or fair dealing, or where the waiver would lead to a determination obviously in error or inconsistent with the Bidding Documents.

14.1.4. For Bids over \$100,000.00, Bidders that self-certify to be a Michigan business shall be given a preference over an out of state Bidder in the same manner in which an out-of-state Bidder would be preferred in its home state. Bidders that neither self-certify as a Michigan business in their Bid nor authorize the Michigan Department of Treasury to release information necessary to verify entitlement will be deemed to have waived their right to claim entitlement to any preference.

14.2. No Bidder shall be considered responsible under the requirements of the Bidding Documents, unless that Bidder delivers the information required in paragraph 2.1 that the **Owner** considers necessary to the evaluation of the Bid.

14.3. The following may be considered examples of sufficient grounds for determining that a Bidder is not responsible, or for objecting to any of the Bidder's Subcontractors (even if holding a valid license) or Suppliers: \*(a) being listed on the Michigan Department of Labor's register of employers who have been found in contempt of court by a Federal Court of Appeals for failure to correct an unfair labor practice as prohibited by Section 8 of Chapter 372 of the National Labor Relations Act, 29 U.S.C. 158 (1980 PA No. 278, as amended, MCL 423.321 et seq.); \*(b) being debarred from participation in the bid process pursuant to Section 264 of 1984 PA 431, as amended, MCL 18.1264, or debarred or suspended from consideration for award of contracts by any other State or any federal Agency; (c) a felony conviction in any state (including this State) within the last three (3) years before the date of Bid opening; (d) lack of adequate experience or demonstrated qualifications or capability to perform the trades or classifications of the Work specified in the Bidding Documents; (e) reasonable doubt concerning the ability to maintain adequate construction equipment, quality control, schedule control or financing to meet contractual obligations under the Bidding Documents; (f) a previous termination for cause by the **Owner** within the last five (5) years before Bid opening; (g) failure to comply with all requirements for foreign corporations; (h) concealment, misrepresentation or misstatement of any material facts; or (i) failure to pay any federal, State or local taxes.

14.4 If the Owner, either through the Director-DCD or his/her designee, or the Board, intends to disqualify any Bidder under consideration for award, written notice of the impending disqualification will be provided by the Owner (including reasons for the disqualification) to that Bidder and those Bidders remaining under consideration to the award. If the disqualified Bidder has any

objection to the disqualification that Bidder shall, within two (2) Business Days, file a written protest, as provided in paragraph 12.2, and follow the protest procedures in paragraphs 12.3 through 12.5. The decision of the Board shall be final and binding on the disqualified Bidder.

14.5. Except in circumstances leading to a determination obviously in error or inconsistent with the Bidding Documents, irregularities on any Bid shall be resolved using the rules provided in paragraph 14.6. Except as stated in paragraph 14.6(e), any Bid Form and Bid Form Attachment having any such irregularity shall be modified, altered, or revised to reflect the resolution of the irregularity, however, no Bidder-provided sum or extension shall be modified, altered, or revised and the Bidder's Bid shall be binding on the Bidder and the Bidder's surety, subject to the provisions governing Bid withdrawals stipulated in Article 11.

14.6. The following irregularities on any Bid Form or Bid Form Attachment shall be resolved as follows: (a) between SIGMA entry and signed Bid Summary attachment, the signed Bid Summary attachment will be used; (b) between words and figures, the words shall be used; (c) between any sum, computed by the Bidder, and the correct sum, the sum computed by the Bidder shall be used; (d) between the product, computed by the Bidder, of any quantity and bid unit price and the correct product of the unit price and the quantity of Unit Price Work, the product extended by the Bidder shall be used; (e) between a stipulated Allowance and the amount entered, the Allowance shall be used; (f) any mobilization pay item exceeding the maximum specified shall be ignored and the Bid shall remain unchanged; (g) if any Bidder fails or neglects to bid a unit price for an item of Unit Price Work but shows a "Bid Price" for that item, the missing unit price shall be computed from the respective quantity and the Bid Price shown; (h) if any Bidder fails or neglects to show a "Bid Price" for an item of Unit Price Work but bids a unit price, the missing Bid Price shall remain as "zero"; and (i) if any Bidder fails or neglects to enter a Bid price in both words and figures, the Bid price printed or typed, whether in words or figures, shall be used.

14.7. If there are reasonable grounds for believing that collusion or unlawful agreements exist between any Bidders, that a Bidder is interested in more than one Bid, or that any Bids are not genuine, those Bidders will be disqualified, and their Bids will be rejected without consideration.

14.8. All costs of the Bidder awarded the Contract and that are incurred in responding to requests from the **Owner** or **Professional**, whether or not sufficient, shall neither justify any increase in Contract Price or Contract Time nor provide any basis for subsequent consideration by the **Owner** of a proposal or claim for any increase in Contract Price or Contract Time.

\*14.9. Michigan and Recycled Products – The Bidder awarded the Contract and all Subcontractors and Suppliers shall use (a) Michigan-made products whenever possible where price, quality and performance are equal to or better than non-Michigan products, and (b) supplies, materials and equipment made from Recycled Materials if there is a readily identifiable source or market as determined by the **Director-DCD, or his/her designee**, and the cost does not exceed one hundred ten percent (110%) of supplies, materials or equipment not containing Recycled Materials (Sections 261 and 261a of the Management and Budget Act, 1984 PA 431, as amended, MCL 18.1261 and MCL 18.1261a).

\*14.10. Subcontractor and Supplier Businesses Owned by Minorities, Women and Persons with Physical or Mental Disabilities – Bidders are urged to utilize as Subcontractors and Suppliers, businesses owned by minorities, women, and persons with physical or mental disabilities. For assistance in locating and identifying certified businesses, contact the Michigan Department of Civil Rights, Business and Community Affairs, Cadillac Place, 3054 W. Grand Boulevard, Suite 3-600, Detroit, MI 48202, 1-800-482-3604.

\*14.11. Unfair Labor Practice - Bidders who have been found in contempt of court by a Federal Court of Appeals on not less than three occasions involving different violations during the preceding seven (7) years for failure to correct an unfair labor practice prohibited by Section 8 of Chapter 372 of the National Labor Relations Act, 29 U.S.C. 158 are not eligible to be awarded the Contract. A register of employers in violation of this requirement is compiled by the Michigan Department of Energy, Labor and Economic Growth pursuant to 1980 PA 278, MCL 423.321 et seq. Further, the Bidder awarded the Contract shall not use any Subcontractors or Suppliers on the Work whose name appears on the register. According to Section 4 of 1980 PA 278, any contract entered into by the State may be declared void and rescinded to the extent the Bidder awarded the Contract or any Subcontractor, manufacturer, or Supplier awarded Work under the Contract subsequently appears in the register compiled by the Department of Consumer and Industry Services.

\*14.12. Nondiscrimination – The Bidder awarded the Contract, and each Subcontractor and Supplier awarded a Sub agreement covenants that it will comply with the nondiscrimination requirements described in paragraphs 7.12.1 through 7.12.3 of Section 00700 General Conditions.

\*14.12.1. A breach of the covenants set forth in paragraph 7.12 of Section 00700 General Conditions shall be regarded as a material breach of the Contract.

\*14.12.2. The Bidder awarded the Contract shall include or incorporate by reference paragraph 14.12.1 (above) and the provisions of paragraphs 7.12.1 through 7.12.3 of Section 00700 General Conditions in every Sub agreement, unless exempted by rules, regulations, or orders of the Michigan Civil Rights Commission. Each Sub agreement shall provide that those provisions shall be binding upon the Subcontractor or Supplier.

\*14.13. Bidders are further directed to Article 7 of Section 00700 General Conditions for terms and conditions concerning the following Michigan legal requirements applicable to this Contract: (a) Laws and permits, paragraph 7.1, (b) taxes, paragraph 7.2, (c) safety and protection, paragraph 7.3, (d) unfair labor practice, paragraph 7.10, (e) Michigan Right-to-Know Law, paragraph 7.11, and (f) Michigan residency for employees, paragraph 7.13.

## ARTICLE 15 EXECUTION OF THE AGREEMENT

15.1. Upon acceptance of a Bid for the Work by the **Board** or by the **Director** of the **Department** of Technology, Management and Budget, the **Director-DCD** or his/her designate will send the Notice of Award to the Bidder awarded the Contract. The Notice of Award will (a) designate the Contract Price and itemize the Alternates that the **Owner**, in its sole discretion, has accepted, (b) enclose completed, unsigned Section 00500 Agreement forms and blank Section 00610 Performance and Section 00620 Payment Bond forms, and (c) outline the procedures to be followed and information to be provided by the **Contractor** for execution of Section 00500 Agreement.

15.2. Unless otherwise designated in the Notice of Award, within fifteen (15) Calendar Days after receipt of the Notice of Award, the Bidder recommended for award shall (a) sign Section 00500 Agreement; (b) execute Section 00610 Performance Bond and Section 00620 Payment Bond (and attach to each Bond separate, certified copy of Power of Attorney); and (c) return to the Owner the executed Section 00500 Agreement, Section 00610 Performance Bond and Section 00620 Payment Bond forms, evidence of original certificates of insurance and any other documents required for submission by the Notice of Award.

15.3. Evidence of insurance shall consist of certificates of insurance confirming that the policies of insurance that the **Contractor** has obtained, including the limits of coverage and endorsements provided, are in compliance with the insurance requirements specified in paragraphs 7.4 through 7.7 of Section 00700 General Conditions. Certificates of insurance shall contain a statement confirming that coverage will not be canceled, adversely changed or renewal refused until at least thirty (30) Calendar Days' prior written notice has been delivered or mailed to the **Owner** and **Contractor**.

15.4. The **Owner** will execute the Section 00500 Agreement retain one hard copy and compile a complete electronic copy of the Contract Documents upon two conditions: (a) receipt of the executed Section 00500 Agreement, Section 00610 Performance Bond and Section 00620 Payment Bond (with each Bond enclosing a separate certified copy of Power of Attorney and a separate certificate of principal) and evidence of insurance; and (b) a determination by the **Owner** that the Section 00610 Performance Bond and Section 00620 Payment Bond, required certifications and evidence of insurance received conform to the requirements of the Contract Documents and are acceptable to the **Owner**.

15.5. Each full set of the executed Contract Documents shall consist of: (a) two (2) or more volumes containing the executed Agreement (conformed Section 00500); executed Performance and Payment Bond and certifications (conformed Section 00610 and Section 00620); the **Contractor's** Bid Form and Non-Collusion Affidavit (conformed Sections 00300 and 00320); and the remainder of the Bidding Documents, including Addenda; and (b) a separate volume with Qualification Submittals submitted by the **Contractor** that the **Owner**, in its sole discretion, chooses to include as part of the Contract Documents. The **Contractor** will receive one full set of the executed Contract Documents.

15.6. Bid prices in the "Schedule of Change Order Prices" on the **Contractor's** Bid Form accepted by the **Owner** upon evaluation of the **Contractor's** Bid will be incorporated into the Contract as provided in paragraph 3.2 of Section 00500 Agreement.

15.7. The Notice to Proceed shall be authorized by the **Director-DCD** or his/her designee. Subject to the provisions of Article 13 and compliance with paragraphs 15.2 through 15.4, the Notice to Proceed shall designate a Date of Commencement of the Contract Time no later than sixty (60) Calendar Days after the date ending the Bid hold period, or thirty (30) Calendar Days after receipt by the **Owner** of the executed Section 00500 Agreement and acceptable, executed Section 00610 Performance Bond and Section 00620 Payment Bond, whichever last occurs, unless otherwise directed in writing by the **Owner**.

15.8. Within fifteen (15) Calendar Days after receiving the Notice to Proceed, the **Contractor** shall submit to the **Owner** any additional Change Order cost and pricing data requested with the Notice to Proceed. The **Contractor's** submittal shall be itemized in a breakdown acceptable to the **Owner**, and shall be certified as accurate, current, and complete by a duly authorized financial representative of the **Contractor**. The **Contractor** shall meet with the **Owner** to review the cost and pricing data submittal. The **Owner** shall incorporate into the Contract Documents any acceptable cost and pricing data by Change Authorization issued within a reasonable time after the Notice to Proceed.

## ARTICLE 16 MOBILIZATION PAY ITEM

16.1. The mobilization pay item, if designated in the Specifications and/or the Bid Schedule in Section 00300 Bid Form, shall be intended to cover, at least in part, up-front costs incurred by the **Contractor** from Contract Award until sixty (60) Calendar Days after the **Contractor** starts the Work. Allowable mobilization items shall be as itemized in the Schedule of Values approved by the **Professional**, and may include costs incurred by the **Contractor** (a) in establishing temporary site offices and other facilities specified

in the Specifications, (b) in obtaining permits required to commence the Work, (c) for premiums for the required Section 00610 Performance Bond and Section 00620 Payment Bond, (d) for insurance obtained by the **Contractor** to comply with the requirements of the Contract Documents, and (e) in complying with the Revision 0 Schedule and Cost Submittal requirements.

16.2. Total payments to the **Contractor** under the mobilization pay item shall not exceed four percent (4%) of the Base Bid, unless otherwise expressly provided in the Bidding Documents. If the **Contractor** incurs costs, which the **Contractor** considers within the scope of the mobilization pay item, more than the four percent (4%) limitation, those excess costs will not be reimbursed under the mobilization pay item and will be deemed to have been included in other parts of the **Contractor's** Bid.

16.3. To the extent practicable, the basis of measurement for payment shall be proof of actual payment by the **Contractor**. Where actual payment by the **Contractor** does not apply, as in the case of premiums for the Section 00610 Performance Bond, the Section 00620 Payment Bond and the insurance policies the **Contractor** is required to furnish under the provisions of Article 15, or in connection with the **Contractor** costs to comply with the Revision 0 Progress Schedule and Cost Submittal requirements of the Contract Documents, the basis of measurement for payment shall be as stipulated in the Schedule of Values approved by the **Professional**. Payments to the **Contractor** shall be based on the requirements of the Bidding Documents, subject to the following:

16.3.1. Approval by the **Professional** of the Schedule of Values (required by paragraph 12.1 of Section 00700 General Conditions) shall be a condition precedent to making any payment under the mobilization pay item. Partial payments shall be based on the breakdown itemized in the Schedule of Values and the extent of completion, as determined by the **Professional**.

16.3.2. Full payment of the amount corresponding to the Revision 0 Schedule and Cost Submittals shall be paid by with the Request for Payment following return to the **Contractor** of the Revision 0 Submittal, or Revision 0A Submittal (i.e., first resubmission), Revision 0B Submittal (i.e., second resubmission), etc. of the Progress Schedule marked "Resubmittal Not Required."

## ARTICLE 17 SOIL EROSION AND SEDIMENTATION CONTROL —FINE FOR NON-COMPLIANCE

17.1. All Work within this Contract must comply with the applicable soil erosion and sedimentation control rules and regulations (Soil Erosion and Sedimentation Control – 1994 PA 451, Part 91, as amended, MCL 324.9101 et seq.) and specific provisions for same within the Contract Documents. Soil erosion and sedimentation control will be monitored and enforced by the Department of Technology, Management and Budget, **State Facilities Administration**.

17.2. Soil erosion and sedimentation control on **Department** Projects will be monitored and enforced by **State Facilities Administration** through the review of **Contractor** implementation plans and site inspections by Soil Erosion and Sedimentation Control Unit personnel and/or **State Facilities Administration** Representative.

17.2.1. In the event, the **Owner** determines through site inspections by the **State Facilities Administration** Representative or by notification by regulatory authorities that the **Contractor** has not met the soil erosion requirements of the Project and/or is in violation of the applicable soil erosion and sedimentation control statutes, the **Contractor** shall be notified in writing and stop work orders may be issued by **State Facilities Administration** in conjunction with paragraph 2.3 of Section 00700 General Conditions.

17.3. In the event, the **Owner** determines through site inspections by the **State Facilities Administration** Representative or by notification by regulatory authorities that the **Contractor** has not met the soil erosion requirements of the Project and/or is in violation of the applicable soil erosion and sedimentation control statutes, the **Contractor** shall be notified in writing and corrective actions undertaken by **State Facilities Administration** in conjunction with paragraph 9.4 of Section 00700 General Conditions.

17.4. In the event, the **Contractor** fails to respond to written notice from **State Facilities Administration** regarding noncompliance with the provisions of the Contract Documents and/or soil erosion and sedimentation control regulations applicable to this Work, **State Facilities Administration** has the right to assess a fine to the **Contractor**. Fines shall be in addition to any other remediation costs or liquidated damages applicable to the Project and may exceed the value of the Contract.

END OF SECTION 00100



**ATTACHMENT A TO SECTION 00100 – BIDDER'S CHECK LIST****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. – 751/24078.SMD

**BEFORE BID OPENING:**

9/3/2025 – Due date for delivery to the **Professional** of written proposals seeking to have the **Professional** consent to naming additional materials or equipment by Addenda. (Reference: Section 00100, Paragraph 7.2).

9/3/2025 – Bidder inquiries received after this date will not be answered, unless answered through Addenda issued at least seventy-two (72) hours before Bid opening (Business Days only), the Bid opening is postponed by Addendum, or the Work is rebid following post-Bid Addenda. (Reference: Section 00100, paragraph 4.1).

**CONTENTS SHALL BE UPLOADED AS A PDF DOCUMENT TO/THROUGH SIGMA VSS (ITEMS 1 THROUGH 5.5 BELOW):**

**NOTE 1: THE BIDDER SHALL USE THE BID SUMMARY, BID FORM AND BID FORM ATTACHMENTS INCLUDED WITH THE BIDDING DOCUMENTS, UNLESS REVISED BY ADDENDUM, IN WHICH CASE THE LATEST REVISION OF THE BID SUMMARY, BID FORM AND/OR BID FORM ATTACHMENTS ISSUED BY ADDENDUM SHALL BE USED.**

**NOTE 2: THE BIDDER IS NOT REQUIRED TO INCLUDE THE PROJECT MANUAL OR DRAWINGS IN THE PDF BID DOCUMENT PACKAGE UPLOADED TO SIGMA VSS, ONLY THE COMPLETED BID SUMMARY, BID FORM AND BID FORM ATTACHMENTS!**

- ☐ 1. Completed Bid Summary provided with Section 00300 Bid Form.
- ☐ 2. Completed Section 00300 Bid Form, which requires (a) completing the acknowledgment of Addenda in paragraph 2.1, (b) filling out Article 6 Bid Schedule and, if any prices are designated, completing Article 7 Change Order Prices, and (c) completing Article 8, that is, entering the date the Bid is submitted, completing paragraphs 8.1 through 8.4, and, if the Bidder is a joint venture, paragraph 8.5, and signing, as appropriate, in the spaces provided.
- ☐ 2.1 Completed Certificate of Principal or other equivalent acceptable certificate or authorization document, which certificate shall be attached to the completed Section 00300 Bid Form.
- ☐ 3. If the Bid includes a Bid Bond, ensure that the surety is authorized to do business in the State by the Department of Licensing and Regulatory Affairs – Insurance Bureau and is listed on the current U.S. Department of the Treasury Circular 570. Also, ensure that the completed Section 00310 Bid Bond is dated, is signed by both the Bidder and surety, and attaches Power of Attorney. If the Bid includes a certified or cashier's check or money order, that check, or money order shall be delivered in original copy before the Bid Due Time to:

State Facilities Administration  
Design & Construction Division  
3111 W. St. Joseph Street  
Lansing, Michigan 48917

*All other Bid information must be submitted via SIGMA as per standard bidding procedure.*

- ☐ 4. Completed Section 00320 Non-collusion Affidavit and if applicable, completed Section 00330 Asbestos Abatement Attestation.
- ☐ 5. Qualified Disabled Veterans Preference Documentation (if preference requested).
- ☐ 5.1 DD 214 – Proof of Service/Discharge.
- ☐ 5.2 Veterans Administration Rating Decision Letter – Proof of Disability, if not indicated in the DD 214.
- ☐ 5.3 Legal Proof of 51% QDV Ownership
- ☐ 5.4 Byrd Anti-Lobbying Certification (Only when Federal Provisions Addendum is included)
- ☐ 5.5 State Project Registration (SPR) for the Contractor and subcontractors (if applicable pursuant to 2023 PA 10, as amended, MCL 408.1101 et seq.)

This Bidder's Check List is provided solely to aid the Bidder in submitting a Bid. It shall not be relied on to include all items necessary to insure a complete Bid. The Bidder is solely responsible for including all items as required by the Bidding Documents, including any items required by Addenda, which may not be listed in this Bidder's Check List.

**END OF ATTACHMENT A TO SECTION 00100**

**SECTION 00120 – SUPPLEMENTARY INSTRUCTIONS****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. – 751/24078.SMD

The provisions of this Section 00120 Supplementary Instructions amend or supplement Section 00100 Instructions to Bidders and those other provisions of the Bidding Requirements that are indicated below. All other Bidding Requirements that are not so amended or supplemented remain in full force and effect.

**Modify Specification Section 00700 Paragraph 4.6.2 to add the following paragraphs:**

Final Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
  - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
  - e. Remove snow and ice to provide safe access to building.
  - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - h. Sweep concrete floors broom clean in unoccupied spaces.
  - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
  - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - k. Remove labels that are not permanent.
  - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
  - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grilles.
  - q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
    - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.

- r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- s. Leave Project clean and ready for occupancy.

**END OF SECTION 00120**

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**SECTION 00210 INFORMATION FOR BIDDERS**

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**PROFESSIONAL** – G.H. Forbes Associates Architects  
**WORK** – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements  
**FILE No.** – 751/24078.SMD

---

**1.0 RELATED PROVISIONS**

1.1. Paragraphs 3.4 through 3.7 of Section 00100 Instructions to Bidders, which contain terms and conditions governing the information made available to Bidders in this Section, are made part of this Section 00210 Information for Bidders by this reference.

**2.0 SUBSURFACE CONDITIONS**

2.1. The reports of explorations and tests of subsurface conditions itemized immediately below have been used by the **Professional** in the preparation of the Bidding Documents.

NA

2.1.1. Information or data contained in those reports that may be properly considered Authorized Technical Data concerning subsurface conditions include (NOTE: All other information or data excluded from the list below represent Non-Technical Information or Data, interpretations, or opinions):

NA

2.2. The reports of explorations and tests of subsurface conditions itemized immediately below have not been used by the **Professional** in the preparation of the Bidding Documents. Those reports are available at the office of the **Professional** for review or purchase. Neither the **Owner** nor **Professional** warrants that this list identifies all existing relevant documents.

**3.0 OTHER PHYSICAL CONDITIONS**

3.1. The Drawings and technical Specifications and those drawings itemized immediately below contain information or data that have been used by the **Professional** in the preparation of the Bidding Documents, and that may be properly considered Authorized Technical Data concerning physical conditions of existing surface and subsurface facilities.

NA

3.2. The reference documents itemized immediately below have not been used by the **Professional** in the preparation of the Bidding Documents and are available at the office of the **Professional** for review or purchase. Information and data contained in those reference documents, including, but not limited to dimensions, locations and conditions of existing surface and subsurface structures, roadways, piping, raceways, equipment, etc. may not accurately or reliably reflect actual conditions. Neither the **Owner** nor **Professional** warrants that this list identifies all existing relevant documents.

NA

**4.0 UNDERGROUND UTILITIES**

4.1. Information or data about physical conditions of existing Underground Utilities, that have been used by the **Professional** in the preparation of the Bidding Documents, is shown or indicated in the Drawings and technical Specifications and those Underground Utility drawings itemized immediately below.

NA

**5.0 PERMITS, APPROVALS, LICENSES AND FEES**

5.1. To the extent that the **Owner** has secured or will secure any permits, approvals and licenses and has paid or will pay any associated charges and fees, any such permits, approvals and licenses are itemized in this paragraph.

NA

5.2. In the event any permits, approvals and licenses itemized in paragraph 5.1 have been obtained by the **Owner** and the fees have been paid, copies of those permits, approvals, licenses, and corresponding fee receipts, will be attached by the **Professional** as a PDF copy with the SIGMA posting or will otherwise be made available for contractor to download.

5.3. Except for any permits, approvals, licenses, and fees identified in paragraph 5.1, the **Contractor** shall be responsible for all permits, approvals, licenses, and fees applicable to Work.

**6.0 SEQUENCING REQUIREMENTS**

6.1. Refer to the technical Specifications, including, but not limited to the General Requirements, for information, data, and criteria on sequences of Work restraints, constructability, and maintenance of service to existing facilities, which, if provided, shall govern the selection of Work sequences.

6.2. Each Bidder shall be responsible for any conclusions or interpretations the Bidder makes related to the selection of sequences and Means and Methods, based on the technical data made available, and/or those additional investigations or studies made or obtained by that Bidder.

**END OF SECTION 00210**

## SECTION 00300 – BID SUMMARY

## BID SUMMARY

### DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET

STATE FACILITIES ADMINISTRATION  
DESIGN AND CONSTRUCTION DIVISION  
3111 W. St. Joseph Street  
Lansing, Michigan 48917

Bids **must** be submitted electronically through the SIGMA VSS website at  
<https://sigma.michigan.gov/webapp/PRDVSS2X1/AltSelfService>

|                                                                                                                                                                                                                                                                                              |                                                                                 |                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--|
| FILE NUMBER<br>751/24078.SMD                                                                                                                                                                                                                                                                 | DEPARTMENT/AGENCY<br>Department of Technology, Management, and Budget           |                                                                                                                                  |  |
| CONTRACT TIME(S)<br>150 calendar days                                                                                                                                                                                                                                                        | PROJECT NAME<br>Belle Isle Athletic Shelter HVAC & Fire Protection Improvements | LOCATION<br>330 Vista Ave, Detroit MI 48207                                                                                      |  |
| BID OPENING DATE<br><br>September 17, 2025                                                                                                                                                                                                                                                   |                                                                                 | FOR AN EXAMINATION OF THE SITE CONTACT:<br><br>at 2:00 pm ET<br><br>Amanda Treadwell, (313) 269-7430,<br>treadwella@michigan.gov |  |
| SEE SECTION 00100 INSTRUCTIONS TO BIDDERS AND SECTION 00700 GENERAL CONDITIONS PROVIDED WITH THE BIDDING DOCUMENTS.<br><b>BID: WE PROPOSE TO FURNISH, PERFORM AND COMPLETE THE ENTIRE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS IN CONSIDERATION OF THE BID PRICE (S) STATED BELOW.</b> |                                                                                 |                                                                                                                                  |  |
| FIRM NAME AND COMPLETE ADDRESS                                                                                                                                                                                                                                                               |                                                                                 | TELEPHONE NUMBER and E-MAIL ADDRESS                                                                                              |  |
| <input type="checkbox"/> Qualified Disabled Veteran<br><br>BIDDER'S SIGNATURE AND TITLE _____ DATE _____                                                                                                                                                                                     |                                                                                 | <b>SIGMA VENDOR NUMBER</b><br><br><small>(protected information required for processing payments)</small>                        |  |
|                                                                                                                                                                                                                                                                                              |                                                                                 | WITNESS' SIGNATURE _____ DATE _____                                                                                              |  |

By signing this bid above, bidder certifies their enclosed Qualified Disabled Veteran and Michigan-Based Business Certifications.

**BASE BID FROM BID SCHEDULE** (Include specified Allowance of \$100,000):

|                                                                                                |                                  |
|------------------------------------------------------------------------------------------------|----------------------------------|
| (use words)                                                                                    | Dollars \$ _____<br>(in figures) |
| Alternate1: (Add) <u>Add a new transformer in lieu of solar fixtures at the Handball Court</u> | Dollars \$ _____<br>(in figures) |
| (use words)                                                                                    | (in figures)                     |
| Alternate 2: (Add/Subtract) _____                                                              | Dollars \$ _____<br>(in figures) |
| (use words)                                                                                    | (in figures)                     |
| Alternate 3: (Add/Subtract) _____                                                              | Dollars \$ _____<br>(in figures) |
| (use words)                                                                                    | (in figures)                     |

A PERFORMANCE BOND AND A PAYMENT BOND ARE REQUIRED FOR ALL BIDS OVER \$50,000.00. EACH BID MUST BE ACCOMPANIED BY A FIVE (5) PERCENT BID GUARANTEE. BUILDERS RISK INSURANCE IS REQUIRED TO BE PROVIDED BY THE CONTRACTOR UNLESS OTHERWISE INDICATED IN THE BID DOCUMENTS.

BIDDERS ARE ALSO CAUTIONED TO FAMILIARIZE THEMSELVES WITH ALL OF THE OTHER CONDITIONS OF THE CONTRACT.

Project Scope of Work:

THIS PROJECT INCLUDES ADDING NEW FURNACES AND A HOT WATER HEATER. A COMPLETE FIRE ALARM AND FIRE SUPPRESSION SYSTEM THROUGHOUT THE FIRST AND SECOND FLOOR WILL BE ADDED. LIMITED CEILING, PAINTING AND LIGHTING CHANGES ON THE FIRST FLOOR.

The Bidder must figure its Base Bid on the specified, or Addendum-approved, materials and equipment **only**. No "or equal" or substitution proposals will be permitted after Bid opening, except as provided in the General Conditions.

Addenda: Bidder acknowledges receipt of Addenda: No. \_\_\_\_ dated: \_\_\_\_\_, No. \_\_\_\_ dated: \_\_\_\_\_ No. \_\_\_\_ dated: \_\_\_\_\_

## SECTION 00300 BID FORM

**PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

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### ARTICLE 1 THIS BID IS SUBMITTED TO THE STATE OF MICHIGAN ("the Owner").

1.1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the **Owner** on the form in Section 00500 Agreement and to furnish and perform the Work as specified or indicated in the Bidding Documents for the Bid prices in the "Bid Schedule" on this Section 00300 Bid Form, within the Contract Times specified in Section 00500 Agreement, and in accordance with all other provisions and terms and conditions of the Bidding Documents, including, without limitation, those dealing with the disposition of the Bid Security.

1.2. The undersigned Bidder agrees to hold this Bid open for acceptance by the **Owner** for the period specified in Article 9 of Section 00030 Advertisement.

### STATE OF MICHIGAN MODEL

Developed from FORMSPEC™ Michigan Model

1.3. The Bidder will provide a signed original of Section 00500 Agreement, the executed Section 00610 Performance Bond, the executed Section 00620 Payment Bond, and appropriate evidence of insurance within the times and in the manner specified in the Bidding Documents.

**ARTICLE 2 THE BIDDER'S REPRESENTATIONS**

---

2.1. The Bidder has examined the Bidding Documents, including the Addenda acknowledged in the table below. The Bidder has verified that the Addenda acknowledged below include all issued Addenda. Except for Addenda, which solely revise the date of Bid, opening, failure by the Bidder to acknowledge receipt of all Addenda correctly, by either failing to complete or incorrectly completing the table below, shall justify the Owner's refusal to read the Bid and automatically disqualify the Bidder from any consideration for award of the Contract.



|                      |                      |                      |
|----------------------|----------------------|----------------------|
| No. ____ Dated _____ | No. ____ Dated _____ | No. ____ Dated _____ |
| No. ____ Dated _____ | No. ____ Dated _____ | No. ____ Dated _____ |
| No. ____ Dated _____ | No. ____ Dated _____ | No. ____ Dated _____ |

2.2. The Bidder has taken those steps that are reasonably necessary to (a) ascertain and become familiar with the Work, site, and locality; (b) account for all applicable federal, state, and other local Laws and all general, local, and prevailing conditions that may in any manner affect cost, schedule, progress, performance or furnishing of the Work; and (c) study and account for the terms and conditions of the Bidding Documents. The Bidder has carefully correlated the Bidder's observations with the Bidding Documents.

2.3. The Bidder has studied carefully all reports concerning subsurface conditions and drawings of physical conditions of existing surface and subsurface facilities that have been used by the **Professional** and all documents of physical conditions of existing Underground Utilities facilities that have been used by the **Professional** – in both cases as identified in Section 00210 Information for bidders. The Bidder assumes responsibility for carefully and accurately locating existing Underground Utilities in a manner consistent with paragraph 10.3 of Section 00700 General Conditions and as required by 2013 PA 174, as amended, MCL 460.721 et seq. The Bidder accepts the determinations set forth in the Bidding Documents as to the extent of such Authorized Technical Data and Underground Utilities information and data contained in those reports, drawings, documents, or the Bidding Documents, as applicable, upon which the Bidder may rely.

2.4. To the extent Additional Technical Data has been considered by the Bidder as necessary for determining the Bid in Article 6 Bid Schedule, and the **Owner**, upon request, did not have the necessary Additional Technical Data, the Bidder assumes responsibility for having undertaken or undertaking reasonable examinations of the site and any other pertinent available information and data. The Bidder agrees to perform and furnish the Work affected by the conditions involved, at no increase in Contract Price and Contract Time, to the extent the information and data necessary for determining the Bid could have been discovered through reasonable examinations of the site and any other pertinent information and data available (including, but not limited to the information and data designated in Section 00210 Information for Bidders).

2.5. The Bidder has carefully correlated the results of its observations, examinations, and studies of those reports of explorations and all that information and data in studies, drawings, and specifications, referred to in paragraphs 2.3 and 2.4, with the terms and conditions of the Bidding Documents.

2.6. The Bidder has examined all information and data shown or indicated in the Bidding Documents concerning other work, including, but not limited to provisions in Section 00700 General Conditions. The Bidder assumes responsibility for all reasonably foreseeable terms, conditions and consequences resulting from other work that may in any manner affect cost, schedule, progress, performance or furnishing of the Work.

2.7. The Bidder has carefully examined the terms and conditions of the Bidding Documents concerning Delay, Activity Float times and early completion. The Bidder agrees that increases in Contract Price and/or Contract Time for Delay shall be as provided in Section 00700 General Conditions. The Bidder has correlated those terms and conditions with the Bidder's schedule for the Work and its Base Bid and Alternates.

2.8. The Bidder represents that each unit price covering Specified or Contingent Unit Price Work, whether bid on Article 6 – Bid Schedule or on Article 7 – Schedule of Change Order Prices, includes sufficient amounts to cover (a) all labor costs, Subcontractor costs, material and equipment costs, construction equipment costs and general conditions costs, and (b) all administrative costs and home office overhead), and (c) profit. The **Owner** reserves the right to reject any unit prices bid on paragraph 6.2 Schedule of Alternates or in Article 7 Schedule of Change Order Prices, which, in the **Owner's** sole discretion, are not in the **Owner's** best interest.

2.9. The Bidder has given the **Professional** written notice of all conflicts, ambiguities, errors, or omissions the Bidder has discovered in the Bidding Documents, and the written resolution given by the **Professional** is acceptable to the Bidder.

2.10. This Bid is genuine, is not made in the interest of or on behalf of any undisclosed person and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation. To induce the **Owner** into consideration of this Bid, the Bidder reiterates and makes each of the representations made by the Bidder in Section 00320 Non-collusion Affidavit attached to this Section 00300 Bid Form.

2.11. The Bidder is aware of the **Owner's** requirements for business owned by minorities, women, and persons with physical or mental disabilities, and assumes responsibility for all conditions and consequences that may result from meeting those requirements and that may in any manner affect cost, schedule, progress, performance and furnishing of the Work.

2.12. The Bidder has read and studied each provision of the Bidding Documents. The Bidder has no expectations different from the terms and conditions of the Bidding Documents.

2.13. The Bidder is aware of the **Owner's** requirements for asbestos abatement projects pursuant to PA 59 of 2024, MCL 338.3371 et seq. and the APPENDIX II – ASBESTOS ABATEMENT PROJECT PROCEDURES as part of and in conjunction with all other contract requirements and assumes responsibility for all conditions and consequences that may result from meeting those requirements and that may in any manner affect cost, schedule, progress, performance and furnishing of the Work.

---

**ARTICLE 3 TIME OF COMPLETION**

---

3.1. The Contract Times are specified in paragraph 4.1 of Section 00500 Agreement. The Bidder has carefully correlated the provisions in paragraph 4.1 of Section 00500 Agreement with the other terms and conditions of the Bidding Documents and unequivocally accepts the Contract Times for the Work, and any other designated parts of the Work, as specified.

3.2. The Bidder unequivocally accepts the liquidated damage provisions specified in paragraph 4.2 of Section 00500 Agreement in the event of any failure, neglect, or refusal to complete the Work, or designated part of the Work, within the corresponding Contract Times specified in paragraph 4.1 of Section 00500 Agreement.

---

**ARTICLE 4 ATTACHMENTS INCLUDED WITH THIS BID**

---

4.1. Attachments to this Section 00300 Bid Form and made a condition of this Bid are:

4.1.1. Evidence of Authority to Sign the Bid.

4.1.2. Section 00310 Bid Bond, with the attached certified copy of Power of Attorney, or

Alternate Bid Security.

4.1.3. Section 00320 Non-collusion Affidavit, and if applicable, Section 00330 Asbestos Abatement Attestation.

***TO BE PROVIDED POST BID WITH SECTION 00400 SUBMITTALS:***

4.1.5 Current EMR Rating

4.1.6 Identification of the proposed project superintendent with a resume or list of similar projects handled by that individual.

4.1.7 A list of at least three (3) projects completed within the last three (3) years of similar size and complexity, with contact information for references for each.

4.2. Bidder-provided documents, made a condition of this Bid, are as required in the following Section(s) of the Bidding Documents:

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**ARTICLE 5 DEFINED TERMS**

---

5.1. Section 00020 Glossary assigns specific intent and meanings to capitalized terms and to other defined terms used in (a) this Section 00300 Bid Form, (b) Section 00310 Bid Bond and Section 00320 Non-collusion Affidavit, and (c) Section 00410 Bid Breakdown, Section 00420 Questionnaire, Section 00430 List of Subcontractors and Section 00440 Schedule of Materials and Equipment.

**ARTICLE 6 BID SCHEDULE**

**6.1 Base Bid Schedule** - The Bidder will complete the Work and accept in full payment, for the Work items listed, the following unit prices and/or Bid Prices, as applicable:

| Base Bid Item No.                                                            | Bid Quantity | Description      | Unit Price | Item Bid Price |
|------------------------------------------------------------------------------|--------------|------------------|------------|----------------|
| MOBILIZATION                                                                 |              |                  |            |                |
| DEMOLITION                                                                   |              |                  |            |                |
| CONCRETE                                                                     |              |                  |            |                |
| MASONRY                                                                      |              |                  |            |                |
| METALS                                                                       |              |                  |            |                |
| SEALANTS & INSULATION                                                        |              |                  |            |                |
| OPENINGS                                                                     |              |                  |            |                |
| FINISHES                                                                     |              |                  |            |                |
| MECHANICAL                                                                   |              |                  |            |                |
| FIRE SUPPRESSION                                                             |              |                  |            |                |
| PLUMBING                                                                     |              |                  |            |                |
| HVAC                                                                         |              |                  |            |                |
| ELECTRICAL                                                                   |              |                  |            |                |
| FIRE ALARM                                                                   |              |                  |            |                |
| HANDBALL COURT ELEC                                                          |              |                  |            |                |
| BALANCE OF PROJECT                                                           |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              |                  |            |                |
|                                                                              |              | ALLOWANCE AMOUNT |            | \$100,000      |
|                                                                              |              |                  |            |                |
| TOTAL (This amount should equal the Base Bid amount on the Bid Summary Form) |              |                  |            | \$             |

**Base Bid** (Sum of Bid Prices for all Base Bid Items):

\_\_\_\_\_ Dollars and No/Cents \$ \_\_\_\_\_  
 (use words) (in figures)

Name of the Bidder \_\_\_\_\_ File No. \_\_\_\_\_

Date \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

Telephone No. \_\_\_\_\_

**6.2 Schedule of Alternates** - The Bidder will complete (or deduct from the Contract) the parts of the Work designated by the Alternates that follow and accept in full payment (or allow in full credit) for those parts of the Work the following Bid Prices:

| Alternate Item No. | Bid Quantity | Description                                                           | Unit Price | Item Bid Price |
|--------------------|--------------|-----------------------------------------------------------------------|------------|----------------|
| 1                  |              | Add a new transformer in lieu of solar fixtures at the Handball Court |            |                |
|                    |              |                                                                       |            |                |
|                    |              |                                                                       |            |                |
|                    |              |                                                                       |            |                |
|                    |              |                                                                       |            |                |
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|                    |              |                                                                       |            |                |
|                    |              |                                                                       |            |                |
|                    |              |                                                                       |            |                |

The Bidder further acknowledges and agrees that the separate prices bid on this "Schedule of Alternates," where they are applicable and deemed acceptable by the **Owner**, will be used if incorporated into the Contract when the **Owner** issues the Notice of Award.

Name of the Bidder \_\_\_\_\_ File No. \_\_\_\_\_

Date \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

Telephone No. \_\_\_\_\_

**ARTICLE 7 SCHEDULE OF CHANGE ORDER PRICES**

7.1 The Bidder shall use this "Schedule of Change Order Prices" to propose contingent prices. The proposed contingent Change Order prices set forth in this schedule, at the sole discretion of the **Owner**, may, or may not be incorporated into the Contract Documents. The **Owner** reserves the right to negotiate contingent Change Order prices set forth herein prior to their possible incorporation into the Contract Documents. Proposed Change Order prices will not affect determination of the lowest Bid.

7.2 Subject to their incorporation into the Contract Documents, as provided in the Agreement, the Bidder will add to, or deduct from, the Contract Work covered by the contingent prices that follow and accept in full payment, or allow in full credit, for that Work (a) those prices bid by the Bidder, or (b) if a particular price is not bid, the price proposed by the **Owner** (and shown in the appropriate column):

| Item No. | Bid Quantity | Description | Unit Price | Item Bid Price |
|----------|--------------|-------------|------------|----------------|
|          |              |             |            |                |
|          |              |             |            |                |
|          |              |             |            |                |
|          |              |             |            |                |
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|          |              |             |            |                |
|          |              |             |            |                |

Name of the Bidder \_\_\_\_\_

File No. \_\_\_\_\_

Date \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

Telephone No. \_\_\_\_\_

**ARTICLE 8 BID SUBMITTED ON the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.**

**8.1. Bid Security** is in the form of a Bid Bond \_\_\_\_\_ Bid Bond form provided in Section 00310 has been duly executed \_\_\_\_\_; or

*A Certified or Cashier's check \_\_\_\_ or Money Order \_\_\_\_ if a check or money order is provided as Bid Security, the original check/money order must be delivered before Bid Due Time to the issuing office as per Section 00100 paragraph 5.2 and Section 00110 item 3.*

**8.2. If the Bidder is an Individual:**

Name of Individual: \_\_\_\_\_

Name & Title of Person

Authorized to sign: \_\_\_\_\_

Signature: \_\_\_\_\_  
(If not the Individual, Attach Power of Attorney) Date

Doing Business as: \_\_\_\_\_

Business Address: \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

County of registration \_\_\_\_\_

Telephone: \_\_\_\_\_ FAX: \_\_\_\_\_

**8.3. If the Bidder is a Partnership:**

By: \_\_\_\_\_  
(True Name of the Partnership)

Partner Authorized to Sign Date

Signature: \_\_\_\_\_  
(Attach evidence of Authority to sign) Date

Business Address: \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

County of registration \_\_\_\_\_

Telephone: \_\_\_\_\_ FAX \_\_\_\_\_

**8.4. If the Bidder is a Corporation:**

By: \_\_\_\_\_  
(Legal Corporation Name)

Name & Title of  
Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_  
(Attach evidence of Authority to sign) Date

Name & Title of  
Officer Attesting: \_\_\_\_\_

Signature: \_\_\_\_\_  
Date

Business Address: \_\_\_\_\_

**SIGMA VENDOR NUMBER** \_\_\_\_\_

Telephone: \_\_\_\_\_ FAX \_\_\_\_\_

(State of Incorporation): \_\_\_\_\_

**8.5. If The Bidder is A Joint Venture:** JOINT VENTURE SIGNATURES SHALL BE AS PROVIDED IN PARAGRAPH 9.5 OF SECTION 00100 INSTRUCTIONS TO BIDDERS. EACH JOINT VENTURER SIGNING THE BID SHALL SIGN IN THE MANNER INDICATED FOR AN INDIVIDUAL, A PARTNERSHIP OR A CORPORATION. IF MORE THAN TWO JOINT VENTURERS OF THE SAME TYPE ARE INCLUDED, USE ADDITIONAL PAGES. JOINT VENTURE STATE OF INCORPORATION \_\_\_\_\_ OR COUNTY OF REGISTRATION \_\_\_\_\_

**CERTIFICATE OF PRINCIPAL****(BIDDER)**

I, \_\_\_\_\_, certify that I am the Secretary of the Corporation \_\_\_\_\_, or a General Partner \_\_\_\_\_ or Managing Partner \_\_\_\_\_ or Partner \_\_\_\_\_ of the partnership, named as the Bidder in the attached Section 00300 Bid Form; that \_\_\_\_\_ who signed Section 00300 Bid Form on behalf of the Bidder, was then \_\_\_\_\_ of that corporation \_\_\_\_\_ or partnership \_\_\_\_\_; that I know the undersigned's signature, and the signature is genuine; and that Section 00300 Bid Form was duly signed, sealed and attested for and on behalf of that corporation \_\_\_\_\_ partnership \_\_\_\_\_ by authority of its governing body \_\_\_\_\_ or partners \_\_\_\_\_

\_\_\_\_\_  
Signed by the Secretary or Other Authorized Officer of the Corporation \_\_\_\_\_ Date \_\_\_\_\_  
or By General Partner or Managing Partner or Authorized Partner Certifying

\_\_\_\_\_  
Name of the Corporation or True Name of the Partnership

\_\_\_\_\_  
Federal Identification (I.D.) No. or Social Security No. **(LAST 4 ONLY)**

\_\_\_\_\_  
Telephone No.

(Corporate Seal)

**VERIFICATION  
(BIDDER)**

STATE OF MICHIGAN )  
 )  
COUNTY OF \_\_\_\_\_ )

Before me, a Notary duly commissioned, qualified and acting, personally appeared (enter name of person who signed the Bid Form on behalf of the Bidder), \_\_\_\_\_ to me well known to be the person described in and who signed Section 00300 Bid Form, who being by me first duly sworn upon oath, says that he/she is the Attorney-in-Fact for (enter the Bidder's name) \_\_\_\_\_ and that he/she has been authorized by (enter name of individual, partnership name, or that governing body of the Bidder named in the attached corporate resolution) \_\_\_\_\_ to execute the attached Section 00300 Bid Form on behalf of the named Bidder in favor of the STATE OF MICHIGAN.

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public, State of: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**END OF SECTION 00300**

**SECTION 00310 BID BOND**FILE No. 751/24078.SMD SURETY COMPANY REFERENCE No. \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS: That we, "the Bidder," \_\_\_\_\_, a corporation \_\_\_\_\_, individual \_\_\_\_\_, partnership \_\_\_\_\_, joint venture \_\_\_\_\_, of the State of \_\_\_\_\_, qualified to do business in the State of Michigan, as Principal, and "the Surety," \_\_\_\_\_, of the State of \_\_\_\_\_, as surety, are hereby held and firmly bound unto the State of Michigan, "the **Owner**," as Obligee, in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), and if no amount is entered, in the amount of five percent (5%) of the Bidder's Base Bid designated in paragraph 6.1 Base Bid Schedule in Section 00300 Bid Form, for the payment of which the Bidder and the Surety hereby bind ourselves, our respective heirs, successors, legal representatives and assigns, jointly and severally, firmly by these presents in accordance with Michigan Law.

WHEREAS, the Bidder has submitted to the **Owner** a Bid, to which this Bond is attached, to enter into the Contract with the **Owner** for \_\_\_\_\_ covered by Bidding Documents prepared by the **Professional**, which Bidding Documents are incorporated into this Bid Bond by this reference:

NOW, THEREFORE: THE CONDITION OF THIS OBLIGATION IS THAT, if the Bidder faithfully performs and fulfills all the understandings, covenants, terms and conditions of the Bidding Documents governing the bidding and award of the Contract (including Addenda issued before Bid opening and any post-Bid Addenda) within the time specified or any extension thereof, with or without notice to the Surety or fails to do so but pays to the **Owner** the full amount of the sum set forth in this Section 00310 Bid Bond as liquidated damages - then THIS OBLIGATION SHALL BE NULL AND VOID, OTHERWISE THIS OBLIGATION SHALL REMAIN IN FULL FORCE AND EFFECT.

A. If the **Owner** makes demand on the Surety to perform in accordance with the Surety's obligations under this Section 00310 Bid Bond, the full amount of the sum set forth in this Section 00310 Bid Bond shall be immediately due and payable to the **Owner**, and the Surety shall pay that sum without delay. Additionally, the Surety shall reimburse the **Owner** all costs of collection, which shall include, but not be limited to reasonable fees and charges of architects, engineers, attorneys and others, court or hearing costs incurred with or without suit, and interest.

B. The Surety, for value received, stipulates, and agrees that the obligations of the Surety and this Section 00310 Bid Bond shall be in no way impaired or affected by any extension of the time within which the **Owner** may accept the Bid, and the Surety does, by this agreement, waive notice of any such extension.

C. It is the intention of the Bidder, Surety and **Owner** that the Surety shall be bound by all terms and conditions of the Bidding Documents and this Section 00310 Bid Bond. However, if any provision(s) of this Section 00310 Bid Bond is/are illegal, invalid, or unenforceable, all other provisions of this Section 00310 Bid Bond shall nevertheless remain in full force and effect, and the **Owner** shall be protected to the full extent provided by Michigan Law.

**IMPORTANT:** The Surety shall be authorized to do business in the State by the Department of Consumer and Industry Services – Insurance Bureau and listed on the current U.S. Department of the Treasury Circular 570 and shall be otherwise acceptable to the **Owner**.

Address and Telephone of Surety

Address and Telephone of Agent

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ (NOTE: Use the date entered on Article 8 of Section 00300 Bid Form).

THE BIDDER: (Print Full Name and Sign)

THE SURETY: (Print Full Name and Sign)

By: \_\_\_\_\_

By Agent: \_\_\_\_\_

Name &amp; Title: \_\_\_\_\_

By Attorney-in-Fact: \_\_\_\_\_  
(Attach Certified Copy of Power of Attorney)

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

WITNESS: \_\_\_\_\_

WITNESS: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Telephone No. \_\_\_\_\_

Email: \_\_\_\_\_

**END OF SECTION 00310**



**SECTION 00320 NONCOLLUSION AFFIDAVIT****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

Affiant, \_\_\_\_\_, being first duly sworn, deposes and says that:

(1) Affiant is (enter title) \_\_\_\_\_ of \_\_\_\_\_, "the Bidder." Affiant has personal knowledge of the matters set forth in this Affidavit and is competent to testify about them.

(2) The Bidder has submitted to the **Owner** a "Bid" to enter into the above referenced Contract, also referred to in this Affidavit as "the Work."(3) This Section 00320 Non-collusion Affidavit is executed by Affiant for inclusion with the submission to the **Owner** of the Bid and may be relied upon by the **Owner** in considering the Bid.

(4) Affiant is fully informed about the preparation and contents of the Bid and of all pertinent circumstances surrounding the Bid, has not entered into any contract, combination, conspiracy, or other act prohibited by federal, State or any other local Law. The Bid is genuine and is not a collusive or sham Bid.

(5) Neither the Bidder nor any of the Bidder's owners, officers, partners, directors, agents, representatives, employees or parties in interest, including this Affiant, have in any way entered or proposed to enter into any combination to prevent the making of any Bid, or to fix any prices (including overhead, profit or other costs) for the Bid; or have made any agreement, or given or promised any consideration to induce any other person not to Bid for the Work, or to Bid at a specified price; or have secured, proposed or intended to secure through any agreement an unlawful advantage against the **Owner** or any other person interested in the Work.

(6) No officer or employee of the State of Michigan is personally or financially interested, directly or indirectly, in the Bid, or any Contract which may be under it, or in the purchase or sale of any materials, equipment or supplies for the Work to which it relates, or any portion of any expected profits thereto.

(7) The Bid is not intended to secure an unfair advantage or benefit from the **Owner** or in favor of any person interested in the proposed Contract.

(8) The prices bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of the Bidder's owners, officers, partners, directors, agents, representatives, employees or parties in interest, including this Affiant; and neither the Bidder nor any of its owners, officers, partners, directors, agents, representatives, employees or parties in interest, including this Affiant, have divulged any information regarding the Bid or any data about the Bid to any other person.

By: \_\_\_\_\_

Title: \_\_\_\_\_

SIGMA VENDOR NUMBER \_\_\_\_\_

Telephone No. \_\_\_\_\_

**VERIFICATION**

STATE OF \_\_\_\_\_ )

COUNTY OF \_\_\_\_\_ )

Before me, a Notary Public commissioned, qualified and acting, personally appeared (enter name of the person signing this Affidavit) \_\_\_\_\_ to me well known to be the person described in and who signed this Section 00320 Non-collusion Affidavit, who being by me first duly sworn upon oath, says that he/she is the Attorney-in-Fact for (enter Bidder's name) \_\_\_\_\_, that he/she has been authorized by (enter name of individual, partnership name, or the authorized governing body of the Bidder) \_\_\_\_\_ to execute this Section 00320 Non-collusion Affidavit on behalf of the named Bidder in favor of the STATE OF MICHIGAN, for the uses and purposes mentioned.

Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

Notary Public, State of \_\_\_\_\_

My Commission expires: \_\_\_\_\_, 20 \_\_\_\_

**END OF SECTION 00320**

**SECTION 00330 ASBESTOS ABATEMENT ATTESTATION****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

**ASBESTOS ABATEMENT ATTESTATION****SUBMISSION REQUIRED WITH ALL BIDS**

Pursuant to the Public Entity Asbestos Removal Verification Act, PA 59 of 2024, MCL 338.3371 et seq. ("the Act"), the Owner will conduct the background investigation as required of any asbestos abatement contractor, or a general contractor that contracts with an asbestos abatement contractor, for the abatement of asbestos. Under the Act, an "Asbestos abatement contractor" means a business entity that is licensed under the asbestos abatement contractors licensing act, 1986 PA 135, MCL 338.3101 to 338.3319, and that carries on the business of asbestos abatement on the premises of another business entity and not on the asbestos abatement contractor's premises. Asbestos abatement contractor includes an individual or person with an ownership interest in a business entity described in MCL 338.3373(b).

**THE SCOPE OF WORK TO BE COVERED UNDER THIS CONTRACT CONTAINS ASBESTOS ABATEMENT AND THIS ATTESTATION MUST BE COMPLETED.****Contractor attests that: (check one:)**

1. ☐ The Contractor will self-perform all asbestos abatement project work and attests that Contractor has not been issued 5 or more notices of violation of environmental regulations (State and/or Federal), nor has been subject to an administrative consent order or a consent judgment involving environmental regulations.
2. ☐ The Contractor will self-perform all asbestos abatement project work; however, Contractor has been issued 5 or more notices of violation of environmental regulations (State and/or Federal), or has been subject to an administrative consent order or a consent judgment involving environmental regulations, requiring Owner to conduct a background investigation and a public hearing pursuant to PA 59 of 2024, MCL 338.3371 et seq.
3. ☐ The Contractor nominates the following Sub-contractor for all asbestos abatement project work and attests that the nominated Sub-contractor has not been issued 5 or more notices of violation of environmental regulations (State and/or Federal), nor has been subject to an administrative consent order or a consent judgment involving environmental regulations:

Nominated Sub-contractor: \_\_\_\_\_

4. ☐ The Contractor nominates the following Sub-contractor for all asbestos abatement project work; however, the nominated Sub-contractor has been issued 5 or more notices of violation of environmental regulations (State and/or Federal), or has been subject to an administrative consent order or a consent judgment involving environmental regulations, requiring Owner to conduct a background investigation and a public hearing pursuant to PA 59 of 2024, MCL 338.3371 et seq.

Nominated Sub-contractor: \_\_\_\_\_

**END OF SECTION 00330**

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**SECTION 00410 BID BREAKDOWN**

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**PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

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**1.0 BID BREAKDOWN:** The Apparent Low Bidder shall itemize below a cost breakdown of the Apparent Low Bidder's Bid. The Bid Breakdown shall be organized into separable parts of the Work so that one hundred percent (100%) of the Base Bid plus all Alternates is accounted for. Portions of the Work for which costs are itemized shall include Work to be furnished and performed directly by the Apparent Low Bidder and its Subcontractors and Suppliers, as applicable. Each separable part of the Work identified in this Bid Breakdown shall have a value not exceeding \_\_\_\_\_ percent (\_\_\_\_%) of the Apparent Low Bidder's Base Bid, except parts of the Work designating furnished materials or equipment, which may be itemized as quoted.

**2.0 DISCREPANCIES:** Discrepancies in this Section 00410 Bid Breakdown shall be resolved in accordance with Article 14 of the Instructions to Bidders. Any discrepancies between the Apparent Low Bidder's Bid Breakdown and Article 6 "Bid Schedule" on the Apparent Low Bidder's Section 00300 Bid Form with respect to a given lump sum item, unit price item or "One Each" item, or any sum of any of them, will be resolved so that the corresponding amount(s) on the Apparent Low Bidder's Section 00300 Bid Form will be binding on the Apparent Low Bidder.

**END OF SECTION 00410**

PROFESSIONAL – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

## ARTICLE 1 ORGANIZATION

1.1. Date of organization (or incorporation) \_\_\_\_\_ State of incorporation \_\_\_\_\_ (IRS) EIN \_\_\_\_\_

1.2. Title and name of Principals (President, Vice-Presidents, Secretary and Treasurer, if a corporation; partners, if a partnership)

\_\_\_\_\_

\_\_\_\_\_

1.3. Is your organization's principal place of business maintained in the State of Michigan? \_\_\_\_ If your organization maintains its principal place of business outside the State, attach a copy of the Certificate of Authority which your organization procured in accordance with MCL 450.2011.

1.4. If your organization, any business entity related to or affiliated with your organization, or any present or former executive employee, officer, director, shareholder (owning twenty percent (20%) or more of the outstanding shares), partner, or owner of your organization or of any such related or affiliated entity has ever been convicted of a felony, or has felony charges pending, in any state within the last three (3) years from the date of Bid opening, furnish with this Bidder's Questionnaire all material facts relating to any such felony conviction or such pending felony charges.

## ARTICLE 2 SPECIALTY CONTRACTOR LICENSES

2.1. Does your organization hold valid licenses covering specialty classifications of Work that your organization itself intends to perform and for which a specific specialty license is required by any Political Subdivision with jurisdiction over the Work \_\_\_\_\_? If so, attach a list with all licenses by number and classification; state the name of the organization holding the license, the renewal date of each license, whether each license is active, and attach a copy of each license.

## ARTICLE 3 EXPERIENCE

3.1. What is the general character of the work performed by your organization? \_\_\_\_\_ How many years of experience in construction work similar in character and scope to the Work under the Bidding Documents has your organization had: (a) as a General Contractor? \_\_\_\_\_; (b) as a Subcontractor? \_\_\_\_\_.

3.2. Attach a list of all public contracts or subcontracts under public contracts that your organization has performed within the last five (5) years which are similar in character and scope to the Work under the Bidding Documents (using the forms in the "References Attachment" provided with this Questionnaire). If the contract or subcontract referenced is not substantially completed, furnish the percent complete for that contract or subcontract.

3.3. Within the last five (5) years, has your organization been in litigation with The State of Michigan or failed to complete a contract or subcontract awarded to it? \_\_\_\_ If so, attach a list for each contract or subcontract, state when, where and why.

3.4. Within the last five (5) years, has any officer, partner or executive employee of your organization been an officer, partner or employee of another organization that was involved in a litigation with The State of Michigan? or failed to complete a contract or subcontract? \_\_\_\_\_. If so, for each contract or subcontract, state the name of each officer, partner or employee and the name of the organization and owner(s), and the explanation of litigation or reasons why the contract or subcontract was not completed.

3.5 Identify your organizations Experience Modification Rating (EMR) \_\_\_\_\_. Attach a letter of explanation if your organization does not have an EMR.

3.6 Provide the name and attach a brief resume and list of similar success projects for your proposed Project Superintendent.

**ARTICLE 4 ADDITIONAL QUALIFICATIONS**

4.1. **(Nominated Subcontractor only)** Will you subcontract any part of the Work covered by the intended Sub agreement? \_\_\_\_\_. If so, which parts of the Work covered by the intended Sub agreement do you intend to subcontract to a lower tier Subcontractor?

\_\_\_\_\_

4.2. State the name, address, and telephone number of a representative of your organization who personally visited and inspected the site: \_\_\_\_\_.

Also, describe, in an attachment to this Section 00420 Questionnaire, subsurface and physical conditions at or contiguous to the site that your representative investigated and how they were accounted for in the preparation of your organization's Bid.

4.3. Attach a list of construction equipment and machinery your organization intends to use in the execution of the Work, as estimated in the preparation of your organization's Bid.

4.4. Does your organization rent or lease equipment or facilities from other affiliate organizations? \_\_\_\_\_. If so, state the name of the affiliate organization(s) \_\_\_\_\_.

4.5. **(Apparent Low Bidder only)** Bank line of credit available? \$ \_\_\_\_\_.

4.6. **(Apparent Low Bidder only)** Will your organization, i.e., the Bidder named in the Authorized Signature Article on Section 00300 Bid Form, be the only named Principal in Section 00610 Performance Bond and Section 00620 Payment Bond? \_\_\_\_\_. If not, please identify the organization who will be named as Principal or Co-Principal on Section 00610 Performance Bond and Section 00620 Payment Bond \_\_\_\_\_. Also, state how such organization relates to the Bidder \_\_\_\_\_. (NOTE: If another organization is identified, the Apparent Low Bidder shall submit to the Owner a separate Section 00420 Questionnaire filled out by that organization as part of the Qualification Submittals required under Article 2 of Section 00100 Instructions to Bidders).

**ARTICLE 5 REFERENCES**

5.1. Trade references (Minimum of three (3)):

5.2. Bank references:

5.3. Insurance:

The undersigned Apparent Low Bidder \_\_\_\_\_ or nominated Subcontractor \_\_\_\_\_ certifies that all statements and answers made to the interrogatories in this Section 00420 Questionnaire are current, accurate and complete as of the date stated below. (Note: Attachments shall be fastened at the end of this Section).

Signed by: \_\_\_\_\_ Name \_\_\_\_\_ Title \_\_\_\_\_

on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**END OF SECTION 00420**

**REFERENCES ATTACHMENT**

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**PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

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**REFERENCE #**

Public Owner: \_\_\_\_\_

Project/Contract Name: \_\_\_\_\_

Location of Project/Contract: \_\_\_\_\_

Contract Price: \_\_\_\_\_ Project/Contract Started: \_\_\_\_\_ Completed: \_\_\_\_\_

Owner's Representative (Name and Telephone): \_\_\_\_\_  
\_\_\_\_\_

Apparent Low Bidder's \_\_\_\_ or Nominated Subcontractor's \_\_\_\_

Representative Name and Telephone \_\_\_\_\_

Scope of Project/Contract: \_\_\_\_\_  
\_\_\_\_\_**REFERENCE #**

Public Owner: \_\_\_\_\_

Project/Contract Name: \_\_\_\_\_

Location of Project/Contract: \_\_\_\_\_

Contract Price: \_\_\_\_\_ Project/Contract Started: \_\_\_\_\_ Completed: \_\_\_\_\_

Owner's Representative (Name and Telephone): \_\_\_\_\_  
\_\_\_\_\_

Apparent Low Bidder's \_\_\_\_ or Nominated Subcontractor's \_\_\_\_

Representative Name and Telephone \_\_\_\_\_

Scope of Project/Contract: \_\_\_\_\_  
\_\_\_\_\_

**REFERENCES ATTACHMENT****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD**REFERENCE #**

Public Owner: \_\_\_\_\_

Project/Contract Name: \_\_\_\_\_

Location of Project/Contract: \_\_\_\_\_

Contract Price: \_\_\_\_\_ Project/Contract Started: \_\_\_\_\_ Completed: \_\_\_\_\_

Owner's Representative (Name and Telephone): \_\_\_\_\_

Apparent Low Bidder's \_\_\_\_\_ or Nominated Subcontractor's \_\_\_\_\_

Representative Name and Telephone \_\_\_\_\_

Scope of Project/Contract: \_\_\_\_\_

**REFERENCE #**

Public Owner: \_\_\_\_\_

Project/Contract Name: \_\_\_\_\_

Location of Project/Contract: \_\_\_\_\_

Contract Price: \_\_\_\_\_ Project/Contract Started: \_\_\_\_\_ Completed: \_\_\_\_\_

Owner's Representative (Name and Telephone): \_\_\_\_\_

Apparent Low Bidder's \_\_\_\_\_ or Nominated Subcontractor's \_\_\_\_\_

Representative Name and Telephone \_\_\_\_\_

Scope of Project/Contract: \_\_\_\_\_

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SECTION 00430 LIST OF SUBCONTRACTORS

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**PROFESSIONAL** – G.H. Forbes Associates Architects

**WORK** – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

**FILE No.** 751/24078.SMD

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1. To enable the **Owner** and **Professional** to evaluate the Apparent Low Bidder's qualifications to perform the Work, for each Division of the Specifications, Section of the Specifications and/or trade itemized in this Section 00430 List of Subcontractors, the Apparent Low Bidder shall nominate the Subcontractor(s) to be awarded a Sub agreement(s). The Apparent Low Bidder will ensure that all Subcontractors have a current State Project Registration in compliance with PA10 of 2023, as amended in PA110 of 2024. To the extent a contractors' licensing is required for any such classification of Work, the Apparent Low Bidder shall provide the nominated Subcontractor's license number(s). If the Apparent Low Bidder intends to self-perform any of the listed classifications of Work, the Apparent Low Bidder shall nominate itself in the spaces provided for that purpose and shall furnish the corresponding Apparent Low Bidder's license number(s). For each nominated Subcontractor, the Apparent Low Bidder shall enter, if applicable, whether the Subcontractor is a minority, woman or handicapped owned business in the spaces provided for that purpose. The Apparent Low Bidder also shall furnish the amount of the Sub agreement that the Apparent Low Bidder, directly or through another higher tier Subcontractor, anticipates awarding to each nominated Subcontractor.

2. Should the Apparent Low Bidder fail to nominate Subcontractors, as required, or provide duplicate nominees for any Division, Specification, or trade, or fail to enter the required licensing information, the Apparent Low Bidder shall clarify the omission or ambiguity within two (2) Business Days of the **Owner** or **Professional's** request. Failure by the Apparent Low Bidder to comply with this Subcontractor nominating requirement may render the Bid as not conforming in all material respects with the requirements of the Bidding Documents.

3. Pursuant to the Bidding Documents, the Apparent Low Bidder shall not remove, replace, or add a nominated Subcontractor except as provided in paragraph 8.3 of Section 00100 Instructions to Bidders and/or in paragraph 5.1 of Section 00700 General Conditions. Since the requirement to nominate Subcontractors for the *listed* Divisions, Specification Sections and/or trades survives the award of the Contract, any Subcontractor nominated for any *listed* Division, Specification Section and/or trade *for the first time* after Contract Award and who is objected to by the **Owner**, for good cause, shall be replaced at no increase in Contract Price and/or Contract Time.

4. The requirement to make a definite nomination of Subcontractors or to state that the Apparent Low Bidder intends to self-perform that classification, and to clarify any omissions or ambiguities in this Section 00430 List of Subcontractors, applies to the Apparent Low Bidder and any other Bidder remaining or wishing to remain in contention for the award.

5. This listing requirement is not intended to create any express or implied duty or obligation to the Apparent Low Bidder or the nominated Subcontractors by the **Owner** or **Professional**.

(THE REMAINDER OF THIS PAGE LEFT BLANK INTENTIONALLY)



| Division, Specification Section<br>and/or Trade | Nominated<br>Subcontractor(s) | License Number(s)<br>Classification | Amount of<br>Subcontract |
|-------------------------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 1. _____                                        | _____                         | _____                               | _____                    |
| 2. _____                                        | _____                         | _____                               | _____                    |
| 3. _____                                        | _____                         | _____                               | _____                    |
| 4. _____                                        | _____                         | _____                               | _____                    |
| 5. _____                                        | _____                         | _____                               | _____                    |
| 6. _____                                        | _____                         | _____                               | _____                    |
| 7. _____                                        | _____                         | _____                               | _____                    |
| 8. _____                                        | _____                         | _____                               | _____                    |
| 9. _____                                        | _____                         | _____                               | _____                    |
| 10. _____                                       | _____                         | _____                               | _____                    |
| 11. _____                                       | _____                         | _____                               | _____                    |
| 12. _____                                       | _____                         | _____                               | _____                    |
| 13. _____                                       | _____                         | _____                               | _____                    |
| 14. _____                                       | _____                         | _____                               | _____                    |

The undersigned Apparent Low Bidder \_\_\_\_\_ certifies that all the information and data furnished in this Section 00430 List of Subcontractors are current, accurate and complete as of the date stated below.

Signed by: \_\_\_\_\_ Name \_\_\_\_\_ Title \_\_\_\_\_

on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**END OF SECTION 00430**

**PROFESSIONAL** – G.H. Forbes Associates Architects

**WORK** – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

**FILE No.** 751/24078.SMD

**ARTICLE 1 BID MATERIALS AND EQUIPMENT – LISTED (NAMED OR SPECIFIED) ITEMS**

1.1. The Apparent Low Bidder has examined the requirements of paragraphs 7.4 and 7.5 of Section 00100 Instructions to Bidders, and by submitting a Bid, commits to bid only a *listed* named or specified materials and equipment for those Specifications *listed* in Schedule 1.6. To the extent that any such *listed* Specification states that an "or equal" or a substitute may be furnished, if acceptable to the **Professional**, application for any such acceptance will not be considered by the **Professional** until after Contract Award. Any such application shall comply with the terms and conditions of Article 2 in this Section and paragraph 5.2 of Section 00700 General Conditions.

1.2. For those Sections of the Specifications *listed* in paragraph 1.6, the Contract will be awarded on the basis that only one of the *listed* materials or equipment will be furnished. Therefore, to be considered responsible, the Apparent Low Bidder shall nominate, by circling the letters "A," "B," "C," etc. corresponding to each *listed* manufacturer/Supplier, the Bidder's chosen manufacturers/Suppliers for the corresponding products named or specified in the Specifications and Drawings (including all Addenda).

1.3. If the Apparent Low Bidder fails to circle a manufacturer/Supplier for a *listed* material or equipment, or circles more than one letter for a *listed* material or equipment, the Apparent Low Bidder hereby agrees to correct the omission or ambiguity within two (2) Business Days after submittal of this Section 00440 Schedule of Materials and Equipment. The requirement to make a definite selection and to correct any omissions or ambiguities in Schedule 1.6 applies to the Apparent Low Bidder and any other Bidder remaining or wishing to remain under consideration for the award.

1.4. The Apparent Low Bidder's attention is directed to paragraph 7.3 of Section 00100 Instruction to Bidders, which holds the Apparent Low Bidder responsible, if awarded the Contract, for certain costs and time impacts, provided the Apparent Low Bidder, in the preparation of its Bid, knew or had reason to know, that any *listed* material or equipment bid by the Bidder requires changes in the Work and failed to provide advanced written notice to that effect to the **Professional**.

1.5. The Apparent Low Bidder shall insert the provisions of this Section in all Sub agreements with Subcontractors and Suppliers furnishing the materials or equipment *listed* in Schedule 1.6, altering the respective paragraphs only as appropriate to properly identify the contracting parties. Each such Sub agreement shall expressly bind the respective Subcontractor or Supplier to the conditions of paragraph 1.4, the other provisions of Section 00440 Schedule of Materials And Equipment and paragraph 5.2 of Section 00700 General Conditions.

**1.6. Schedule of Bid Materials and Equipment**

ITEMS NAMED OR SPECIFIED (ENTERED BY THE **PROFESSIONAL**)

| ITEM OF MATERIAL<br>OR EQUIPMENT           | SPECIFICATION<br>SECTION | <b>CONTRACTOR</b> TO NOMINATE (CIRCLE)<br>ITS CHOSEN NAMED OR SPECIFIED<br>MANUFACTURERS AND SUPPLIERS |
|--------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------|
| ITEM 1 - Interior Lighting- L1 and L1S     | 26 57 00                 | A. Lithonia Lighting<br>B.<br>C.<br>D.                                                                 |
| ITEM 2 - Exterior Solar Light Fixtures- O1 | 26 57 00                 | A. DSST150-50K-BLK-T3M-SCA<br>B.<br>C.<br>D.                                                           |
| ITEM 3 –                                   |                          |                                                                                                        |
| ITEM 4 -                                   |                          |                                                                                                        |

**1.7 Use of "Or Equal" or Substitute Materials or Equipment After Contract Award**

1.7.1. Paragraph 5.2 of Section 00700 General Conditions provides for the consideration (after the date of Contract Award) and possible acceptance by the **Professional** of "or equal" or substitute materials or equipment (unless any material or equipment named is followed by words establishing that no "or equal" or substitution is permitted). If sufficient information is submitted to allow the **Professional** to determine in a timely manner that the material or equipment proposed is equivalent or equal to that named or described in the Drawings or specified in the Specifications, then the **Professional** will consider the proposed "or equal" or substitute material or equipment.

1.7.2. The Apparent Low Bidder assumes responsibility for the cost and time required to make any proposed "or equal" or substitute material or equipment approved by the **Professional** conform to the requirements of the Contract Documents. In addition, if any such "or equal" or substitute material or equipment requires any changes in the drawings, or in any testing requirements, or in any Means and Methods indicated in or required by the Contract Documents, or in work performed by the **Owner** or others, or requires any other changes in the Work whatsoever, the Apparent Low Bidder shall assume full responsibility for the cost and the time required to carry out such changes in the Work or the work of others. Pursuant to this provision, the Apparent Low Bidder shall bear an appropriate portion of the Delay and costs resulting from the events contemplated in this paragraph.

1.7.3. Paragraph 5.2 of Section 00700 General Conditions provides for reimbursement by the **Contractor** to the **Owner** for any additional expenses incurred by the **Professional** directly attributable to the evaluation of any proposed substitute material or equipment and any proposed "or equal" material or equipment for materials and equipment *listed* in Schedule 1.6.

1.7.4. The Apparent Low Bidder shall insert the provisions of this Article 1 of Section 00440 Schedule of Materials and Equipment in all Sub agreements with Subcontractors and Suppliers furnishing any materials or equipment, altering the respective paragraphs only as appropriate to properly identify the contracting parties. Each such Sub agreement shall expressly bind the respective Subcontractor or Supplier to the conditions of paragraph 1.7.2, the other provisions of this Section 00440 Schedule of Materials And Equipment and paragraph 5.2 of Section 00700 General Conditions.

**ARTICLE 2 BID MATERIALS AND EQUIPMENT – OPEN SPECIFICATIONS**

2.1. For those Specifications not listed in Schedule 1.6, the Apparent Low Bidder, if and when awarded the Contract, shall disclose to the **Owner** and **Professional** (when submitting the Schedule of Values required by paragraph 12.1.1 of Section 00700 General Conditions) the Bidder's chosen manufacturers/Suppliers for the corresponding materials and equipment specified in the Specifications and Drawings (including all Addenda).

2.2. The Apparent Low Bidder has examined the requirements of paragraphs 7.2 and 7.3 of the Instructions to Bidders and commits to furnish materials and equipment meeting the requirements of the Specifications. If any such Bidder-selected material or equipment represents an "or equal" or a substitute material or equipment, no such material or equipment shall be used or furnished in the execution of the Work unless previously approved by the **Professional** as an acceptable "or equal" or substitute material or equipment. Application for any such acceptance will not be considered until after Contract Award. Any such application shall comply with the terms and conditions of this Article 2 and paragraph 5.2 of Section 00700 General Conditions.

2.3. The Apparent Low Bidder shall insert the provisions of this Section in all Sub agreements with Subcontractors and Suppliers furnishing the materials or equipment listed in Schedule 2.4, altering the respective paragraphs only as appropriate to properly identify the contracting parties. Each such Sub agreement shall expressly bind the respective Subcontractor or Supplier to the conditions of paragraph 2.2, the other provisions of this Section 00440 Schedule of Materials and Equipment and paragraph 5.2 of Section 00700 General Conditions.

**2.4. Schedule of Bid Materials and Equipment**

| MATERIAL OR<br>EQUIPMENT                            | SPECIFICATION<br>SECTION | CONTRACTOR TO NAME ITS<br>CHOSEN MANUFACTURERS<br>AND SUPPLIERS |
|-----------------------------------------------------|--------------------------|-----------------------------------------------------------------|
| ITEM 1 - CONCRETE UNIT MASONRY (04 22 00)           |                          |                                                                 |
| ITEM 2 - METAL FABRICATIONS (05 50 00)              |                          |                                                                 |
| ITEM 3 – CAST-IN-PLACE CONCRETE (03 33 00)          |                          |                                                                 |
| ITEM 4 - HOLLOW METAL DOORS AND FRAMES (08 11 13)   |                          |                                                                 |
| ITEM 5 - DOOR HARDWARE (08 71 00)                   |                          |                                                                 |
| ITEM 6 - GYPSUM VENEER PLASTER (09 23 13)           |                          |                                                                 |
| ITEM 6 - GYPSUM BOARD (09 29 00)                    |                          |                                                                 |
| ITEM 7 - RESILIENT BASE (09 65 13)                  |                          |                                                                 |
| ITEM 8 - INSULATED GLAZING PANELS (08 51 13)        |                          |                                                                 |
| ITEM 9 - PAINTING (09 91 00)                        |                          |                                                                 |
| ITEM 10 - WIRE MESH ENCLOSURES (10 22 13)           |                          |                                                                 |
| ITEM 11 – FIRE SPRINKLER (21 13 13)                 |                          |                                                                 |
| ITEM 12 – FIRE ALARM (28 31 00)                     |                          |                                                                 |
| ITEM 13 – DOMESTIC WATER PIPING (22 11 16)          |                          |                                                                 |
| ITEM 14 - SANITARY WASTE AND VENT PIPING (22 13 16) |                          |                                                                 |

MATERIAL OR  
EQUIPMENTSPECIFICATION  
SECTION**CONTRACTOR** TO NAME ITS  
CHOSEN MANUFACTURERS  
AND SUPPLIERS

ITEM 15 - CONDENSING FUEL-FIRED DOMESTIC WATER HEATERS (22 34 10)

ITEM 16 – TEMPERATURE CONTROLS (23 09 33)

ITEM 17 – FUEL GAS PIPING (23 11 23)

ITEM 18 - REFRIGERANT PIPING (23 23 00)

ITEM 19 – METAL DUCTS (23 31 13)

ITEM 20 – DUCT ACCESSORIES (23 33 00)

ITEM 21 – DIFFUSERS, REGISTERS, AND GRILLES (23 37 13)

ITEM 22 - BREECHING, CHIMNEYS, AND STACKS (23 51 00)

ITEM 23 – GAS-FIRED FURNACES (23 54 16)

ITEM 24 – LIGHT COMMERCIAL AIR-TO-AIR ENERGY RECOVERY EQUIPMENT (23 72 10)

ITEM 25 – LIGHTING CONTROL DEVICES (26 09 23)

ITEM 26 - WIRING DEVICES (26 27 26)

ITEM 27 – FUSES (26 28 13)

ITEM 28 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS (26 28 16)

**IMPORTANT:** The provisions of this Section 00440 Schedule of Materials and Equipment shall not create or impose any express or implied duty or obligation on the **Owner** or **Professional** to exercise this authority for the benefit of the Apparent Low Bidder or any *listed* manufacturer/Supplier.

The undersigned Apparent Low Bidder \_\_\_\_\_ certifies that all the information and data furnished in this Section 00440 Schedule of Materials and Equipment are current, accurate and complete as of the date stated below.

Signed by: \_\_\_\_\_ Name \_\_\_\_\_ Title \_\_\_\_\_

on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**END OF SECTION 00440**

**SECTION 00500 AGREEMENT**FILE No. 751/24078.SMD CONTRACT ORDER No. Y **TABLE OF CONTENTS**

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**\*\* To Be Completed Upon Award of the Contract \*\***

\*\*THIS AGREEMENT TO CONTRACT is made this \_\_\_\_\_ day of \_\_\_\_\_ in the year Two-Thousand And \_\_\_\_\_ (\_\_\_\_\_) by and between **THE STATE OF MICHIGAN, "Owner,"** represented by the **Director, Department** of Technology, Management and Budget, duly authorized, and \_\_\_\_\_, \_\_\_\_\_ the "**Contractor**," a corporation \_\_\_\_\_, partnership \_\_\_\_\_, individual \_\_\_\_\_, or joint venture \_\_\_\_\_ (between \_\_\_\_\_ and \_\_\_\_\_), of the State of \_\_\_\_\_, whose address is \_\_\_\_\_, represented by \_\_\_\_\_, its \_\_\_\_\_, duly authorized.

The **Owner** and **Contractor**, in consideration of the mutual covenants and obligations stated in this Section 00500 Agreement and the other parts of the Contract Documents, agree as follows:

**ARTICLE 1 THE CONTRACT; THE PROJECT; THE WORK**

1.1. THE CONTRACT – The contract entered between the **Owner** and **Contractor** for the furnishing and performance of the Work by the **Contractor**, which consists of the Contract Documents listed or designated in paragraphs 2.2 through 2.4.

**STATE OF MICHIGAN MODEL**

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1.2. PROJECT NAME – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

1.3. THE WORK – THIS PROJECT INCLUDES ADDING HEAT TO THE BUILDING WITH NEW FURNACES AND A HOT WATER HEATER. A COMPLETE FIRE ALARM AND FIRE SUPPRESSION SYSTEM THROUGHOUT THE FIRST AND SECOND FLOOR WILL BE ADDED. LIMITED CEILING, PAINTING AND LIGHTING CHANGES ON THE FIRST FLOOR.

**ARTICLE 2 CONTRACT DOCUMENTS**

2.1. The Contract Documents form the contract between the **Owner** and **Contractor** and represent the entire and final integrated agreement between the **Owner** and **Contractor** with respect to the Work. The Contract Documents are incorporated into this Agreement by this reference, and supersede all prior oral or written agreements, if any, between the **Owner** and **Contractor**. Any statement, representation, promise or inducement not set forth in the Contract Documents is null and void, and not binding on either the **Owner** or **Contractor**.

The Contract Documents shall not in any way create a relationship of any kind between the **Professional** and **Contractor**, or between the **Owner** and a Subcontractor, or Supplier or any other third party. The **Professional** shall, however, be entitled to performance and enforcement of obligations under the Contract that are consistent with the **Professional's** authority and responsibilities under the Contract Documents.

2.2. The Contract Documents on the date when the **Owner** executes this Section 00500 Agreement, which are attached to this Section 00500 Agreement, consist of the following:

2.2.1. This **Section 00500 Agreement**, fully executed by the **Owner** and **Contractor**, including the following attachments: \_\_\_\_\_ and **Addenda** \_\_\_\_\_ through \_\_\_\_\_.

2.2.2. **Section 00800 Supplementary Conditions**, including \_\_\_\_\_; and **Section 00120 Supplementary Instructions**, including \_\_\_\_\_.

2.2.3. **Section 00020 Glossary**, and **Section 00700 General Conditions**.

2.2.4. **General Requirements**, Division 1 of the Specifications.

2.2.5. **Divisions 2 through \_\_\_\_\_ of the Specifications**, and **Drawings**, bearing the title: \_\_\_\_\_, dated \_\_\_\_\_.

2.2.6. **Section 00030 Advertisement**; **Section 00100 Instructions to Bidders**, including **Attachment A-Bidder's Check List**, and **Section 00210 Information for Bidders**.

2.2.7. **Section 00610 Performance Bond** and **Section 00620 Payment Bond**, fully executed by the **Contractor** and the sureties for the contract award amount, each enclosing separate evidence of Power of Attorney.

2.2.8. The **Contractor's Section 00300 Bid Summary and Bid Form** (with attachments), **Section 00320 Non-collusion Affidavit** (including any revisions delivered after Bid opening) and **Section 00330 Asbestos Abatement Attestation**.

2.2.9. The following **Contractor's Qualification Submittals** (post-Bid opening): \_\_\_\_\_

2.3. Contract Documents that will be issued after the date the **Owner** executes this Section 00500 Agreement consist of:

2.3.1. **Change Orders** and **Change Authorizations** signed as provided in the Contract Documents.

2.3.2. **Notice of Award** and **Notice to Proceed**.

2.4. There are no Contract Documents other than those listed or designated in this Article or added through Section 00520 Attachment A to the Agreement. The Contract Documents may be modified, as provided in Section 00700 General Conditions.

### ARTICLE 3 CONTRACT PRICE

3.1. The **Contractor** will furnish and perform the Work and accept in full payment the Contract Price of \_\_\_\_\_ Dollars (\$\_\_\_\_\_). The Contract Price includes only those Alternates accepted by the **Owner**, as itemized in the Notice of Award.

3.2. The Contract will include those Change Order prices (bid on Section 00300 Bid Form) accepted by the **Owner** when the **Owner** issues the Notice to Proceed or by Change Authorization.

3.3. Payments to the **Contractor** will be made based on the prices stated on the **Contractor's** Section 00300 Bid Form, subject to the terms and conditions of the Contract Documents.

### ARTICLE 4 CONTRACT TIME; LIQUIDATED DAMAGES

4.1. The periods allowed for completion of the Work, or a designated part of the Work, will be as follows:

4.1.1. The entire Work will be substantially complete in accordance with the requirements of the Contract Documents: 150 calendar days

4.1.2. If separable parts of the Work shall be completed before the period allowed for Substantial Completion of the entire Work, the Contract Times for those parts of the Work will be as specified in Section 00520 Attachment A to Agreement, and as may be supplemented in the Specifications.

4.1.3. The entire Work will be complete and ready for final payment as specified in the Contract Documents: 180 calendar days

4.2. The **Owner** and **Contractor** recognize that the Contract Times are of the essence of the Contract and that the **Owner** will suffer costs and damages if the Work is not completed within the Contract Times, including any extensions in Contract Time authorized by Change Orders. Therefore, liquidated damages (in the amounts specified in paragraphs 4.2.3 through 4.2.5) will apply if the Work is not completed within the limits of the Contract Times. Liquidated damages are not a penalty, are cumulative and represent a reasonable estimate of the **Owner's** extra costs and damages, which are difficult to estimate with accuracy in advance.

4.2.1. Accordingly, if the **Contractor** fails, neglects, or refuses to complete all or any designated part of the Work within the specified Contract Time, the **Contractor** agrees to pay to the **Owner** liquidated damages and to allow, at the appropriate time, a corresponding adjustment in Contract Price.

4.2.2. If under the procedures of paragraph 4.3, the **Owner** is justified in withholding liquidated damages due to or in anticipation of late completion, the **Contractor** agrees to allow the **Owner** to deduct liquidated damages from Requests for Payment.

4.2.3. Liquidated damages for each Calendar Day that expires after the Contract Time specified in paragraph 4.1.1 for Substantial Completion of the entire Work – until the Work is substantially complete – shall be in the amount of One Thousand Dollars and No/Cents (\$1,000)

4.2.4. Liquidated damages for each Calendar Day that expires after each of the Contract Times designated in Section 00520 Attachment A to the Agreement – until each such part of the Work is sufficiently complete – shall be in the amounts stated in Section 00520 Attachment A to the Agreement.

4.2.5. Liquidated damages for each Calendar Day after Substantial Completion of the entire Work that expires after the Contract Time specified in paragraph 4.1.3 for completion and readiness for final payment – until the entire Work is complete and ready for final payment – shall be in the amount of One Thousand Dollars and No/Cents (\$1,000)

#### **Assessment and/or Withholding of Liquidated Damages**

4.3. If the **Contractor** fails to complete the Work, or a specified part of the Work, within the corresponding Contract Time, or if at any time after the Work is eighty percent (80%) in place, the **Contractor** does not prosecute the balance of the Work with the diligence required to comply with the Contract Times, the **Contractor** shall be requested to submit a schedule recovery plan acceptable to the **Owner**. The **Contractor's** schedule recovery plan shall describe the cause of schedule slippage or delayed progress and the actions proposed and taken to recover schedule. In addition, to the extent that the **Contractor** believes that an extension in Contract Time is justified, the recovery plan shall include a request for an appropriate extension in Contract Time.

4.3.1. Within fifteen (15) Calendar Days after the **Contractor** receives any such request, the **Contractor** shall meet with the **Owner** and present the **Contractor's** written schedule recovery plan. If, upon evaluation of the **Contractors'** schedule recovery plan, and after consultation with the **Professional**, the **Owner**, in its sole discretion, determines that there is sufficient cause to withhold liquidated damages, the **Owner** may deduct from Requests for Payment the liquidated damages then due or that would become due using the **Owner's** estimate of late completion of the Work.

4.3.2. For the purposes of returning liquidated damages, schedule recovery implementation shall not be complete until such slippage or delayed progress has been corrected and the Progress Schedule once again supports compliance with the Contract Times. Once late completion has been corrected, the **Contractor** shall be entitled to reimbursement of all liquidated damage sums previously withheld. Any such reimbursement of liquidated damages previously withheld shall not constitute a waiver of any claims that the **Owner** may otherwise have.

#### **ARTICLE 5 PAYMENTS TO CONTRACTOR**

\*5.1. The **Owner** will pay one hundred percent (100%) of the amount due upon completion of any Schedule of Value *pay item*. The **Professional** may require, for each Request for Payment, sworn statements, consent of surety, waivers of lien (from the **Contractor**, Subcontractors and Suppliers), Record Documents, guarantees, operating and maintenance manuals and such other documents required by the Contract Documents. Payment to the **Contractor** will be made within thirty (30) Calendar Days from receipt by the **Owner** of the **Professional's** certification representing to the **Owner** the amount of payment to be due to the **Contractor**.

\*5.2. Processing of Requests for Payment by the **Owner** may be deferred until Work having a prior sequence, as provided in the Contract Documents, is in place and is approved.



5.3. Payments shall be subject to the terms and conditions of Section 00700 General Conditions and the other parts of the Contract Documents and shall be made less such deductions as the **Owner** and/or **Professional** determines are appropriate, as specified in paragraph 12.4 of Section 00700 General Conditions.

5.4. If any portion of the Work is funded by a federal or State agency, the **Owner** will have fifteen (15) Calendar Days after receiving those funds in which to make payment. This provision shall take effect only after the thirty (30) Calendar Day period following certification by the **Professional** has expired.

## ARTICLE 6 THE PROFESSIONAL SERVICES CONTRACTOR

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6.1. The **Owner** has retained G. H. Forbes Associates Architects to assume all duties and responsibilities of, and have the rights and authority assigned to, the **Professional Services Contractor** in the Contract Documents with respect to completion of the Work in accordance with the Contract Documents.

## ARTICLE 7 CONTRACTOR'S REPRESENTATIONS

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7.1. The **Contractor** reiterates and makes each of the representations itemized in Article 2 of the **Contractor's** Section 00300 Bid Form. Article 2 in the **Contractor's** Section 00300 Bid Form is by this reference repeated verbatim in this Section 00500 Agreement as paragraphs 7.2 through 7.13 just as though those paragraphs had been written in this Article 7, except that the term "**Contractor**" shall replace the term "Bidder" in every instance.

## ARTICLE 8 MISCELLANEOUS

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8.1. If any provision of the Contract Documents is invalid, illegal, or unenforceable, all other provisions of the Contract Documents shall remain in full force and effect. If any provision of the Contract Documents is inapplicable to any Person or circumstance, that provision shall remain applicable to all other Persons and circumstances.

8.2. It is the intent of the **Owner** and **Contractor** that all provisions of Law required to be inserted or referenced in the Contract Documents are in fact so inserted or referenced. If any provision of Law is not so inserted or referenced, or is inserted or referenced improperly, then each such provision shall be considered inserted or referenced in the Contract Documents in proper form at no increase in Contract Price and/or Contract Time.

8.3. The duties, obligations, criteria or procedure imposed by, and the rights and remedies made available in, the Contract Documents are in addition to, and not in any way a limitation of, any rights and remedies that are otherwise allowed or imposed by Law, except that in the event a specific part or detailed requirement of a provision, criterion or procedure in the Contract Documents and a specific part or detailed requirement of a provision, criterion or procedure imposed by Law conflict, the specific part or detailed requirement of such provision, criterion or procedure imposed by Law shall govern. All other specific parts or detailed requirements in the provisions, criteria or procedures imposed by Law and the Contract Documents shall remain in full force and effect and be read with the controlling specific part or detailed requirement. These provisions will be as effective as if repeated specifically in the Contract Documents in connection with each duty, obligation, right and remedy to which they apply.

8.4. The **Contractor** shall not sell, assign, transfer or otherwise convey any of the **Contractor's** rights and shall not delegate any of the **Contractor's** duties under this Agreement without the prior written consent of the **Owner** and the sureties for the **Contractor**. In its sole discretion, the **Owner** may refuse to consent to any proposed assignment or delegation. Any attempted sale, assignment, transfer, or other conveyance in violation of this paragraph shall be void and shall relieve the **Owner** of any further liability under the Contract Documents but shall not relieve the **Contractor's** sureties of any liability. If the **Owner** consents in writing to an assignment, unless specifically stated to the contrary in the consent, that assignment shall not release or discharge the **Contractor** from any duty or responsibility set forth in the Contract Documents and shall not release or discharge the **Contractor's** sureties under the Bonds required by the Contract Documents.

8.5. The **Owner** reserves the right to correct any error in any Request for Payment that may have been paid. The **Owner** reserves the right, should proof of Defective Work be discovered after final payment, to claim and recover from the **Contractor** and/or the **Contractor's** surety, sufficient sums to correct or remove and replace the Defective Work.

8.6. Any waiver by the **Owner** of any provision of the Contract Documents shall be specific and in writing and apply only to the specific matter and not to other similar or dissimilar matters. Any waiver of any breach of this Contract shall not be held to be a waiver of any other or subsequent breach.

8.7. Nothing contained in this Agreement shall in any manner authorize, empower, or constitute the **Contractor**, Subcontractors or Suppliers (a) to act as agents of the **Owner**, (b) to assume or create any obligation or responsibility whatsoever, express, or implied, on behalf of or in the name of the **Owner**; (c) to bind the **Owner** in any manner, or (d) to make any representation, warranty, covenant, agreement, or commitment on behalf of the **Owner**. It is the intent and understanding of the parties that the **Contractor** shall perform the Work as an independent contractor. This Agreement does not create, and shall not be construed as creating, any rights enforceable by any third party.

8.8. If the **Owner** or **Contractor** suffers injury or damage to person or property because of error, omission, or act of the other, any of the other's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observation of that injury or damage. This provision is not and shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or time requirements set forth in Section 00700 General Conditions.

8.9. All computer programs which are not the subject of copyrights by third parties, and which are delivered, developed, produced, or paid for under a specific requirement of the Contract Documents and all plans, drawings, designs, specifications, technical reports, operating manuals, and other data which are delivered, developed, produced, or paid for under the Contract Documents shall be the property of the **Owner**. The **Owner** maintains all rights to such programs and deliverables, including the right to use, duplicate, and disclose the programs and deliverables, in whole or in part, in any manner and for any purpose. If any program or deliverable is copyrightable, the **Contractor** may copyright it subject to the **Owner's** rights. The **Owner** reserves a royalty-free, nonexclusive, and irrevocable license to use, duplicate, publish, and disclose such programs and deliverables, in whole or in part, and to authorize others to do so.

8.10. The **Contractor** warrants that all costs in proposals and claims for adjustments in Contract Price shall not exceed those allowed under the Contract Documents, and that proposals and claims for adjustments in Contract Price shall grant prices, terms, and warranties comparable to or better than prices, terms and warranties offered to others for similar work.

8.11. This Agreement shall be binding on the **Contractor, Owner** and their respective successors and legal representatives and, if the **Owner** has consented to an assignment or other conveyance, on all their respective assigns and delegates.

\*8.12. The Contract Documents shall be governed by and construed in accordance with the Laws of the State of Michigan in effect on the date of Bid opening. Any change in Michigan Law after that date shall be binding only to the extent the **Owner** and **Contractor** agree or to the extent such change is beyond the capacity of the parties to avoid.

## ARTICLE 9 NOTICE AND SERVICE

9.1. Unless otherwise provided in the Contract Documents or consented to by the **Owner** in writing, any notice, demand, or communication shall be in writing and shall be deemed to have been given when received by the individual required to be given notice at the address designated in this Agreement. A copy of any notice, demand or notification shall be sent to the address below.

9.2. Any written notice or other written communication to the sureties shall be sufficiently given if delivered to the individual required to be given notice at the address designated in the Bond.

IN WITNESS WHEREOF, the **Owner** and **Contractor** have signed this Section 00500 Agreement in triplicate and initialed three (3) full sets of the Contract Documents. One (1) full set of the executed Contract Documents will be delivered to the **Contractor**.

### THE STATE OF MICHIGAN

BY:

\_\_\_\_\_  
**Director**, DTMB, SFA, Design and Construction  
NAME:

\_\_\_\_\_  
Witness:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Address for giving notices:

Department of Technology, Management and Budget  
State Facilities Administration  
Design and Construction  
3111 W. St. Joseph Street  
Lansing, MI 48917

### THE CONTRACTOR

BY:

\_\_\_\_\_  
Title: \_\_\_\_\_ Date \_\_\_\_\_

NAME:

\_\_\_\_\_  
Federal ID No. or SS No. (LAST 4 Only)

\_\_\_\_\_  
Telephone No.

\_\_\_\_\_  
Witness:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Address for giving notices

**CERTIFICATE OF PRINCIPAL**(If **Contractor** is Other Than a Sole Proprietor)

I, \_\_\_\_\_, certify that I am the Secretary of the Corporation \_\_\_\_\_, or a General Partner \_\_\_\_\_ or Managing Partner \_\_\_\_\_ or Partner \_\_\_\_\_ of the partnership, named as the **Contractor** in the attached Section 00500 Agreement, that \_\_\_\_\_ who signed Section 00500 Agreement on behalf of the **Contractor**, was then \_\_\_\_\_ of that corporation \_\_\_\_\_ or partnership \_\_\_\_\_; that I know the undersigned's signature, and the signature is genuine; and that Section 00500 Agreement was duly signed, sealed and attested for and on behalf of that corporation \_\_\_\_\_ partnership \_\_\_\_\_ by authority of its governing body \_\_\_\_\_ or partners \_\_\_\_\_

\_\_\_\_\_  
Signed by the Secretary or Other Authorized Officer of the Corporation \_\_\_\_\_ Date  
or By General Partner or Managing Partner or Authorized Partner Certifying

\_\_\_\_\_  
Name of the Corporation or True Name of the Partnership

\_\_\_\_\_  
Telephone No.

(Corporate Seal)

**VERIFICATION**  
(by **Contractor**)

STATE OF \_\_\_\_\_ )

COUNTY OF \_\_\_\_\_ )

Before me, a Notary Public duly commissioned, qualified and acting, personally appeared (enter name of person who signed Section 00500 Agreement on behalf of the Bidder), \_\_\_\_\_ to me well known, who being by me first duly sworn upon oath, says that he/she is the Attorney-In-Fact for (enter the **Contractor's** name) \_\_\_\_\_ and that he/she has been authorized by (enter name of individual, partnership name, or that governing body of the Bidder named in the attached corporate resolution) \_\_\_\_\_ to execute Section 00500 Agreement on behalf of the named **Contractor** in favor of the STATE OF MICHIGAN.

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 20\_\_\_\_\_.  
\_\_\_\_\_

\_\_\_\_\_  
Notary Public, State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**RESOLUTION OF CORPORATE AUTHORITY**  
(If **Contractor** is a Corporation)

I, \_\_\_\_\_, Corporate Officer of \_\_\_\_\_, a \_\_\_\_\_  
(Print or type) Corporation (the "Company") (Indicate State)

DO HEREBY CERTIFY that the following is a true and correct excerpt from the minutes of the meeting of the Board of Directors, wherein a quorum was present, duly called and held on \_\_\_\_\_ and that the same is now in full force and effect:

"RESOLVED, that the Chairman, the President, each Vice President, the Treasurer, and the Secretary and each of them, hereby is authorized to execute and deliver, in the name and on behalf of the Company and under its corporate seal or otherwise, any agreement or other instrument or document in connection with any matter or transaction that shall have been duly approved; the execution and delivery of any agreement, document, or other instrument, or document in connection with any matter or transaction that shall have been duly approved; the execution and delivery of any agreement, document, or other instrument by any of such officers to be conclusive evidence of such approval."

I FURTHER CERTIFY that \_\_\_\_\_ is Chairman of the Board, \_\_\_\_\_ is President, \_\_\_\_\_ is Treasurer, and \_\_\_\_\_ is Secretary.

I FURTHER CERTIFY that any of the officers of the Company named in this Resolution of Corporate Authority are authorized to execute or guarantee and commit the Company to the conditions, obligations, stipulations, and undertakings contained in the Contract Documents for File No. \_\_\_\_\_ Work \_\_\_\_\_, \_\_\_\_\_ and that all necessary corporate approvals have been obtained in relationship thereto.

IN WITNESS THEREOF, I have set my hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**CORPORATE SEAL**

\_\_\_\_\_  
Corporate Officer's Signature

\_\_\_\_\_  
Title

Telephone No. \_\_\_\_\_

**CERTIFICATE OF PARTNERSHIP AUTHORITY**  
(If **Contractor** is a Partnership)

I, \_\_\_\_\_, General Partner in \_\_\_\_\_, a \_\_\_\_\_  
(Print or Type) Partnership (the "Partnership") (Indicate State)

DO HEREBY CERTIFY that I am a General Partner in the Partnership formulated pursuant to a Partnership Agreement dated \_\_\_\_\_, 20\_\_\_\_, and that the following is a true and correct excerpt from the minutes of the meeting of the General Partnership held on \_\_\_\_\_ and that the same is now in full force and effect:

"That each General Partner is authorized to execute and deliver, in the name and on behalf of the Partnership, any agreement or other instrument or document in connection with any matter or transaction that shall have been duly approved; the execution and delivery of any agreement, document, or other instrument, or document in connection with any matter or transaction that shall have been duly approved; the execution and delivery of any agreement, document, or other instrument by a General Partner to be conclusive evidence of such approval."

I FURTHER CERTIFY that any of the aforementioned General Partners of the Partnership are authorized to execute or guarantee and commit the assets of the Partnership to the conditions, obligations, stipulations, and undertakings contained in the Contract Documents for File No. \_\_\_\_\_ Work \_\_\_\_\_, \_\_\_\_\_ and that all necessary partnership approvals have been obtained in relationship thereto.

IN WITNESS THEREOF, I have set my hand this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
General Partner's Signature

\_\_\_\_\_  
Title

Telephone No. \_\_\_\_\_

**END OF SECTION 00500**

**SECTION 00520 ATTACHMENT "A" TO AGREEMENT****PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD CONTRACT ORDER No. Y\_\_\_\_\_

This Section 00520 Attachment A to Agreement supplements those specific provisions in Section 00500 Agreement designated below. All other provisions in Section 00500 Agreement that are not so supplemented remain in full force and effect. The terms "Agreement", "Contract Documents" and "Contract" have specific intents and meanings assigned as stated in Section 00500 Agreement and Section 00020 Glossary.

**SUPPLEMENTARY TERMS AND CONDITIONS TO  
ARTICLE 4 CONTRACT TIME; LIQUIDATED DAMAGES**

The following separable parts of the Work will be completed, as specified in the Contract Documents:

- (a) within \_\_\_\_\_ (\_\_\_\_) Days from the date when the Contract Time commences to run, or on or before \_\_\_\_\_, 20\_\_\_\_.
- (b) within \_\_\_\_\_ (\_\_\_\_) Days from the date when the Contract Time commences to run, or on or before \_\_\_\_\_, 20\_\_\_\_.
- (c) within \_\_\_\_\_ (\_\_\_\_) Days from the date when the Contract Time commences to run, or on or before \_\_\_\_\_, 20\_\_\_\_.

These interim Contract Times are of the essence so as to: (a) not Delay work by others as provided in Article 13 of the General Conditions; (b) conform to the sequences of Work indicated in or required by the Contract documents; and (c) comply with the coordination requirements of the Contract Documents.

The **Owner** and **Contractor** recognize that the Contract Time(s) specified in this Attachment A is(are) of the essence to this Agreement in that the **Owner** will suffer costs and damages if the Work is not completed within the Contract Time(s) plus any extensions authorized in accordance with Section 00700 General Conditions. Accordingly, liquidated damages will apply based on the following schedule: (a) \_\_\_\_\_ Dollars and No/Cents (\$ \_\_\_\_\_); (b) \_\_\_\_\_ Dollars and No/Cents (\$ \_\_\_\_\_); and (c) \_\_\_\_\_ Dollars and No/Cents (\$ \_\_\_\_\_) for each Calendar Day that expires after each of the respective Contract Times specified in this Section 00520 Attachment A to the Agreement for the completion of each of those designated parts of the Work, respectively, until each of those parts of the Work is complete. Any deduction by the **Owner** of liquidated damages from Requests for Payment shall be undertaken only after consultation with the **Professional** and shall be subject to the procedures outlined in paragraph 4.3, Section 00500 Agreement.

**END OF SECTION 00520**

## SECTION 00610 PERFORMANCE BOND

FILE No. 751/24078.SMD SURETY COMPANY REFERENCE No. \_\_\_\_\_

"The **Contractor**," \_\_\_\_\_, a corporation \_\_\_\_\_, individual \_\_\_\_\_, partnership \_\_\_\_\_, joint venture \_\_\_\_\_ of the State of \_\_\_\_\_, qualified to do business in the State of Michigan, as Principal, and "the Surety," \_\_\_\_\_, of the State of \_\_\_\_\_, as surety, are held and bound unto the State of Michigan, "the **Owner**," as Obligee, in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), for the payment of which the **Contractor** and Surety hereby bind themselves, their respective heirs, successors, legal representatives and assigns, jointly and severally, in compliance with 1963 PA 213, as amended, MCL 129.201 et seq.

The **Contractor** has entered into "the Contract" with the **Owner** for \_\_\_\_\_, "the Work," covered by the Contract Documents, which are incorporated into this Performance Bond by this reference.

If the **Contractor** faithfully performs and fulfills all the undertakings, covenants, terms, conditions, warranties, indemnifications and agreements of the Contract Documents within the Contract Time (including any authorized changes, with or without notice to the Surety) and during the Correction Period, and if the **Contractor** also performs and fulfills all the undertakings, covenants, terms, conditions, warranties, indemnifications and agreements of any and all duly authorized modifications of the Contract Documents, then THIS OBLIGATION IS VOID, OTHERWISE TO REMAIN IN FULL FORCE AND EFFECT.

A. No change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion, or other revision) releases the Surety of its obligations under this Section 00610 Performance Bond. The Surety expressly waives notice of any such change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion, or other revision).

B. This Section 00610 Performance Bond shall be solely for the protection of the **Owner** and its successors, legal representatives or assigns. The prevailing party in a suit on this Bond is entitled to recover as part of that party's judgment reasonable attorneys' fees.

C. It is the intention of the **Contractor** and Surety that they shall be bound by all terms and conditions of the Contract Documents (including, but not limited to Article 14 of Section 00700 General Conditions and this Section 00610 Performance Bond). However, this Section 00610 Performance Bond is executed pursuant to 1963 PA 213, as amended, MCL 129.201 et seq., and if any provision(s) of this Section 00610 Performance Bond is/are illegal, invalid, or unenforceable, all other provisions of this Section 00610 Performance Bond must nevertheless remain in full force and effect, and the **Owner** shall be protected to the full extent provided by 1963 PA 213, as amended, MCL 129.201 et seq.

**IMPORTANT:** The Surety shall be authorized to do business in the State of Michigan by the Department of Licensing and Regulatory Affairs, must be listed on the current U.S. Department of the Treasury Circular 570, and, unless otherwise authorized by the **Owner** in writing, must have at least an A- Best's rating and a Class VII or better financial size category per current A. M. Best Company ratings.

Name, Address and Telephone of the Surety:

Address and Telephone of Agent, who is either a resident of, or whose principal office is maintained in, the State of Michigan

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

THE **CONTRACTOR**: (Print Full Name and Sign)  
WITNESS \_\_\_\_\_By: \_\_\_\_\_  
Name & Title: \_\_\_\_\_

THE SURETY: (Print Full Name and Sign)

Telephone No. \_\_\_\_\_  
Agent: \_\_\_\_\_

WITNESS \_\_\_\_\_

Attorney-in-Fact: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Email: \_\_\_\_\_

END OF SECTION 00610

## SECTION 00620 PAYMENT BOND

FILE No. 751/24078.SMD SURETY COMPANY REFERENCE No. \_\_\_\_\_

"The **Contractor**," \_\_\_\_\_, a corporation \_\_\_\_\_, individual \_\_\_\_\_, partnership \_\_\_\_\_, joint venture \_\_\_\_\_ of the State of \_\_\_\_\_, qualified to do business in the State of Michigan, as Principal, and "the Surety," \_\_\_\_\_, of the State of \_\_\_\_\_, as surety, are held and bound unto the State of Michigan, "the **Owner**," as Obligee, in the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), for the payment of which the **Contractor** and Surety bind themselves, their respective heirs, successors, legal representatives and assigns, jointly and severally, in compliance with 1963 PA 213, as amended, MCL 129.201 et seq.

The **Contractor** has entered into "the Contract" with the **Owner** for \_\_\_\_\_, "the Work," covered by the Contract Documents, which are incorporated into this Payment Bond by this reference.

If the **Contractor** promptly pays all claimants supplying labor or materials to the **Contractor** or to the **Contractor's** Subcontractors in the prosecution of the Work, then THIS OBLIGATION IS VOID, OTHERWISE TO REMAIN IN FULL FORCE AND EFFECT.

A. All rights and remedies on this Section 00620 Payment Bond shall be solely for the protection of all claimants supplying labor and materials to the **Contractor** or the **Contractor's** Subcontractors in the prosecution of the Work and must be determined in accordance with Michigan Law.

B. No change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion, or other revision) must release the Surety of its obligations under this Section 00620 Payment Bond. The Surety hereby expressly waives notice of any such change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion, or other revision).

C. It is the intention of the **Contractor** and Surety that they must be bound by all terms and conditions of the Contract Documents (including, but not limited to this Section 00620 Payment Bond). However, this Section 00620 Payment Bond is executed pursuant to 1963 PA 213, as amended, MCL 129.201 et seq., and if any provision(s) of this Section 00620 Payment Bond is/are illegal, invalid, or unenforceable, all other provisions of this Section 00620 Payment Bond must nevertheless remain in full force and effect, and the **Owner** must be protected to the full extent provided by 1963 PA 213, as amended, MCL 129.201 et seq.

**IMPORTANT:** The Surety shall be authorized to do business in the State of Michigan by the Department of Licensing and Regulatory Affairs, must be listed on the current U.S. Department of the Treasury Circular 570, and, unless otherwise authorized by the **Owner** in writing, must have at least an A- Best's rating and a Class VII or better financial size category per current A. M. Best Company ratings.

Name, Address and Telephone of the Surety:

Address and Telephone of Agent, who is either a resident of, or whose principal office is maintained in, the State of Michigan

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

THE **CONTRACTOR**: (Print Full Name and Sign)

WITNESS \_\_\_\_\_

By: \_\_\_\_\_

Name &amp; Title: \_\_\_\_\_

Telephone No. \_\_\_\_\_

THE SURETY: (Print Full Name and Sign)

Agent: \_\_\_\_\_

WITNESS \_\_\_\_\_

Attorney-in-Fact: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Email: \_\_\_\_\_

END OF SECTION 00620



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## STATE OF MICHIGAN MODEL

Developed from FORMSPEC™ Michigan Model

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### ARTICLE 1 INTERPRETATIONS

#### 1.1 Section 00020 Glossary:

1.1.1. Section 00020 Glossary assigns specific intent and meanings to capitalized terms and to other defined terms used in this Section 00700 General Conditions, Section 00500 Agreement, Section 00520 Attachment A to the Agreement, Section 00610 Performance Bond, Section 00620 Payment Bond, and Section 00800 Supplementary Conditions.

1.1.2. Section 00020 Glossary also provides specific rules for construing any reference to any Article or paragraph that is made in this Section 00700 General Conditions.

#### 1.2 Intent of the Contract Documents:

1.2.1. The intent of the Contract Documents is to describe the *entire* Work, including its various parts, to the extent necessary for the **Contractor** to discharge its obligation to execute and complete the Work in accordance with the Contract Documents. The Contract Documents are complementary; what is required by one shall be as binding as if required by all Contract Documents.

1.2.2. The *entire* Work required by the Contract Documents includes Work, which is reasonably inferable from the Contract Documents or from prevailing custom and trade usage.

The **Contractor** shall provide any Work reasonably inferable to the extent such Work is required to properly complete the installation of other Work expressly shown or specified in the Contract Documents. If the **Contractor** disagrees that Work that is not expressly shown or detailed in the Contract Documents is Work reasonably inferable, the **Contractor** shall proceed in accordance with the provisions of paragraph 10.1.3.

1.2.3. The breakdown of the Work by Divisions and Sections, or the identification of any Drawing, shall not delineate or be construed to delineate Work to be performed by any trade. The breakdown shall not control the manner in which the Work may be divided by the **Contractor** among Subcontractors and Suppliers.

\*1.2.4. Reference to the State Construction Code Act of 1972, 1972 PA 230, as amended, MCL 125.1501 *et seq.*, or to standard specifications, manuals or codes of any technical society, organization, or association, whether specifically or by implication, means the issue in effect on the date of Bid opening, unless otherwise expressly stated. Work indicated in or required by the Contract Documents that is above standards set in the State Construction Code shall be provided to the higher standard.

1.2.5. The provisions of the Contract Documents shall govern over any standard specification, manual or code of any technical society, organization, or association. Unless otherwise provided in the Contract Documents, words with an accepted technical or trade meaning used to describe any Work shall be interpreted in accordance with that meaning.

1.2.6. If any Work indicated in, or required by, the Contract Documents is above the standards set by any Law applicable to the Work and the Project, the higher standard shall govern.

1.2.7. The terms "the Contract Documents," "as specified in the Contract Documents," "in accordance with the Contract Documents" or such other similar terms shall be construed as including all valid Change Orders and Change Authorizations.

1.2.8. "Execution of the Work" and "shall provide" includes the furnishing and/or performance of the Work. "Work" as in "Unit Price Work," or "any Work" or "acceptable Work," etc. refers to a specific part(s) of the Work.

1.2.9. Subject to the **Contractor's** continuing responsibilities for the acts of Subcontractors and Suppliers, whenever in the Contract Documents the term "the **Contractor**" is used concerning any action, obligation, cost, or event, it shall cover, even if not expressly stated, actions or obligations or costs of, or events involving, any Subcontractor, Supplier, or anyone for whom any of them may be liable, unless the context requires otherwise.

1.2.10. Use of the terms "as ordered," "as directed," "as required," "as allowed," "as approved" or similar terms, or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or similar adjectives, to describe a requirement, direction, review, or judgment of the **Professional** or **Owner** as to the Work will be solely to evaluate the Work for compliance with the Contract Documents. No use of any such term or adjective, or provision of any standard specification, manual or code (whether expressly incorporated by reference in the Contract Documents or not), or Suppliers' instructions, shall be effective to (a) change the duties and responsibilities of the **Owner** or **Professional** from those assigned in the Contract Documents, (b) assign to the **Owner** or **Professional** any duty or authority to supervise or direct the furnishing or performance of the Work or assume responsibility contrary to the provisions of the Contract Documents.

1.2.11. A provision stating "the **Contractor** shall bear its proportionate share of the Delay and costs" shall be construed as entitling the **Owner** to an appropriate decrease in Contract Price and Contract Time for all the **Owner's** direct, indirect, and consequential costs and damages that are attributable to the **Contractor**.

1.2.12. Contract Time computations shall be made in Calendar Days. The Progress Schedule shall be in the form of a Critical Path Method schedule, Total Float and Contract Float values stated in Business Days shall be converted to Calendar Days when used for the purpose of calculating changes in Contract Time.

1.2.13. Any computation of a Contract Time which adds Calendar Days to a date shall include both the first and last Day. Any computation of a notice period shall exclude the first Day and include the last Day. In any case, if the computed Day falls on a non-Business Day, it shall be omitted from the computation.

1.2.14. In the Contract Documents, the terms "substantially completed" and "substantially complete" have in context the same meaning as Substantial Completion.

### 1.3 Priority of the Contract Documents:

1.3.1. Whenever an issue of priority involves two Sections within the Contract Documents, the following will apply: Unless the **Owner** and **Contractor** mutually agree otherwise, a Section of the Contract Documents will *supersede* another *conflicting* Section if the *superseding* Section is listed in paragraph 2.2 of Section 00500 Agreement ahead of the *conflicting* Section.

1.3.2. Whenever an issue of priority involves Work called for in the technical Specifications or Drawings – figured dimensions shall govern scaled dimensions, detail Drawings shall govern general Drawings and Drawings shall govern Submittals.

Whenever specifications, dimensions, notes, schedules, or details conflict (whether within the Specifications or Drawings, or between the Specifications and Drawings, or between Change Order Drawings and the Drawings), the **Contractor** shall be required to provide the higher performance requirement only to the extent such outcome results in Work reasonably inferable.

#### 1.4 Interpretation of Indemnification Provisions:

1.4.1. Paragraphs 1.4.2 and 1.4.3 will be as effective as if repeated in paragraphs 4.5.2, 4.6.1, 4.9.1, 10.4.4, 13.3.1 and in any other paragraph requiring the **Contractor** to defend, indemnify and hold harmless the **Owner** and **Professional**.

1.4.2. Any indemnification provision requiring the **Contractor** to defend, indemnify and hold harmless the **Owner** and **Professional** against all claims, or covering liability of the **Owner** or **Professional**, shall include claims caused in part by the negligence or other liability-creating conduct or omission of the **Contractor**.

1.4.3. The terms "against all claims" in any such obligation shall be construed as covering all claims, of whatever type and nature, and all judgments, costs, losses, and damages, whether direct, indirect, or consequential (including, but not limited to, charges of architects, engineers, attorneys and others and all court, hearing, and any other dispute resolution costs).

#### 1.5 Additional Interpretations:

1.5.1. The term "the **Professional**" shall be construed as covering, even if not expressly stated, the **Professional's** consultants, agents, and employees. This interpretation shall not be construed as relieving the **Professional** of its sole responsibility for the performance of the **Professional's** obligations and responsibilities, whether performed by the **Professional** directly or through any consultant, agent, or employee.

1.5.2. The expression "any act or omission within the control of" shall include, but is not limited to, the fault or negligence of the party involved and any other act, cause, and event for which that party is responsible. The expression "any cause beyond the control of" shall include any act or omission not within the reasonable control of the party involved and any other act, cause, and event for which that party is not responsible.

1.5.3. Whenever in the Contract Documents, the term "first tier" is used concerning a Subcontractor or Supplier, it means a Subcontractor or Supplier having a direct Sub agreement with the **Contractor**. Relatedly, the term "lower tier" refers to a Subcontractor or Supplier having a direct Sub agreement with another Subcontractor.

1.5.4. The expression "materials and/or equipment" shall not be construed to equate materials with equipment, but rather shall be interpreted as a general reference to materials or equipment, whichever actually applies. The term "stored materials" shall include materials and equipment. Where a differentiation between materials or equipment is necessary, such as for payments for approved equipment Shop Drawings, use of the term "equipment" shall exclude materials. In any such case, examples of equipment shall be conveying equipment, tanks, pumps, vessels, fans, boilers, air handling units, heat exchangers, compressors, incineration equipment, motor control centers, switchgears, transformers, control panels and so forth; and such components as pipe fittings and specialties, valves, ductwork, plumbing fixtures, cable tray, conduit and cable, electrical fixtures, panel boards and so forth shall be materials and not equipment.

1.5.5. The term "registered mail" includes registered U.S. mail and certified U.S. mail with return receipt requested. The term "hand delivered" includes delivery by private carriers.

1.5.6. The term "self-performed Work" means Work performed by the **Contractor**, as opposed to Work performed by a Subcontractor, which is referred to as "Subcontractor Work."

1.5.7. An "early completion" Progress Schedule is a **Contractor**-prepared Revision Progress Schedule Submittal that anticipates completion of the entire Work, or of any portion of the Work having a separate, specified Contract Time, ahead of the correspondingly specified Contract Time.

#### 1.6 Ownership and Use of the Contract Documents:

1.6.1. Neither the **Contractor** nor any Subcontractor or Supplier shall have or acquire title to or ownership rights in any of the Drawings, Specifications or documents identified in Section 00210 Information for Bidders, and they shall not reuse any of them on extensions of the Project or any other project without prior written consent of the **Owner** and **Professional**.

1.6.2. The **Contractor**, Subcontractors and Suppliers are granted a limited license to use and reproduce parts of the Contract Documents and those documents identified in Section 00210 Information for Bidders as appropriate for their use in the furnishing and performance of their Work. All copies of the Drawings and Project Manual and other documents made under this license shall retain all copyright and trademark notices, if any.

**1.7 Copies of the Contract Documents:**

1.7.1. The **Owner** will furnish, at no cost to the **Contractor**, one (1) electronic copy of the Drawings and Project Manual. If the **Contractor**, or the Contractor's Subcontractors or Suppliers request hard copy sets, reproduction of these documents will be the responsibility of the **Contractor**.

**ARTICLE 2 THE OWNER – GENERAL PROVISIONS****2.1 Availability of Lands, Areas, Properties and Facilities:**

2.1.1. The Contract Documents indicate the lands, areas, properties, and facilities upon which the Work is to be performed and those rights-of-way and easements for access to the site furnished by the **Owner**. Easements for permanent structures or for permanent changes in any existing lands, areas, properties, and facilities will be obtained by the **Owner**, unless otherwise expressly stated elsewhere in the Contract Documents.

2.1.2. The **Contractor** shall obtain, at no increase in Contract Price or Contract Time, any other lands, areas, properties, facilities, rights-of-way, and easements the **Contractor** requires for temporary facilities, storage, disposal of spoil or waste material or any other such purpose. If public property, the **Contractor** shall obtain all required permits from the federal agency, State agency, Political Subdivision or Public Utility with jurisdiction. If private property, the **Contractor** shall obtain prior permission by written agreement. The **Contractor** shall submit copies of the permits and written agreements to the **Owner**.

**2.2 Reference Points; Base Lines and Benchmarks:**

2.2.1. Unless noted otherwise, the **Owner or Professional** will provide engineering surveys to establish reference points for construction that the **Professional** considers necessary for the **Contractor** to proceed with the Work. The **Contractor** shall be responsible for surveying and laying out the Work from those reference points. The **Contractor** shall be responsible for protecting and preserving those reference points as well as any base lines and benchmarks provided for the Work.

2.2.2. The **Contractor** shall make no changes on any reference points, base lines, and benchmarks without the **Professional's** prior written approval. The **Contractor** shall report to the **Professional** whenever any reference point, base line or benchmark is lost, destroyed, or requires relocation. The **Contractor** shall replace and relocate any lost or destroyed reference points accurately, with professionally, licensed personnel, if so, directed by the **Professional**.

2.2.3. The **Contractor** shall bear its proportionate share of the Delay and costs resulting from any loss, destruction, replacement and/or relocation of reference points, base lines and/or benchmarks, to the extent any such loss, destruction, replacement and/or relocation results in whole or in part from any act or omission within the control of the **Contractor**.

**2.3 Stop Work Order:**

2.3.1. The **Owner** may order the **Contractor** in writing to stop the Work, in the whole or in part, in the event any of these situations occur: (a) any Work is Defective, (b) any Work, when completed, will not conform to the Contract Documents, (c) any materials or equipment are unsuitable, or (d) any workers are insufficiently skilled. The **Contractor** shall bear its proportionate share of the Delay and costs resulting from any such stop Work order unless the **Contractor** is/was not at fault.

2.3.2. If the **Contractor** is/was not at fault, the **Owner** will amend the Contract Documents to provide for any adjustments in Contract Price and/or Contract Time made necessary by any resulting Delay which is unreasonable under the circumstances. This authority to stop the Work or any Work shall not create or impose any duty or responsibility on the **Owner** to exercise such authority for the benefit of the **Contractor** or of any Subcontractor, Supplier, surety to any of them or any other third party.

**2.4 Limitations on the Owner's Responsibilities:**

2.4.1. The **Owner** is not responsible for the **Contractor's** Means and Methods, safety precautions and programs related to safety, or the **Contractor's** failure to execute the Work in accordance with the Contract Documents. Nor is the **Owner** responsible for any act or omission of the **Contractor** or of any Subcontractor, any Supplier or anyone for whose acts the **Contractor** or any Subcontractor or Supplier may be liable.

2.4.2. The **Owner** is not responsible for verifying whether the **Contractor's** Progress Schedule Submittals, any certificates and/or policies of insurance or any technical Submittals are in accordance with the Contract Documents, or for verifying their accuracy or completeness in any way.

2.4.3. Neither the **Owner's** authority to review any of those Submittals, nor the **Owner's** decision to raise or not raise any objections about any such Submittals, shall create or impose any duty or responsibility on the **Owner** to exercise any such authority or decision for the benefit of the **Contractor**, any Subcontractor or Supplier, any surety to any of them or any other third party.

**2.5 Additional General Provisions:**

2.5.1. Written communications from the **Owner** to the **Contractor** will generally be issued through the **Professional**. If there is need to issue communications directly, a copy will be sent concurrently to the **Professional**. Written communications from the **Contractor** to the **Owner** may be issued directly to the **Owner** or through the **Professional** if such is more appropriate. Any such communication shall also include concurrent copy of both parties.

2.5.2. The **State Facilities Administration** Representative shall be the representative for the **Owner**. The **State Facilities Administration** Representative may be represented on-site by a Field Representative(s). Neither the **State Facilities Administration** Representative nor the Field Representative shall have authority to interpret the requirements of the Contract Documents. Unless delegated by specific written notice from the **Owner**, the Field Representative does not have any authority to order any changes in the Work or authorize any adjustments in Contract Price or Contract Time.

**2.6 Partnering Charter:**

2.6.1. If the Contract Documents indicate the **Owner's** intent to implement a bilateral partnering charter, unless the **Contractor** declines in writing, the **Contractor** shall cooperate with the **Owner** in implementing such a partnering charter for the Contract. Unless the possibility is expressly allowed for in the Contract Documents, no provision, requirement, or other aspect of the Contract Documents shall be open for change, revision, or modification in any such partnering charter.

**ARTICLE 3 THE PROFESSIONAL – GENERAL PROVISIONS****3.1 Owner's Representative:**

3.1.1. The **Professional** shall be the **Owner's** representative during the Contract Time period. The **Professional's** duties, responsibilities and limits of authority set forth in the Contract Documents shall not be changed without the prior written consent of both the **Owner** and **Professional**.

3.1.2. The **Professional** will make On-Site Inspections at intervals appropriate to the stages of the Work to observe the quality and quantity of progress and completed Work; to determine actual quantities of Unit Price Work completed by the **Contractor** and to determine whether the Work is being executed so that the Work, when completed, will be in accordance with the Contract Documents. Based on the On-site Inspections, the **Professional** will endeavor to guard the **Owner** from Defective Work and to keep the **Owner** informed of the progress of the Work.

3.1.3. If the **Professional** assigns Resident Project Representatives, their duties, responsibilities, and limits of authority will be given in the Contract Documents or at the pre-construction conference. Unless delegated by specific written notice from the **Owner**, the Resident Project Representative does not have any authority to order any changes in the Work or authorize any adjustments in Contract Price or Contract Time.

3.1.4. The **Professional** will have authority to disapprove or reject Work that the **Professional** believes to be Defective, and to require inspection or testing of any Work, whether or not such Work is fabricated, installed, or completed. The **Contractor** shall take prompt corrective action upon receiving any Defective Work notice from the **Professional**.

3.1.5. On-Site Inspections by the **Professional** and/or Resident Project Representatives shall not create or impose any duty on the **Professional** or Resident Project Representatives to make the On-Site Inspections for the benefit of the **Contractor** or any other third party. On-Site Inspections will not relieve the **Contractor** from its obligation to provide the Work in accordance with the Contract Documents or represent acceptance of Defective Work.

3.1.6. Inspections by the Field Representative(s) shall not create or impose any duty on such Field Representative to make the observations for the benefit of the **Contractor** or any other third party. Any such inspection will not relieve the **Contractor** from its obligation to provide the Work in accordance with the Contract Documents or represent acceptance of Defective Work.

**3.2 Clarifications and Interpretations:**

3.2.1. The **Professional** will issue with reasonable promptness written clarifications or interpretations as the **Professional** may determine necessary or in response to a **Contractor** written request for interpretation. If the **Contractor** believes that a written clarification or interpretation issued by the **Professional** justifies an adjustment in Contract Price or Contract Time, the **Contractor** shall promptly notify the **Professional** in writing before proceeding with the Work Involved.

3.2.2. In any such case, if the **Contractor** is properly authorized in writing to proceed with the Work Involved before full agreement is reached on the extent of any such adjustments (if any are determined to be due at all), the **Contractor** shall furnish to the **Professional**, upon request from the **Professional**, those actual cost Records specified in paragraphs 11.4 and 11.5.

**3.3 Minor Variations and No-Cost Changes; Minor Delays:**

3.3.1. The **Professional** may authorize minor variations in the Work, order no-cost changes consistent with the Contract Documents or cause minor Delay if, in the **Professional's** judgment, such variation, no-cost change or Delay does not justify any adjustment in Contract Price or Contract Time. Minor variations will be ordered in writing; no-cost changes will be authorized by Change Authorization. If the **Contractor** believes any minor variation or no-cost change justifies an increase in Contract Price or Contract Time, the **Contractor** shall promptly notify the **Professional** in writing before proceeding with the Work Involved and follow the procedures in paragraph 3.2. Notice requirements for minor Delays are provided in paragraph 8.7.4.

**3.4 Determinations by the Professional:**

3.4.1. The **Professional** will be the interpreter of the requirements of the Contract Documents and, in such capacity, will render determinations on the acceptability of the Work. Notices, proposals, claims, or other matters relating to the acceptability of the Work, the interpretation of the requirements of the Contract Documents or any adjustment in Contract Price or Contract Time shall be referred to the **Professional** in writing requesting a formal, written determination, which the **Professional** will render within a reasonable time. If the **Contractor** disagrees with any such **Professional** determination, the **Contractor** may deliver notice of a claim and a claim submittal within thirty (30) Calendar Days in accordance with the procedures and within the deadlines set forth in Article 15 Disputes.

3.4.2. The rendering of any interpretation or of any determination on any notice, proposal, claim, or other matter relating to the acceptability of the Work or to any adjustment in Contract Price or Contract Time will be a prerequisite to the exercise by the **Contractor** of any rights or remedies the **Contractor** may otherwise have under the Contract Documents or by Law concerning any such issue.

**3.5 Limitations on the Professional's Responsibilities:**

3.5.1. The **Professional's** authority to act under this Article 3 or elsewhere in the Contract Documents, or any decision made by the **Professional** in good faith to exercise or not to exercise such authority, shall not give rise to any duty or responsibility of the **Professional** to the **Contractor**, to any Subcontractor or any Supplier, to any surety or to any third party.

3.5.2. The **Professional** is not responsible for the **Contractor's** Means and Methods, safety precautions and programs related to safety, or for the **Contractor's** failure to execute the Work in accordance with the Contract Documents. Furthermore, the **Professional** is not responsible for any act or omission of the **Contractor** or of any Subcontractor, Supplier, or anyone for whose acts the **Contractor** or any Subcontractor or Supplier may be liable.

**ARTICLE 4 CONTROL OF WORK – GENERAL PROVISIONS****4.1 Review of the Contract Documents:**

4.1.1. Before undertaking each part of the Work, the **Contractor** shall study and compare the Contract Documents with each other and against manufacturers' recommendations for installation and handling. Before undertaking each part of the Work, the **Contractor** shall verify dimensions and take field measurements, and the **Contractor** shall coordinate the location, dimensions, access, fit, completeness, etc. of dependent Work. The **Contractor** shall promptly notify the **Professional** in writing of any conflict, error or omission in the Contract Documents and deviation from manufacturers' recommendations for installation and handling discovered.

4.1.2. The **Contractor** shall bear its proportionate share of the Delay and costs resulting from any Work undertaken before apprising the **Professional** and/or obtaining a written clarification or interpretation from the **Professional**, if the **Contractor** knows or has reason to know that any such Work (a) involves a conflict, error or omission, or (b) is subject to a specified Means and Method which is inappropriate, unworkable or unsafe, or (c) is subject to a specified method of installation, performance or test procedure and/or result which is contrary to the recommendations provided by or for the respective manufacturer.

**4.2 Management, Supervision and Personnel:**

4.2.1. The **Contractor** shall manage, supervise, and direct the Work competently, applying the management, supervision, skills, expertise, scheduling, coordination, and attention necessary to provide the Work in accordance with the Contract Documents, while insuring timely and unhindered access to the site. The **Contractor** shall be responsible for any Means and Methods unless a specific Means and Method is indicated in or required by the Contract Documents. The **Contractor** shall verify that completed Work complies with the Contract Documents, all approved Submittals and all clarifications and interpretations.

4.2.2. The **Contractor** shall maintain a competent, full-time superintendent on the Work at all times during its progress. The superintendent shall be the **Contractor's** representative at the site and shall have authority to act on behalf of the **Contractor**. The Superintendent shall not be assigned or replaced without the **Owner's** consent. If the **Owner**, in the reasonable exercise of its discretion, objects to the superintendent, the **Contractor** shall use a replacement superintendent at no increase in Contract Price or Contract Time. All communications given to the superintendent shall be as binding as if given to the **Contractor**. The DTMB Superintendent Designation [form](#) must be completed by the Contractor and submitted before beginning any work.

4.2.3. The **Contractor** shall provide competent, suitably qualified personnel to survey and lay out the Work. As part of this responsibility, the **Contractor** shall engage a registered land surveyor to accurately locate base lines and Project elevations. The **Contractor** shall be required to furnish certifications that lines and grades for all concrete slabs were checked before and after placing of concrete, and that final grades are as required by the Contract Documents.

4.2.4. The **Contractor** shall provide competent and suitably qualified trade foremen and craft workers to construct the Work, in all cases as required by the Contract Documents. At all times, the **Contractor** shall maintain good discipline and order at the site.

4.2.5. Whenever activities of the **Contractor** are carried out beyond the limits of the site or the indications of temporary fences or barricades, the **Contractor** shall schedule trenching, utility Work, site development, landscaping and all other activities in the way that will cause minimum disturbance to or interference with adjoining property, service to the public or the normal operation of the **Owner** or others affected by such activities.

4.2.6. If a Means and Method is indicated in, or required by, the Contract Documents, a substitute Means, and Method may be used by the **Contractor** only after obtaining the **Professional's** approval that it meets the applicable criteria in paragraph 5.2 without increasing Contract Price or Contract Time. If any such substitution causes earlier completion of the Work, the **Owner** and **Contractor** may negotiate an appropriate shortening in Contract Time, a level of liquidated damages appropriate to the shortened Contract Time, and a decrease in the Contract Price. If the **Owner** and **Contractor** are unable to agree on the extent of any such adjustments, the **Owner** may deliver a claim in accordance with the procedures and within the deadlines set forth in Article 15.

4.2.7. The **Contractor** shall post appropriate construction signs to advise the occupants and visitors of occupied facilities of the limits of construction work areas, hardhat areas, excavations, construction parking and staging areas, etc.

### 4.3 Materials and Equipment:

4.3.1. Unless otherwise specified in the Contract Documents, the **Contractor** shall furnish and be responsible for all materials, equipment, transportation, construction equipment, tools, supplies, fuel, utilities, water for flushing and testing, temporary facilities and all other facilities and incidentals necessary for the furnishing and performance, which includes, without limitation, the testing and completion of the Work.

4.3.2. All materials and equipment shall be of good quality, free of defect and new, unless otherwise allowed in the Contract Documents. For each material and equipment, the **Contractor** shall provide complete information on preventive maintenance, operating requirements, parts lists, ordering of parts and other applicable conditions. Materials and equipment shall be protected against any damage at all times so that they remain new.

4.3.3. If required for the **Professional's** acceptance of any materials or equipment, the **Contractor** shall furnish satisfactory evidence (which shall include test procedures and reports of required tests) as to the kind and quality of the materials and equipment. Materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned following the manufacturer's and Suppliers' instructions, except as otherwise provided in the Contract Documents.

4.3.4. Paragraph 7.3, Section 00100 Instructions to Bidders, dealing with materials and equipment *listed* in Schedule 1.6 of Section 00440 Schedule of Materials and Equipment is made part of this Section 00700 General Conditions by this reference.

### 4.4 Concerning Control of Work:

4.4.1. The **Contractor** shall prosecute the Work in the way that will cause the least practicable interference with and avoid prolonged interruption of, or damage to, existing facilities. The **Contractor** shall obtain written approval from the **Owner** ten (10) Calendar Days before connecting to existing facilities or interrupting service. If the **Contractor's** Means and Methods require tapping into an existing system(s), the **Contractor** shall be responsible for the restoration of such system and of any extensions of such systems.

4.4.2. To the extent specified Work on an existing system may cause damage to, or imbalances in extensions of such systems, and restoration of the entirety of such systems is not designated in the Drawings and/or Specifications as required Work, the **Contractor** shall be responsible for seeking an appropriate clarification or interpretation from the **Professional** before proceeding with the Work Involved.

4.4.3. The **Contractor** shall perform Work and operate vehicles and construction equipment in a safe manner and without becoming a hazard to the public, while at the same time ensuring the least practicable interference with pedestrians and traffic. In addition, such operations shall be carried out without interfering with overhead utilities. When transporting materials or equipment, vehicles shall not be loaded beyond the capacity set by their manufacturers or applicable Laws. When crossing sidewalks, curbs or landscaped areas, the **Contractor** shall protect them from damage. Safe and adequate pedestrian and vehicular access shall be maintained to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, hospitals, fire, and police stations and like establishments.

4.4.4. The **Contractor** shall be responsible for performing the pumping, draining, and controlling of surface water and groundwater in the way that will not endanger the Work or any adjacent facility or property, or interrupt, restrict or interfere with the use of any adjacent facility or property.

4.4.5. Paragraph 3.10, Section 00100 Instructions to Bidders, invoking the "Soil Erosion and Sedimentation Control," 1994 PA 451, Part 91, as amended, MCL 324.9101 et seq., is made part of Section 00700 General Conditions by this reference.

4.4.6. To the extent the **Contractor** knows, or has reason to know, the **Contractor** shall be responsible for performing the Work taking fully into account any dewatering, blasting, etc. operations from other work bearing a potential impact on the Work.

4.4.7. Any damaged Work corrected by the **Contractor** shall be corrected and made equal in all respects (quality, finish, appearance, function, etc.) to similar non-damaged Work otherwise required by the Contract Documents.

4.4.8. The **Contractor** shall verify that Work already *in-place* is in proper condition to receive *dependent* Work, and that dependent Work connecting to the *in-place* Work is properly coordinated. Whether or not expressly specified in the Contract Documents, the **Contractor** shall be responsible for all cutting, fitting, drilling, fixing-up and patching of concrete, masonry, gypsum board, piping and other materials that may be necessary to make *in-place* Work and *dependent* Work fit together properly.

4.4.9. The **Contractor** shall not obstruct access to municipal structures, hydrants, valves, manholes, fire alarms, etc., nor operate valves or otherwise interfere with the operation of any Public utilities without first securing the necessary approvals and permits. Except as may be otherwise provided in the technical Specifications, the **Owner** will charge the **Contractor** for all utilities used based on the charges the **Owner** actually incurs.

4.4.10. In the event of any unauthorized interruption of service to any operating facility, the **Contractor** shall take immediate action to restore that service as soon as practicable. The **Contractor** shall be directly responsible for the charges of any manufacturer's representative called to the site to repair or adjust any systems damaged by the **Contractor**.

4.4.11. Whenever the **Contractor** has caused an operating security system to go out of service or left unsecured openings in existing facilities or security fences, the **Contractor** shall furnish a security guard acceptable to the **Owner** to maintain security of the facility outside of normal working hours. The **Contractor** will be held responsible for any losses on account of the **Contractor's** interruption of security systems or barriers at existing facilities.

4.4.12. The **Contractor** shall take steps, procedures or means as may be required to prevent dust nuisance resulting from the **Contractor's** operations. The dust control measures shall be maintained at all times to the satisfaction of the **Owner** and any Political Subdivision with jurisdiction.

4.4.13. The **Contractor** shall, before final inspection, mark in a permanent and readily identifiable manner, all reference points provided by the **Owner**.

4.4.14. The Contractor shall note and comply with APPENDIX I SPECIAL WORKING CONDITIONS and APPENDIX II SPECIAL PROJECT PROCEDURES as part of and in conjunction with all other contract requirements. APPENDIX I & II immediately follow and are attached hereto SECTION 00800.

#### 4.5 Patent Fees and Royalties:

4.5.1. The **Contractor** shall be responsible for paying all royalties and license fees and assuming all costs resulting from the use in the furnishing and performance of the Work and/or the incorporation into the Work of any invention, design, process, product, or device covered by patent rights or copyrights, whether specified in the Contract Documents or chosen by the **Contractor**. The **Contractor** shall sign suitable agreement(s) with the patentee or copyright owner and, if requested, provide copies to the **Owner**.

4.5.2. The **Contractor** shall defend, indemnify, and hold harmless the **Owner** and **Professional** from and against all claims, as construed in paragraph 1.4, arising from any patent or copyright infringement by the Contractor including, but not limited to, patent or copyright infringements resulting from "or equal" substitution of any invention, design, process, product, or device that is specified in the Contract Documents.

4.5.3. If the **Contractor** knows, or should know, that the specified invention, design, process, product, or device infringes on a patent or copyright, the **Contractor's** obligation to defend, indemnify and hold harmless **Owner** and **Professional** from and against all claims arising from any patent or copyright infringement shall apply, unless the **Contractor** promptly furnishes that information to the **Professional** in writing.

#### 4.6 Use of Premises:

4.6.1. The **Contractor** shall confine its operations (including, but not limited to construction equipment and laydown and storage) to the site and lands, areas, properties, facilities, rights-of-way, and easements ("the premises") identified and permitted by the Contract Documents and shall not unreasonably encumber the premises. The **Contractor** shall be responsible for any damage to the premises (including, but not limited to, damage to any real and personal property) and for any damage to any adjacent lands, areas, properties, facilities, rights-of-way, and easements (including, but not limited to, damage to any real and personal property) resulting from the **Contractor's** operations.



The **Contractor** shall defend, indemnify, and hold harmless the **Owner** and **Professional** against all claims, as construed in paragraph 1.4, arising from any damage to such premises or adjacent lands, areas, properties, facilities, rights-of-way, and easements (inclusive of real and personal property), including loss of use, to the extent resulting from the **Contractor's** operations.

4.6.2. The **Contractor** shall keep the premises free from accumulations of waste materials, rubbish, and other debris, and shall not remove, injure, cut, alter, or destroy trees, shrubs, plants, or grass, unless otherwise provided elsewhere in the Contract Documents. At the completion of the Work, the **Contractor** shall remove all obstructions, waste and surplus materials, rubbish, debris, tools, and construction equipment and shall leave the site clean and ready for occupancy by the **Owner**.

4.6.3. The **Contractor** shall restore to pre-existing conditions all walks, roadways, paved or landscaped areas and other real and personal property not designated for alteration by the Contract Documents. To the extent the **Contractor** refuses, fails or neglects to replace all such altered premises and/or restore to its pre-existing condition any walk, roadway, paved or landscaped area and other property not designated for alteration by the Contract Documents, the **Contractor** shall bear its proportionate share of the Delay and costs resulting from the **Contractor's** refusal, failure, or neglect to do so.

4.6.4. The **Contractor** shall not load or permit any part of any structure to be loaded in any way that will endanger the structure. The **Contractor** shall not subject any part of the Work or adjacent property to stresses or pressures that will damage or endanger the Work or adjacent property, or both.

#### 4.7 Record Documents:

4.7.1. The **Contractor** shall maintain at the site one copy of all Record Documents in good order and annotated in a neat and legible manner using a contrasting, reproducible color to show (a) all revisions made, (b) dimensions noted during the furnishing and performance of the Work, and (c) all deviations between the as-built installation and the Contract Documents, all approved Submittals and all clarifications and interpretations.

4.7.2. Record Documents, along with a properly annotated copy of all approved Submittals, shall be available to the **Professional** and **Owner** at all times during the progress of the Work. The finalized Record Documents and approved Submittals shall be required for processing final payment to the **Contractor**.

4.7.3. The **Contractor** shall maintain and make available to the **Owner** and **Professional** daily field reports and digital photos recording the on-site labor force and equipment (**Contractor** and Subcontractors); materials/equipment received (at the site or at another location); visits by Suppliers; significant in-progress and completed trade Work within major areas; and other pertinent information.

4.7.4. Such daily field reports shall be furnished by the **Contractor** promptly to the **Professional** and **Owner** upon their request and shall be accepted by the **Owner** for information only. Neither the **Owner** nor **Professional's** review of any daily field report shall be construed as agreement with the information contained in any such daily field report.

#### 4.8 Emergencies:

4.8.1. In Emergencies affecting the safety or protection of Persons, the Work or property at or adjacent to the site, the **Contractor**, without any special instruction or authorization from the **Professional** and/or the **Owner**, is obligated to act to prevent threatened damage, death, injury, or loss.

4.8.2. The **Contractor** shall give the **Owner** prompt written notice of any changes in the Work resulting from the action taken. If the **Owner** concurs, the **Owner** will amend the Contract Documents to provide for those changes and, unless the Emergency results in whole or in part from any act or omission within the control of the **Contractor**, to provide for any corresponding adjustment in Contract Price and/or Contract Time.

#### 4.9 Indemnification:

4.9.1. The **Contractor** shall defend, indemnify and hold harmless the **Owner** and **Professional** from and against all claims, as construed in paragraph 1.4, for bodily injury, sickness, disease or death, or injury to the destruction of property, including loss of use, arising out of, relating to, or being in any way connected with the Work, that are in any way (a) caused by any negligent act or omission of the **Contractor**, any Subcontractor or Supplier or anyone for whose acts any of them may be liable, or (b) related to the **Contractor's** failure to maintain the required insurance and coverages. As a point of emphasis, and as set forth in paragraph 1.4, such claims shall include, but are not limited to charges of architects, engineers, attorneys and others and all court, hearing, and other dispute resolution costs.

4.9.2. As a point of emphasis, as set forth in paragraph 1.4, this indemnification obligation shall include claims caused in part by the negligence or other liability-creating conduct or omissions of the **Owner** (including State departments, agencies, boards, commissions, officers, and employees) or **Professional**; however, the **Contractor** shall not be required to indemnify the **Owner** or **Professional** against liability for loss or damage resulting from the sole negligence of the **Owner** and/or **Professional**.

4.9.3. With respect to claims against the **Owner** or **Professional** by any employee of the **Contractor**, the indemnification obligation under this paragraph 4.9 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the **Contractor**, any Subcontractor or Supplier under workers' compensation, disability benefit or other benefit acts.

## ARTICLE 5 SUBCONTRACTORS AND SUPPLIERS

### 5.1 Employment of Subcontractors:

5.1.1. Upon due investigation, the **Owner** may revoke, because of subsequent violation of a material requirement of the Contract Documents, the **Owner's** consent to any Subcontractor previously given pursuant to the provisions of Article 8 of Section 00100 Instructions to Bidders and Section 00430 List of Subcontractors. Any such revocation of the **Owner's** consent shall not justify any increase in Contract Price or Contract Time.

5.1.2. After Contract Award, if the **Contractor** intends to add or substitute a Subcontractor for Work in a Division, Specification and/or trade for which Subcontractor nomination was required in Section 00430 List of Subcontractors, the **Contractor** shall nominate that Subcontractor for review by the **Owner** and/or **Professional**. The **Contractor** shall not award such Work to any Subcontractor to whom the **Owner** objects for good cause. No adjustment in Contract Price or Contract Time shall be allowed for any such newly nominated Subcontractor.

5.1.3. Whenever the **Owner** objects, for its convenience, to any Subcontractor nominated, but not objected to, before Contract Award or to any Subcontractor nominated after Contract Award, the **Contractor** shall nominate a substitute Subcontractor or shall proceed to self-perform the Work involved if the **Contractor** is so qualified. If any such **Owner** objection requires a Subcontractor substitution or the **Contractor** to self-perform the Work Involved, in either case at an increase of the **Contractor's** cost for the part of the Work Involved, the **Owner** will amend the Contract Documents to provide for a corresponding adjustment in Contract Price and/or Contract Time made necessary by the Subcontractor substitution or self-performance and by any resulting Delay which is not reasonably anticipatable under the circumstances and which is attributable to the **Owner** and/or **Professional**.

5.1.4. Failure of the **Owner** to object to any nominated Subcontractor shall not constitute a waiver of any right of the **Owner** or **Professional** to reject Defective Work; nor shall the authority given to the **Owner** under this paragraph create or impose any duty on the **Owner** or **Professional** to exercise such authority for the benefit of the **Contractor** or any other third party.

5.1.5. Installation of any self-performed or Subcontractor Work shall constitute acceptance by the **Contractor** of all previously placed dependent Work. Consistent with this responsibility, the **Contractor**, directly or through the **Contractor's** choice of Subcontractors, shall supply, install and/or cause items to be built into previously placed Work, shall verify dimensions of previously placed Work, and shall notify the **Professional** of previously placed Work that is unsatisfactory for, or prevents satisfactory installation of, other dependent Work.

5.1.6 Work performed by any Subcontractor or Supplier shall be through an appropriate written Sub agreement that expressly binds the Subcontractor or Supplier to the requirements of the Contract Documents and contains the waiver of rights of subrogation provisions of Article 7.

### 5.2 "Or Equal" and Substitute Materials and Equipment:

5.2.1. Materials or equipment described in the Contract Documents by using a brand name, make, manufacturer, supplier, or specification shall be intended to denote the essential characteristics desired and establish a standard.

5.2.2. For materials and equipment which are actually *listed* in Schedule 1.6 of Section 00440 Schedule of Materials and Equipment, no "or equal" or substitute material or equipment will be acceptable or permitted unless the **Contractor** complies with the terms and conditions of paragraphs 5.2.2.1 through 5.2.2.5.

5.2.2.1. Unless words are used in a technical Specification indicating that no "or equal" or substitution is permitted, a proposal for an "or equal" or substitution may be accepted by the **Professional** if, in the **Professional's** judgment, the proposal (a) meets the criteria set forth in paragraphs 5.2.2.2 through 5.2.2.5, (b) demonstrates a net positive deduction, i.e., the deductive value of the proposal exceeds all direct, indirect and consequential costs and damages attributable to the "or equal" or substitution, and (c) offers a Contract Price decrease of one hundred percent (100%) of the net deduction, or another percentage reflecting a sharing of the savings which is agreed between the **Owner** and **Contractor**.

5.2.2.2. The **Contractor's** written application for the "or equal" or substitute material or equipment shall provide sufficient information to allow the **Professional** to determine whether the material or equipment proposed (a) will equally perform the functions and achieve the results called for by the Contract Documents, (b) is at least of equal materials of construction, quality and necessary essential design features, (c) is suited to the same use as that named or specified, (d) conforms substantially to the desired detailed requirements, e.g., durability, strength, appearance, aesthetics (if aesthetics are significant), safety, useful life, reliability, economy of operation and ease of maintenance, (e) evidences a proven record of performance and the availability of responsive service, and (f) will not extend any Contract Times.

5.2.2.3. Each such application shall certify whether or not acceptance of the proposed "or equal" or substitute material or equipment will require a change in any of the Work or any of the Means and Methods indicated in or required by the Contract Documents, or in work performed by the **Owner** or others, and whether or not incorporation or use of the proposed material or equipment is subject to payment of any license fee or royalty. All variations of the proposed material or equipment from the material or equipment named or specified shall be identified (operation, materials or construction finish, thickness or gauge of material, dimensions, loads, tolerances, deleted and added features, etc.), and information regarding available maintenance, repair and replacement service shall be indicated.

5.2.2.4. The application shall contain an itemized estimate of all direct, indirect, and consequential costs and damages that will result from evaluation and acceptance of the proposed "or equal" or substitute material and equipment, including but not limited to costs and delays of redesign, or claims of other contractors affected by the proposed item, and changes in operating, maintenance, repair, replacement, or spare part costs. The **Professional** may require the **Contractor** to furnish a manufacturer's performance Bond, an analysis of the effects of the evaluation/acceptance of the "or equal" or substitution on the Progress Schedule, a list of locations of similar installations that have been in service for at least three (3) years before the date of the application, and any other relevant data.

5.2.2.5. The **Contractor** shall be responsible for verifying that "or equal" or substitute materials and equipment conform to the Contract Documents, and that all dimensions, arrangement, design and construction details and other features are suited to the specified purpose. If any "or equal" or substitute material or equipment differs materially from the material or equipment named or specified, and that difference was not expressly identified in the **Contractor's** application, or results in changes in the Work, the **Professional** has authority to require removal and replacement of that "or equal" or substitute material or equipment. The **Contractor** shall bear its proportionate share of the Delay and costs resulting from (a) any such removal and replacement of "or equal" or substitute materials or equipment, (b) making "or equal" or substitute materials or equipment conform to the requirements of the Contract Documents, and (c) any changes in the Work and/or in other work required to accommodate the "or equal" or substitute material or equipment, or both.

5.2.2.6. The **Contractor** shall reimburse the **Owner** for any costs incurred by the **Owner** in the evaluation of any "or equal" or substitution proposal. Such costs shall include, but are not limited to, related charges of the **Professional** made necessary by the evaluation and acceptance or rejection, as the case may be, of the proposed "or equal" or substitute material or equipment.

5.2.3. For materials and equipment *not listed* in Schedule 1.6 of Section 00440 Schedule of Materials and Equipment, no substitute material or equipment will be acceptable or permitted unless the **Contractor** meets with the requirements of paragraphs 5.2.2.1 through 5.2.2.5. Further, the reimbursement provisions of paragraph 5.2.2.6 shall apply equally to such substitutions.

5.2.4. Unless approved by the **Professional**, for materials and equipment *not listed* in Schedule 1.6 of Section 00440 Schedule of Materials and Equipment, no "or equal" material or equipment will be acceptable or permitted unless the **Contractor** complies with the requirements of paragraphs 5.2.2.2 – 5.2.2.5.

5.2.5. No "or equal" or substitute item shall be ordered, installed, or utilized without the **Owner's** prior acceptance. The **Owner's** acceptance shall be evidenced by a signed Change Order or Change Authorization, or if so, specifically designated by the **Professional**, by an approved Shop Drawing or sample.

### 5.3 The Contractor's Continuing Responsibilities:

5.3.1. The **Contractor** shall be fully responsible to the **Owner** and **Professional** for all acts and omissions of Subcontractors and Suppliers, at any tier, to the same extent as the **Contractor** is responsible for the **Contractor's** own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between the **Owner** or **Professional** and any Subcontractor or Supplier. No provision in Article 12 or in the other Contract Documents shall create or impose any express or implied duty or obligation on the **Owner** or **Professional** to any Subcontractor or Supplier or the **Contractor's** sureties to pay or to see to the payment of any monies owed to any of them.

## ARTICLE 6 SUBMITTALS

### 6.1 Shop Drawing, Sample and Other Technical Submittals:

6.1.1. After complying with those requirements in paragraphs 6.1.2 through 6.1.5 and the technical Specifications, the **Contractor** shall submit to the **Professional** (a) an electronic file(s) of the drawing(s) compatible with the latest version of AutoCAD of all Shop Drawings required by the Contract Documents and bond copies if requested by the **Owner** or **Professional**; (b) all required samples (whether color or otherwise); and (c) all other technical Submittals (test results, test procedures, safety procedures, O&M manuals, etc.) that are required by the Contract Documents. In addition to electronic copies up to 2 hard copies of the approved O&M manuals may be required to be provided to the agency

6.1.2. Submissions shall be delivered to the **Professional** with due diligence, as delineated in or required by the Progress Schedule, and shall allow reasonable times, per 6.5.1, for the **Professional's** review and turnaround. Each Submittal shall be uniquely identified as the **Professional** and **Contractor** may agree.

6.1.3. Each Submittal shall bear a stamp or specific written indication certifying that the **Contractor** has satisfied the requirements of this Article and the technical Specifications and the **Contractor's** responsibilities for prior review of the submission. In addition, each sample shall have been checked and be accompanied by a certificate guaranteeing that the material sampled complies with the Contract Documents. Unless otherwise allowed by the **Professional**, Submittals without the **Contractor's** indication of approval will be returned without review.

6.1.4. Before each submission, the **Contractor** shall (a) determine and verify all field measurements, quantities, dimensions, instructions for installation and handling of equipment and systems, installation requirements (including location, dimensions, access, fit, completeness, etc.), materials, color, catalog numbers and other similar data as to correctness and completeness, and (b) have reviewed and coordinated that technical Submittal with other technical Submittals and the requirements of the Contract Documents. Technical Submittals of a Subcontractor or Supplier shall be coordinated with those of other Subcontractors or Suppliers (location, dimensions, fit, completeness, consistency, integration, etc.), and so represented in the **Contractor's** stamp or specific written approval before submission to the **Professional**.

6.1.5. With each submission, the **Contractor** shall give the **Professional** specific written notice of each variation from the requirements of the Contract Documents, and the **Contractor** shall cause a specific notation of each variation to be made on that Shop Drawing, sample, or other technical Submittal.

6.1.6. Where a Shop Drawing, sample or other technical Submittal is required by the technical Specifications, any related Work performed by the **Contractor** before the **Professional's** approval of the pertinent technical Submittal will be at the sole expense and responsibility of the **Contractor**.

6.1.7. The **Professional** shall be entitled to rely upon the accuracy or completeness of any designs, calculations or certifications made by licensed or certified professionals attached to a specific technical Submittal, whether or not that stamp, or written certification is required by the Contract Documents.

## 6.2 Review and Return of Technical Submittals:

6.2.1. The **Professional's** review of a technical Submittal will be to evaluate whether the items covered by the Submittal, after installation or incorporation into the Work, will conform to the general design intent of the Contract Documents and for compatibility with the design of the completed Work as a functioning whole as indicated in the Contract Documents.

6.2.2. The review of Submittals by the **Professional** shall not be conducted for the purpose of determining the accuracy and completeness of such details as dimensions or quantities shown or indicated on the Submittals, or for substantiating instructions for installation or performance of equipment and systems developed by or for the **Contractor**, the correctness of which shall remain the sole responsibility of the **Contractor**. Further, any such **Professional's** review and approval will not extend to any Means and Methods (except where a specific Mean and Method is indicated in or required by the Contract Documents) or to safety precautions or programs related to safety.

6.2.3. Approval by the **Professional** of a separate item or partial Submittal shall not translate to approval of the assembly in which the item functions or to the approval of related Submittals not yet reviewed and approved by the **Professional**.

## 6.3 Progress Schedule Submittals:

6.3.1. After complying with the appropriate Progress Schedule requirements in the technical Specifications, the **Contractor** shall submit to the **Professional** electronic copies of the Progress Schedule Submittal then due, which shall include both PDF format and active software files with the **Contractor's** specific schedule data. Each Progress Schedule Submittal shall bear the **Contractor's** stamp or written indication of approval as representation to the **Owner** that the **Contractor** has determined or verified all data on that Progress Schedule, and that the **Contractor** and Subcontractors and Suppliers have reviewed and coordinated the sequences in that Progress Schedule with the requirements of the Work. Progress Schedule Submittals are not Contract Documents.

6.3.2. Progress Schedule Submittals are intended to show: (a) the priority and sequencing by which the **Contractor** intends to execute the Work (or Work remaining) to comply with the Contract Times, those sequences of Work indicated in or required by the Contract Documents and any other requirements of the Contract Documents; (b) how the **Contractor** anticipates foreseeable events, site conditions and all other general, local and prevailing conditions that may in any manner affect cost, progress, schedule, performance and furnishing of the Work; (c) how the Means and Methods chosen by the **Contractor** translate into Activities and sequencing; (d) the actual timing and sequencing of completed Work; and (e) if required by the Contract Documents, the allocation of the Contract Price to the Activities.

#### 6.4 Review and Return of Progress Schedule Submittals:

6.4.1. The **Owner's** and **Professional's** review of Progress Schedule Revision 0 Submittals may result in comments relating to conformance with (a) the Contract Times, (b) those sequences of Work indicated in or required by the Contract Documents, and (c) any other Contract Document requirements that may have a significant bearing on the use of Revision 0 Progress Schedule Submittals to resolve issues affecting Contract Price and/or Contract Time. Progress Schedule review comments may also result in the selection of Targets and recording of Target Times.

6.4.2. The review of Progress Schedule Revision Submittals may, in addition to the types of comments outlined in paragraph 6.4.1, result in comments as to whether the **Contractor's** scheduling of Work remaining continues to conform with the Contract Times and those sequences of Work indicated in or required by the Contract Documents. Progress Schedule Revision Submittal review comments may also respond to suggested **Contractor** schedule recovery plans, when and as appropriate, and to **Contractor** requests for extensions in Contract Time.

6.4.3. Progress Schedule reviews shall not impose on the **Owner** or **Professional** any responsibility for verifying whether Work is omitted; Activity durations are reasonable; the adequacy of the level of labor, materials, and construction equipment; the reasonableness of the **Contractor's** chosen Means and Methods; or whether Work sequences and Activity timing are practicable. Even if any comments or objections are noted from the reviews of Progress Schedule Submittals, no such reviews or objections noted shall be effective or construed to create or impose on the **Owner** or **Professional** any responsibility for the timing, planning, scheduling, or execution of the Work or for the correctness of any such Progress Schedule details. The correctness of the Progress Schedule shall remain the sole responsibility of the **Contractor**.

#### 6.5 Additional Provisions Concerning Submittals:

6.5.1. Unless otherwise designated in a more specific technical Specification, a Submittal will be returned to the **Contractor** within fifteen (15) to twenty (20) Calendar Days, as designated by the **Professional** in writing. If a Submittal cannot be returned when it comes due, the **Professional** shall give appropriate notice to the **Contractor** of its return date. The **Contractor** shall revise, and correct Submittals returned for revision and resubmittal, and resubmit them to the **Professional** directing specific attention in writing to revisions other than the corrections called for by the **Professional** on previous submissions of the same Submittals.

6.5.2. No review or approval of Submittals shall relieve the **Contractor** of responsibility for the following: (a) variation from the requirements of the Contract Documents, unless the **Contractor** has called attention to each variation, as provided in paragraph 6.1.5, and the **Professional** has given written approval of that variation by a specific notation within or attached to the returned Submittal, (b) compliance with the "or equal" and substitution requirements of paragraph 5.2, (c) errors or omissions in the Submittal, or (d) compliance with the requirements of this Article.

6.5.3. Unless the **Professional** determines that additional resubmissions are reasonable under the circumstances, all costs incurred by the **Owner** made necessary by the **Professional's** review of a Submittal after the first resubmission of that Submittal shall be reimbursed by the **Contractor** to the **Owner**.

6.5.4. All time consumed by the resubmissions and rereviews of a particular Submittal shall constitute time required to furnish that Submittal or shall represent Delays not justifying any increase in Contract Time or Contract Price, or both.

### ARTICLE 7 LEGAL REQUIREMENTS; INSURANCE

#### 7.1 Laws; Permits (Which Include Approvals and Licenses):

7.1.1. The **Contractor** shall comply with and shall require all Subcontractors and Suppliers to comply with, all applicable Laws. The **Contractor** shall insure that everyone employed on the Work discharge their responsibilities consistent with all Laws.

\*7.1.2. The **Contractor** shall secure from the State Department of Labor and Economic Growth and from all Political Subdivisions with jurisdiction, all construction permits necessary for the commencement, prosecution, and completion of the Work before starting any Work at the site. All fees for securing the permits shall be paid by the **Contractor**, including all inspection costs which may be legally assessed by the Bureau of Construction Codes according to authority granted under 1972 PA 230, as amended, MCL 125.1501 et seq. The time incurred by the **Contractor** in obtaining construction permits shall constitute time required to complete the Work and shall not justify any increases in Contract Time or Contract Price, except to the extent any related Delay is attributable to the fault of the Drawings or Specifications or to revisions to the Drawings and/or Specifications required by the Political Subdivision with jurisdiction.

7.1.3. Unless expressly required by any Laws or permits, neither the **Owner** nor **Professional** shall be responsible for monitoring the **Contractor's** compliance with any Law, the State Construction Code, or any permits. The **Contractor** is not responsible to make certain that the Contract Documents comply with applicable Laws and the State Construction Code; however, if the **Contractor** believes the Contract Documents deviate from the requirements of any Law, the State Construction Code or any permit, the **Contractor** shall give the **Professional** prompt written notice. If the **Contractor** provides any Work knowing or having reason to know such Work conflicts with any Laws, or the State Construction Code or any permits, the **Contractor** shall be responsible for that performance. The **Contractor** shall be proportionately responsible for the time required and the costs involved in complying with the obligations stated in this paragraph.

\*7.1.4. All Work shall be provided in accordance with the State Construction Code and the requirements of paragraph 1.2.4. If the **Contractor** observes that any Contract Document is at variance with any Laws or the State Construction Code in any respect, the **Contractor** shall promptly notify the **Professional** in writing, and any necessary changes shall be accomplished by an appropriate Change Order. The **Contractor** shall pay all charges of Public Utilities for connections to the Work, unless otherwise provided by Cash Allowances specific to those connections.

\*7.1.5. In accordance with the Michigan State Construction Code Act, 1972 PA 230, as amended, MCL 125.1501 *et seq.*, the State Department of Labor and Economic Growth, Construction Code Commission has adopted and filed with the Secretary of State the following Construction Code Reference Standards: (a) Michigan Building Code; (b) Michigan Plumbing Code; (c) National Electric Code; (d) Michigan Mechanical Code; (e) State Elevator Code; (f) State Boiler Code; and (g) State Barrier Free Design Rules.

## 7.2 Sales and Use Tax and Other Similar Taxes:

7.2.1. The **Contractor** shall be responsible for and pay all Michigan sales and use taxes and any other similar taxes covering the Work that are currently imposed by legislative enactment and as administered by the Michigan Department of Treasury, Revenue Division. The **Owner** shall make a corresponding adjustment in Contract Price for any increase or decrease in sales, use and other similar taxes (excluding payroll taxes) covering the Work that are enacted after the date of Bid opening.

## 7.3 Safety and Protection:

7.3.1. The **Contractor** shall comply with and shall require all Subcontractors and Suppliers to comply with, all Laws governing the safety and protection of persons or property, including, but not limited to the Michigan Occupational Safety and Health Act (1974 PA 154, as amended, MCL 408.1001 *et seq.*) and all rules promulgated under the Act. The **Contractor** shall be responsible for all fines and penalties imposed for any related violation(s) of federal and State health and safety requirements. The **Contractor's** safety representative at the site shall be the superintendent required by the provisions of paragraph 4.2.2, unless otherwise designated in writing by the **Contractor**.

7.3.2. The **Contractor** shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs. The **Contractor** shall take all necessary precautions for the safety of, and shall erect and maintain all necessary safeguards and provide the necessary protection to prevent damage, injury or loss to: (a) all employees on the Work and other persons who may be affected by the Work, (b) all the Work and materials and equipment to be incorporated into the Work, whether stored on or off the site, and (c) other property at or adjacent to the site, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Utilities not designated for removal, relocation or replacement. In the event of severe weather, the **Contractor** shall immediately inspect the Work and the site and take all reasonably necessary actions and precautions to protect the Work and ensure that public access and safety are maintained.

7.3.2.1. All damage, injury or loss to the Work, materials and equipment and such other property caused, directly or indirectly, in whole or in part, by the **Contractor** shall be remedied by the **Contractor**, except to the extent due to fault of the Drawings or Specifications or to act or omission of the **Owner** or **Professional**, and not due to, directly or indirectly, in whole or in part, to the fault or negligence of the **Contractor** or any Subcontractor or Supplier.

7.3.2.2. The **Contractor** shall notify owners of adjacent property and Underground Utilities when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

7.3.2.3. Except as the division of responsibilities for safety may be otherwise delineated in writing between the **Owner** and **Contractor** in a Substantial Completion certificate, the **Contractor** duties and responsibilities for safety and protection shall continue until such time as the **Professional** is satisfied that the Work, or Work inspected, is completed and ready for final payment.

7.3.3. Use of Explosives – The **Contractor** shall comply with all federal, state, and local Laws governing the use of explosives, obtain and pay for any required permits before their use and furnish a copy of the permits to the **Professional** before using explosives. The **Contractor** shall, under the supervision of competent and suitably trained and qualified personnel, exercise the utmost care not to endanger life or damage property in the transportation, storage, handling, use and disposal of explosives, and in the use of Means and Methods. The **Contractor** shall be responsible for all injury, damage and adverse impacts outside the permit area resulting from the use of explosives (including an appropriate portion of the Delay and costs resulting from such injury, damage, and impacts).

**7.4 Bonds and Insurance – General Requirements:**

7.4.1. Both the Section 00610 Performance Bond and Section 00620 Payment Bond shall remain in full force and effect from the date of Contract Award until final completion of the Work or the end of the Correction Period, whichever comes later. The **Contractor** shall furnish any other bonds (e.g., manufacturer performance Bond or maintenance Bond) required by Section 00800 Supplementary Conditions or the technical Specifications.

7.4.2. The **Contractor** shall purchase and maintain insurance providing the coverages and limits designated in this Article. Insurance shall be provided by insurers authorized to do business as insurer in the State, as evidenced by a Certificate of Authority issued by the Department of Consumer and Industry Services – Insurance Bureau. Also, and unless otherwise authorized in writing by the **Owner**, insurers shall have an "A-" A.M. Best Company Rating and a Class VII or better financial size category as shown in the most current A.M. Best Company ratings. The **Contractor** shall not start to perform and furnish the Work, or continue with any part of the Work, unless the **Contractor** has in full force and effect all the required insurance.

7.4.3. Insurance policies shall contain a provision or endorsement stating that coverage will not be canceled or materially changed, or renewal refused unless at least thirty (30) Calendar Days prior written notice has been personally delivered or sent by registered mail to the **Owner** and **Contractor**. Any coverage nearing expiration during the period in which it is to remain in full force and effect shall be renewed before its expiration, and an acceptable certificate of insurance shall be filed with the **Owner** at least thirty (30) Calendar Days before it expires.

7.4.4. If any of the **Contractor's** sureties or insurers is declared bankrupt or placed into receivership, ceases to meet the requirements of the Contract Documents or its authority to do business in the State is revoked or expires, the **Contractor** shall immediately substitute other Bonds/sureties or insurers/policies, which shall meet the requirements of the Contract Documents.

**7.5 The Contractor's Liability Insurance:**

7.5.1. The **Contractor** shall maintain Workers' Compensation and Employer's Liability, Commercial General Liability, Commercial Automobile Liability, Excess Liability, and such other insurance as may be designated in Section 00800 Supplementary Conditions or as is appropriate for the Work. The **Contractor's** liability insurance shall provide protection from claims which may arise out of or result from the **Contractor's** performance and furnishing of the Work and the **Contractor's** other obligations under the Contract Documents, whether performed or furnished by the **Contractor**, any Subcontractor, any Supplier, or anyone for whose acts any of them may be liable.

7.5.2. Liability Insurance shall be endorsed to list as additional insureds the **State of Michigan** (Owner), its departments, divisions, agencies, offices, commissions, officers, employees and agents, the **Owner's** consultants, and agents, the **Professional**, and the **Professional's** consultants and agents, including their respective subsidiaries and affiliates and their respective directors, officers, shareholders, agents, or employees. The **Contractor** shall use the current Insurance Services Office (ISO) Form CG 20 09 for general liability insurance or equivalent, ISO Form CA 20 01 for automobile liability insurance or equivalent, and manuscript form for excess liability insurance. The insurance afforded to the additional insureds shall be primary, and neither the coverages nor limits under the **Contractor's** policies shall be reduced or prorated by the existence of any other insurance applicable to any loss that the additional insureds may have sustained. Workers' Compensation, Employer's Liability Insurance and all other liability insurance policies shall be endorsed to include a waiver of rights to recover from the **Owner**, **Professional** and the other additional insureds.

7.5.3. The **Contractor's** liability insurance shall remain in effect through the Correction Period and through any special correction periods that are implemented pursuant to the requirements of paragraph 9.5.3. Liability insurance issued on a claims-made basis and completed operations shall be maintained for two (2) years after final payment, and evidence of coverage shall be furnished to the **Owner** yearly.

7.5.4. For any employee, resident of and hired in Michigan, the **Contractor** shall have insurance for benefits payable under Michigan's Workers' Compensation Law. For any other employee protected by Worker's Compensation Laws of any other state, the **Contractor** shall have insurance or participate in a mandatory state fund, where applicable, to cover the benefits payable to any such employee.

7.5.5. Commercial General Liability Insurance shall be equivalent to that provided by the current edition of standard ISO Form CG 00 01, and shall include contractual liability and underground, explosion and collapse hazard exposure operations and pile driving operations (if risk is present).

7.5.6. Commercial Automobile Liability Insurance coverage shall be equivalent to that provided by the current edition of the ISO Form CA 00 01 and include Michigan statutory requirements.

7.5.7. Excess Liability Insurance shall provide the following protections: employer's liability, general liability, and automobile liability. Excess Liability Insurance shall be at least as broad as the underlying policies of liability insurance.

7.5.8. Coverage Limits - Workers' Compensation and Employer's Liability Insurance shall conform to statutory limits under Michigan Law. Commercial General Liability limits shall be \$2,000,000.00 each occurrence, \$2,000,000.00 general aggregate, \$2,000,000.00 products and completed operations aggregate, and \$2,000,000.00 personal and advertising injury.

Commercial Automobile Liability limits shall be \$2,000,000.00 combined single limit. Excess Liability limits shall be \$2,000,000.00 each occurrence and aggregate, if the Contract Price is less than \$10,000,000.00, and \$5,000,000.00 each occurrence and aggregate, otherwise. Deductible amounts shall not exceed \$25,000.00.

7.5.9. The **Contractor** shall promptly notify the **Owner** in writing of (a) any reduction in coverage limits over \$100,000.00 resulting from Work under the Contract Documents or otherwise, and (b) any claim notice involving the Work. Notification of a claim shall provide full details and an estimate of the amount of loss or liability. If it turns out that the aggregate limits have been impaired to the extent that they are no longer adequate for the Work, the **Contractor** shall promptly reinstate the coverage limits and submit to the **Owner** certificates of insurance confirming that coverage has been reinstated to the specified limits.

7.5.10. These requirements shall not be construed to limit the liability of the **Contractor** or its insurers. The **Owner** does not represent that the specified coverages or limits of insurance are sufficient to protect the **Contractor's** interests or liabilities.

## 7.7 Property Insurance (Builder's All Risk Insurance)

\*7.7.1. The **Contractor** shall purchase and maintain property insurance for one hundred percent (100%) of the actual cash replacement value of the insurable Work (minimum amount to be the contract award amount) while in the course of construction, including foundations, additions, attachments, and all fixtures, machinery and equipment belonging to and constituting a permanent part of the building structure. The property insurance also shall cover temporary structures, materials and supplies of all kinds, to be used in completing the Work, only while on the building site premises or within five hundred (500) feet of the site. The property insurance shall insure the interests of the **Owner**, **Contractor** and all Subcontractors and Suppliers at any tier as their interests may appear. The property insurance shall insure against "all risk" of physical loss or damage to the extent usually provided in policy forms of insurers authorized to transact this insurance in Michigan. Any deductible shall be both the option and responsibility of the **Contractor**.

\*7.7.2. A certificate or other proof of coverage shall be provided prior to final contract execution or issuance of a purchase order by the State. A copy of the master insurance policy will be made available to the **Owner** upon request.

7.7.3. The **Contractor** and **Owner** will cooperate in determining the actual cash replacement value of any insured loss. Any deductible amount shall be assumed or shared by the **Contractor** and Subcontractors, at any tier, in accordance with any agreement the parties in interest may reach.

7.7.4. The **Owner** may purchase and maintain for its benefit boiler and machinery insurance for boiler and machinery required to be registered and inspected by Law.

## 7.8 Waiver of Rights:

7.8.1. To the extent any losses and damages caused by any of the perils covered by property insurance covering the Work (whether under paragraph 7.7 or otherwise) are covered and payments are made, the **Owner** and **Contractor** waive all rights against each other for any such losses and damages and also waive all such rights against the **Professional** and all other Persons named as insureds or additional insureds in such policies. Each Sub agreement shall contain similar waiver provisions by the Subcontractor or Supplier in favor of the **Owner**, **Professional**, and all other Persons named as insureds or additional insureds. None of these waivers shall extend to the rights that any of the insureds may have to the proceeds of insurance held by the **Owner** as trustee or otherwise payable under a policy so issued.

7.8.2. The **Owner** and **Contractor** intend that the required policies of property insurance shall protect all the parties insured and provide primary coverage for all losses and damages caused by the perils covered. Accordingly, all such policies shall be endorsed to provide that in the event of payment of any loss or damage the insurer will have no rights of subrogation or other recovery against any of the parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by the **Professional** or the **Owner's** and **Professional's** consultants, the **Owner** will obtain such waiver forms, and if required of any Subcontractor or Supplier, the **Contractor** will obtain such waiver forms as well.

## 7.9 Receipt and Application of Proceeds:

7.9.1. Any insured loss under the policies of property insurance will be adjusted with the **Owner** and will be made payable to the **Owner** as trustee for the insureds, as their interests may appear, subject to the conditions of paragraph 7.9.2. The **Owner** shall deposit, in a separate account, and shall distribute monies received based on any agreement the parties in interest may reach. If no other distribution agreement is reached, the damaged Work shall be replaced or repaired, the monies received shall be used for that purpose and the Work Involved and resulting costs shall be covered by Change Order.



7.9.2. The **Owner**, as trustee, shall have power to adjust and settle any loss with the insurers unless a party in interest objects in writing within fifteen (15) Calendar Days after the occurrence of loss to the **Owner's** exercise of this power. If an objection is made, the **Owner** as trustee shall settle with the insurers pursuant to any agreement the parties in interest may reach.

**\*7.10 Unfair Labor Practice:**

\*7.10.1. The **Owner**, pursuant to 1980 PA 278, as amended by MCL 423.321(b), may void and rescind the Contract if, at any time, the **Contractor** or any Subcontractor or Supplier appears on the register maintained by the Michigan Department of Consumer and Industry Services of employers who have been found in contempt of court by a Federal Court of Appeals on not less than three occasions involving different violations during the preceding seven (7) years for failure to correct unfair labor practices as prohibited by Section 8 of Chapter 372 of the National Labor Relations Act, 29 U.S.C. 158.

**\*7.11 Michigan Right-To-Know Law:**

\*7.11.1. The **Contractor** shall comply with Section 14a-14n of the Michigan Occupational Safety and Health Act (MIOSHA), 1974 PA 154, as amended, MCL 408.1014a – MCL 408.1014n, commonly referred to as the “Michigan Right-to-Know Law” and the rules promulgated under the Act. The Act places certain requirements on employers to develop a communication program designed to safeguard the handling of hazardous chemicals through labeling of chemical containers and development and availability of Safety Data Sheets (SDS), and to provide training for employees who work with these chemicals and develop a written hazard communications program.

\*7.11.2. Provisions of the Michigan Right-to-Know Law may be found in those sections of the Michigan Occupational Safety and Health Act (MIOSHA), which contain Right-to-Know provisions, and the Federal Hazard Community Standard, which is part of the MIOSHA Right-to-Know Law through adoption. The Act, rules and standards should be reviewed for additional requirements.

\*7.11.3. The Michigan Right-to-Know Law also provides for specific employee rights, including the right to be notified of the location of SDS and to be notified at the site of new or revised SDS within five (5) Business Days after receipt and to request SDS copies from their employers. The **Contractor**, employer or Subcontractor shall post and update these notices at the site.

**\*7.12 Nondiscrimination:**

\*7.12.1. The **Contractor** and each Subcontractor and Supplier covenants to comply with the following requirements:

\*7.12.1.1. Not to discriminate against any employee or employment applicant because of race, religion, color, national origin, age, sex (as defined in *Executive Directive 2019-09*), height, weight, marital status, or a physical or mental disability that is unrelated to the individual's ability to perform the duties of the particular job or position.

\*7.12.1.2. To take action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, national origin, age, sex, height, weight, marital status, or a physical or mental disability that is unrelated to the individual's ability to perform the duties of the particular job or position. Such action shall include, but is not limited to employment upgrading, demotion or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

\*7.12.1.3. To state, in all solicitations or advertisements for employees, that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, sex, height, weight, marital status, or a physical or mental disability that is unrelated to the individual's ability to perform the duties of the particular job or position.

\*7.12.1.4. To send, or have its collective bargaining representative send, each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising that labor union or worker's representative of commitments under this provision.

\*7.12.1.5. To comply with the Elliot-Larsen Civil Rights Act, 1976 PA 453, as amended, MCL 37.2201 et seq.; the Michigan Persons With Disabilities Civil Rights Act, 1976 PA 220, as amended, MCL 37.1101 et seq.; *Executive Directive 2019-09*; and all published rules, regulations, directives, and orders of the Michigan Civil Rights Commission which may be in effect on or before the date of Bid opening.

\*7.12.1.6. A breach of the covenants set forth in paragraphs 7.12.1.1 through 7.12.1.5 shall be regarded as a material breach of the Contract.

\*7.12.2. The **Contractor** shall furnish and file compliance reports within the times, and using the forms, prescribed by the Michigan Civil Rights Commission. Compliance report forms may also elicit information as to the practices, policies, programs, and employment statistics of the **Contractor** and Subcontractors. The **Contractor** shall permit access to Records by the Michigan Civil Rights Commission and its agent for the purposes of ascertaining compliance with the Contract Documents and with rules, regulations, and orders of the Michigan Civil Rights Commission.

\*7.12.3. If, after a hearing held pursuant to its rules, the Michigan Civil Rights Commission finds that the **Contractor** has not complied with the nondiscrimination requirements of the Contract Documents, the Michigan Civil Rights Commission may, as part of its order, certify said findings to the **Board**. Upon receipt of certification, the **Board** may order the cancellation of the Contract and/or declare the **Contractor** ineligible for future contracts with the State, until the **Contractor** complies with said order of the Michigan Civil Rights Commission.

**\*7.13 Michigan Residency for Employees:**

\*7.13.1. Fifty percent (50%) of the persons employed on the Work by the **Contractor** shall have been residents of the State of Michigan for not less than one year before beginning employment on the Work. This residency requirement may be reduced or omitted in writing, at the sole discretion of the **Owner**, to the extent that Michigan residents are not available or to the extent necessary to comply with federal Law concerning federal funds used for the Project. A breach of this requirement shall be considered a material breach of the Contract.

\*7.13.2. This residency requirement shall not apply to the **Contractor** or to any Subcontractor if the **Contractor** or any such Subcontractor is signatory to collective bargaining agreements which allow for the portability of employees on an interstate basis (The Management and Budget Act, 1984 PA 431, as amended, MCL 18.1241a).

**\*7.14 Prevailing Wages:**

\*7.14.1. To the extent applicable, Contractor will comply with federal and state prevailing wage requirements. The wage and classification schedules applicable for this project/location are included in Appendix III.

\*7.14.2. Federal Prevailing Wages - If a project is funded in whole or in part by federal dollars, the Contractor and all Subcontractors must comply with the most recent version of Federal Provisions Addendum and all Laws pertaining to occupational classifications and prevailing wage requirements as follows:

1. FEDERAL PROVISIONS ADDENDUM

- a. The most current version of Federal Provisions Addendum shall apply to this contract and is included in Appendix III.

2. DAVIS BACON ACT WAGE AND CLASSIFICATIONS

a. If applicable, the Contractor (and its Subcontractors) for prime construction contracts in excess of \$2,000 must comply with the Davis-Bacon Act (40 USC 3141-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction").

b. The Contractor (and its Subcontractors) shall pay all mechanics and laborers employed directly on the site of the work, unconditionally and at least once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the advertised specifications, regardless of any contractual relationship which may be alleged to exist between the Contractor or subcontractor and the laborers and mechanics.

- c. The Contractor will post the scale of wages to be paid in a prominent and easily accessible place at the site of the work

d. There may be withheld from the Contractor so much of accrued payments as the contracting officer considers necessary to pay to laborers and mechanics employed by the Contractor or any Subcontractor on the work the difference between the rates of wages required by the Contract to be paid laborers and mechanics on the work and the rates of wages received by the laborers and mechanics and not refunded to the Contractor or Subcontractors or their agents.

e. The Contractor shall maintain payrolls and basic records relating thereto for a period of three (3) years after the project; contractor shall submit Certified Payroll Reports using US Department of Labor Wage and Hour Division Form WH-347 for each weekly payroll to support and document compliance with the Davis Bacon Wage rates.

f. Davis Bacon wage and classification schedules applicable for this project/location are included in Appendix III.

7.14.3. State Prevailing Wages - The following provisions apply when 2023 PA 10, as amended, MCL 408.1101 et seq. applies.

7.14.3.1. Prevailing Wage and Fringe Benefits--The rates of wages and fringe benefits to be paid to each class of Construction Mechanic by Contractor and Subcontractors must not be less than the wage and fringe benefit rates prevailing in the locality in which the work is performed.

7.14.3.2 Nondiscrimination, Nonretaliation- Contractor or a Subcontractor shall not discharge, discipline, retaliate against, or otherwise discriminate against a Construction Mechanic, or threaten to do any of these things, because the Construction Mechanic reported or was about to report a violation or suspected violation of the act.

7.14.3.3. Construction Mechanics under this Contract are intended beneficiaries of the contractual prevailing wage, fringe benefit, and nondiscrimination nonretaliation requirements of the Contract. Any such Construction Mechanic aggrieved by failure of a contractor or subcontractor to pay prevailing wages or benefits as specified in the Contract, or by violation of section 7 of 2023 PA 10, in addition to any other remedies provided by law, may bring an action in a court of competent jurisdiction against such contractor or subcontractor for damages or injunctive relief and may be awarded reinstatement or other appropriate relief, and all damages sustained, together with actual costs and attorney fees at trial and on appeal.

7.14.3.4. Contractor and Subcontractors shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in this Contract and shall keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each Construction Mechanic employed by it in connection with the Contract. This record shall be available for reasonable inspection by the State.

7.14.3.5 **Contractor** must immediately notify the **Owner** if **Contractor's** state project registration or a **Subcontractor's** state project registration is no longer valid (i.e. suspended, revoked or not renewed) at any time during the term of the Contract.

7.14.3.6. Contractor is to submit certified payrolls, including contractor and subcontractor, not later than 10-days after the end of a pay period to the Department of Labor and Economic Opportunity database via the internet through the Online Certified Payroll Submission process the Contractor signed up for to receive their State Project Registration, 2023 PA 10 as amended, MCL 408.1122. State certified payroll is not to be submitted to DTMB at any time.

**7.15 Asbestos Abatement:**

7.15.1 For projects requiring Asbestos Abatement, the Contractor must comply with PA 59 of 2024, MCL 338.3371 et seq. as applicable and with APPENDIX II – ASBESTOS ABATEMENT PROJECT PROCEDURES as part of and in conjunction with all other contract requirements.

**ARTICLE 8 PROSECUTION; SUBSTANTIAL COMPLETION****8.1 Starting the Work:**

8.1.1. Within fifteen (15) Calendar Days after the **Owner** executes the Section 00500 Agreement, a pre-construction conference will be held. The conference will be intended, without limitation, to (a) review the **Contractor's** Schedule of Shop Drawing submissions; (b) review the qualifications of key **Contractor** personnel; (c) review the **Contractor's** proposed normal working hours and plans for laydown, staging, construction traffic, access to the site, parking and other similar matters; (d) review procedures for Submittals, clarifications and interpretations (including reasonable times for response turnaround), Change Orders, Change Authorizations and Record Documents; and (e) exchange twenty-four (24) hour emergency telephone numbers for key personnel.

8.1.2. The **Contractor** shall start the Work on the Date of Commencement of the Contract Time. No Work shall be started at the site before such is allowed by the Contract Documents.

**8.2 Revision 0 (Rev. 0) Schedule and Cost Submittals:**

8.2.1. The **Contractor** shall deliver the interim Rev. 0 Progress Schedule, Schedule of Shop Drawing submissions and Rev. 0 Progress Schedule as required in the Contract Documents. The **Contractor** shall correct and adjust any Rev. 0 Submittal returned for revision. The finalized Revision 0 *As-Planned* Schedule shall be the Progress Schedule from which Revision Schedules shall be developed and used by the **Contractor** when making proposals or claims for adjustments in Contract Time and/or Contract Price.

**8.3 Compliance with Contract Time Requirements:**

8.3.1. The **Contractor** shall prosecute the Work with the diligence necessary to ensure its completion within the Contract Times. The **Contractor** shall provide sufficient management, supervision, labor, materials and equipment, and the **Contractor** shall undertake appropriate action promptly to recover schedule when necessary to comply with the Contract Times.

8.3.2. Unless disallowed by any Law or modified in another Section of the Specifications, a daily schedule from 06:00 AM to 06:00 PM, during Business Days, shall be normal working hours. Except in an Emergency, or as may be required by the **Contractor's** safety and protection obligations, or as the **Owner** and **Contractor** may otherwise agree, all Work at the site shall take place during normal working hours. The **Contractor** shall provide written notice to the **Owner** at least twenty-four (24) hours and up to seventy-two (72) hours if so, noted for projects specific requirements such as Correctional Facilities, before performing Work outside of normal working hours.

8.3.3. Unless otherwise agreed in writing by the **Owner**, for any Work actually performed outside of normal working hours, the **Contractor** shall reimburse the **Owner** any related increases in costs the **Owner** incurs, provided those costs are costs which the **Contractor** could reasonably have foreseen, and which are not offset through the earlier completion of the Work resulting from working outside of normal working hours. Examples of **Owner** costs include, but are not limited to, overtime charges of the **Professional** and payments for custodial and security personnel.

8.3.4. Early Dates in the Progress Schedule shall be based on proceeding with all or part of the Work exactly on the date when the corresponding Contract Time commences to run. Late Dates shall be based on completing all or part of the Work exactly on the corresponding Contract Time, regardless of whether the **Contractor** anticipates early completion or not. If sequences of Work are indicated in or required by the Contract Documents, the Progress Schedule shall show in sufficient detail the **Contractor's** approach to conforming with those sequences.

8.3.5. The Progress Schedule shall reflect the **Contractor's** approach to Work remaining, be employed when reporting on progress or schedule recovery and facilitate the evaluation of Requests for Payment, as provided in the Contract Documents.

8.3.6. The **Contractor** shall carry on the Work with due diligence during all disputes or disagreements with the **Owner**. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The **Contractor** shall exercise reasonable precautions, efforts, and measures to avoid or mitigate situations that would cause Delays.

**8.4 Substantial Completion:**

8.4.1. The **Contractor** shall conduct inspections of the Work to verify the extent of completion. The **Contractor** shall provide to the **Owner** a list of items to be completed or corrected resulting from the inspections whenever the **Contractor**, upon completing all pre-requisite testing of the Work, considers that the Work, or any portion of the Work designated in the Contract Documents as having a separate, specified Substantial Completion, has progressed to the point that it is substantially complete.

8.4.2. Within a reasonable time after receiving the **Contractor's** list of items to be completed or corrected, the **Owner, Professional** and **Contractor** shall jointly conduct a Substantial Completion inspection. If, after consulting with the **Owner**, the **Professional** does not consider the Work, or portion of the Work inspected, substantially complete, the **Professional**, within twenty (20) Calendar Days after the inspection, will deliver to the **Owner** and **Contractor** a list of incomplete or Defective Work sufficient to demonstrate the basis for that determination.

8.4.3. If the **Professional** and **Owner** agree that the entire Work, or that the portion of the Work inspected, is substantially complete, the **Professional** will deliver to the **Owner** and **Contractor** a certificate of Substantial Completion with a Punch List.

The certificate shall (a) fix a reasonable date of Substantial Completion, (b) fix a date for completion of the Punch List to the satisfaction of the **Professional**, and (c) recommend the division of responsibilities between the **Owner** and **Contractor**. Neither the Work, nor any portion of the Work inspected, shall be substantially complete, unless the **Owner** can use the Work, or designated portion of the Work inspected, for the use intended.

8.4.4. Upon Substantial Completion of the Work, or designated part of the Work on which separate Substantial Completion and Contract Price are specified, payment may be made in full subject to (a) a withholding of two hundred percent (200%) of the value of any uncompleted Work, as determined by the **Professional**, and (b) any other deductions as the **Professional** may recommend or the **Owner** may withhold to cover Defective Work, liquidated damages and the fair value of any other items entitling the **Owner** to a withholding.

8.4.5. To the extent **Owner** training is required before Substantial Completion, the **Contractor** will provide the **Owner** copies of all related operating and maintenance (O&M) documentation before the start of training. Where **Owner** training for a portion of the Work is not required before Substantial Completion, the related O&M documentation will be provided no later than Substantial Completion. Final O&M documentation (with revisions made after Substantial Completion), will be furnished by the **Contractor** to the **Owner** before the request for final payment.

## 8.5 Partial Use:

8.5.1. Before Substantial Completion of the entire Work, the **Owner** may, at its sole option, use any portion of the Work for which a separate Substantial Completion has been specified in the Contract Documents. Before Substantial Completion of the entire Work, the **Owner** may, at its sole option, use any portion of the Work considered by the **Owner, Professional** and **Contractor** to be separately functioning Work that can be used without significant interference with the **Contractor's** completion of the balance of the Work, even though a Substantial Completion for such Work is not specified in the Contract Documents.

8.5.2. If the **Owner** decides to use any portion of the Work, it shall inform the **Contractor** in writing. Unless such portion of the Work has undergone a Substantial Completion inspection under paragraph 8.4.2, within a reasonable time after receipt of the notice, the **Owner, Contractor** and **Professional** shall jointly make an inspection to determine the extent of completion. If the portion of the Work inspected is substantially complete, the provisions of paragraph 8.4.3 shall be followed by the **Owner, Professional** and **Contractor**. If the portion of the Work inspected is not substantially complete, the **Professional** will prepare a list of items remaining to be completed or corrected before that portion of the Work is considered substantially complete. Upon completing the list, the **Professional** will deliver the prepared list of items to the **Owner** and **Contractor**.

8.5.3. There shall be attached to the list a written recommendation about the division of responsibilities between the **Owner** and **Contractor** for those matters enumerated in paragraph 8.6.1 with respect to that portion of the Work, pending Substantial Completion of that portion of the Work and the entire Work. During Partial Use, and before Substantial Completion of the portion of the Work under Partial Use, the **Owner** shall allow the **Contractor** reasonable access to complete or correct listed items and to complete other Work. The **Owner** will not start any Partial Use unless the property insurer, by endorsement or like acceptable procedure, has acknowledged receipt of notice of and consent to Partial Use.

## 8.6 Division of Responsibilities:

8.6.1. A certificate of Substantial Completion will include the **Professional's** recommendation about the division of responsibilities between the **Owner** and **Contractor** for utilities, security, safety, insurance, maintenance, etc. The **Owner** and **Contractor** will accept the division of responsibilities recommended by the **Professional** or shall negotiate a mutually agreeable split of responsibilities, which shall bind the **Owner** and **Contractor** when the **Owner** starts Partial Use.

## 8.7 Suspension of Work:

8.7.1. Suspension of Work Order – The **Owner** may, at any time, order the **Contractor** in writing to defer, stop, slow down, suspend or interrupt all or any part of the Work for such period as the **Owner** may determine appropriate for its convenience. If any such written order Delays performance for an unreasonable period, the **Owner** will amend the Contract Documents to provide for a corresponding adjustment in Contract Time and/or Contract Price (excluding Fee under paragraph 11.11).

8.7.2. Constructive Suspension of Work – If performance of all or any part of the Work is, for an unreasonable period, deferred, stopped, slowed down, suspended or interrupted by any other act or failure to act of the **Owner** or **Professional**, or act or event attributable to the **Owner** under the Contract Documents, the **Owner** will negotiate with the **Contractor** or authorize an adjustment in Contract Time and/or Contract Price (excluding Fee under paragraph 11.11.1) for any increase in the time required to complete the Work and/or the **Contractor's** cost of performance.

8.7.3. Suspension of Work Limitation – No adjustment in Contract Price under paragraphs 8.7.1 or 8.7.2 shall be made to the extent performance is delayed by any other cause, including any act or omission within the control of the **Contractor**. Further, no suspension of Work shall justify an increase in Contract Price or Contract Time unless the resulting Delay exceeds the time allowed in the Contract Documents for the act or failure to act.

8.7.4. If the **Contractor** believes a suspension of Work justifies an increase in Contract Price or Contract Time, the **Contractor** shall give prompt written notice to the **Owner** and submit a written proposal promptly after the extent of the Delay becomes known. However, no proposal or claim by the **Contractor** on account of a suspension of Work shall be allowed (a) for any Delay or costs incurred more than thirty (30) Calendar Days before the **Contractor** gives written notice (except for written orders under paragraph 8.7.1), or (b) if made after final payment.

## 8.8 Sharing of Total Float On Non–Critical Paths:

8.8.1. The Progress Schedule shall be in the form of a Critical Path Schedule, Total Float on non-Critical Paths shall be available to the **Owner**, to the extent the **Owner's** use is reasonable given the Total Float remaining for the Work affected. If any such **Owner's** use of Total Float causes Delay which materially increases the **Contractor's** cost to complete the Work affected, and the **Contractor** notifies the **Owner** in writing and proceeds to support the assertion to the **Owner's** satisfaction, the **Owner** will correspondingly adjust Contract Price for any such material changes in the **Contractor's** cost to complete the Work.

8.8.2. The amount of Total Float available in the Progress Schedule shall not be artificially reduced by suppressing Total Float merely for the sake of voiding Total Float. Total Float hidden through the use of such techniques as preferential sequencing; slow or late starts of follow-on trades; restraining a Contract Time by Work actually required for a later Contract Time; the use of small crews, extended durations, imposed dates; and so forth, shall be Total Float otherwise available for sharing with the **Owner** under the provisions of paragraph 8.8.1.

## ARTICLE 9 WARRANTY; TESTS, INSPECTIONS AND APPROVALS; CORRECTION OF WORK

### 9.1 Warranty:

9.1.1. The **Contractor** warrants to the **Owner** that all Work will conform to the Contract Documents and will not be Defective. Reasonably prompt notice of Defective Work of which the **Owner** or **Professional** has actual knowledge shall be given to the **Contractor**, but failure to do so will not void the **Contractor's** warranty unless actual prejudice results from such untimely notice. The **Contractor's** warranty excludes defect or damage caused by (a) abuse, modification by others, insufficient or improper operation or maintenance, or (b) normal wear and tear under normal usage.

9.1.2. Manufacturer warranties for materials and equipment received by the **Contractor** shall be assigned and promptly delivered to the **Owner**. Manufacturer warranties shall be in full force and effect for the entire duration of the Correction Period.

### 9.2 Tests, Inspections and Approvals:

9.2.1. The **Owner**, **Professional**, their representatives and consultants, testing agencies and those State agencies and Political Subdivisions with jurisdiction shall be permitted access to the Work at reasonable times while the Work is in progress for On-Site Inspection and/or inspection, testing or approval. The **Contractor** shall provide proper and safe conditions for such access. The **Contractor** shall give the **Professional** timely notice whenever any Work is ready for inspections, tests, or approvals, so that the **Professional** may observe such inspections, tests, or approvals. Tests, inspections, or approvals shall not in any way relieve the **Contractor** from the **Contractor's** obligations to perform the Work in accordance with the Contract Documents or warrant the Work as provided in the Contract Documents.

9.2.2. Unless otherwise provided in Section 00800 Supplementary Conditions, the **Owner** will retain a testing agency, directly or through the **Professional**, to perform inspections, tests or approvals required by the Contract Documents except for those inspections, tests or approvals specifically designated to the Contractor in the Contract Documents. The **Owner** will pay the charges of the testing agency, except if related to tests, inspections or approvals required by Law or otherwise charged to the **Contractor** under the provisions of paragraph 9.2.4 or 9.3.

9.2.3. The **Contractor** shall assume full responsibility for any testing, inspection, or approval (a) required by Law, (b) indicated in or required by the Contract Documents as designated to the Contractor, or (c) required for the **Professional's** acceptance of a Supplier, materials or equipment or mix designs submitted for prior approval by the **Contractor**. The **Contractor** shall (a) pay all related costs, except costs assumed by the **Owner** under paragraph 9.2.2, (b) schedule related activities, and (c) secure and furnish to the **Professional** the required certificates of inspection, testing or approval.

9.2.4. The **Contractor** shall be responsible for any testing, inspection or approval that reveals Defective Work, including an appropriate portion of the Delay and costs occasioned by such discovery of Defective Work. Examples of such costs assumed by the **Contractor** include, but are not limited to, charges of the **Professional** for repeated On-Site Inspections and, to the extent designated in the pertinent Specification, repeat testing, inspection, or approval charges by testing agencies.

### 9.3 Uncovering Work:

9.3.1. Any Work covered without the **Professional's** prior written concurrence shall, when requested by the **Professional**, be uncovered, exposed, or otherwise made available for On-Site Inspection, testing, inspection, or approval as the **Professional** may require, and replaced, if necessary. This requirement applies to Work, which requires On-Site Inspection by the **Professional**, based on the Contract Documents or on specific On-Site Inspection procedures of which the **Professional** notifies the **Contractor** in advance. This requirement also applies to Work, which is to be inspected, tested, or approved by others. The **Contractor** shall be responsible for any such uncovering, exposure, On-Site Inspection, testing, inspection, and satisfactory reconstruction, including an appropriate portion of the Delay and costs, unless the **Contractor** gave the **Professional** timely written notice of the **Contractor's** intentions to cover such Work and the **Professional** failed to act with reasonable promptness in response to such written notice.

9.3.2. The **Contractor**, at the **Professional's** request, shall uncover, expose, or otherwise make available for On-Site Inspection, inspection, testing or approval any covered Work otherwise not required to be observed or inspected, tested, or approved before covering, if the **Professional** determines that such covered Work shall be on-site inspected by the **Professional** or inspected, tested, or approved by others. The **Contractor** shall be responsible for any such uncovering, exposure, On-Site Inspection, inspection, testing and satisfactory reconstruction, including an appropriate portion of the Delay costs, whenever any such uncovered Work is found to be Defective. If, however, any such Work uncovered at the **Professional's** request is not found Defective, the **Owner** will amend the Contract Documents to provide for a corresponding adjustment in Contract Price and/or Contract Time.

### 9.4 Correction of Work:

9.4.1. Before the Correction Period – If required by the **Professional**, the **Contractor** shall correct all Defective Work, whether fabricated, installed or completed or not. If any Work is rejected by the **Professional** or if any testing, inspection, or approval reveals Defective Work, the **Contractor** shall promptly, as direct, remove the Defective Work from the site and replace it with non-Defective Work. The **Contractor** shall bear responsibility for its proportionate share of the Delay and costs resulting from the correction and/or the removal and replacement of Defective Work.

9.4.1.1. If the **Contractor**, within reasonable time after receipt of written notice, (a) fails to correct Defective Work or remove and replace rejected Work, or (b) fails to correct or complete items on any Punch List, or (c) fails to perform Work in accordance with the Contract Documents, or (d) fails to comply with any other provision of the Contract Documents, the **Owner**, after seven (7) Calendar Days' written notice to the **Contractor**, may correct and remedy the deficiency. To the extent necessary to correct and remedy such deficiency, the **Owner** shall be allowed to exclude the **Contractor** from all or part of the site; take possession of all or part of the Work and stop related operations of the **Contractor**; take possession of the **Contractor's** tools, plant and office and construction equipment at the site; and incorporate into the Work materials and equipment for which the **Owner** has paid the **Contractor**. The **Contractor** shall allow the **Owner** and **Professional** access to the site as the **Owner** may require completing corrective and remedial action. The **Owner** shall be entitled to an appropriate decrease in Contract Price for all claims, costs, losses, damages, and Delay incurred or sustained by the **Owner** which are attributable to the **Contractor**. Costs assumed by the **Contractor** under this provision include, without limitation, costs of correction or removal and replacement of Defective Work, costs of repair and replacement of other work destroyed or damaged by the action and related charges of the **Professional**.

9.4.1.2. Instead of requiring correction or removal and replacement of any Defective Work, the **Owner**, with the advice of the **Professional**, may prefer to accept any Defective Work. In any such case, the **Contractor** shall bear its proportionate share of the Delay and costs associated with the **Owner's** determination to accept the Defective Work. If the **Owner's** acceptance of the Defective Work takes place before the **Professional's** recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents, and the Contract Price shall be adjusted accordingly.

9.4.2. Correction Period – The Contract Documents provide for one Correction Period for the entire Work, whether Partial Use of any portion of the Work is designated as eligible by the Contract Documents or not. The Correction Period shall start on the date of Substantial Completion of the Work, or on a later date, if so, provided in the Contract Documents. The Correction Period shall last one year, or longer, if so, specified in the Contract Documents.

9.4.3. Correction of Work During the Correction Period – The **Contractor** shall correct Defective Work or, if rejected by the **Owner**, remove from the site, and replace any Defective Work with non-Defective Work. The **Contractor's** corrective action shall be in accordance with the **Owner's** written instructions and shall be accomplished at the **Contractor's** sole expense. If the Defective Work causes an Emergency or unacceptable risk of loss or damage, the **Contractor** shall take immediate action to correct or remove and replace the Defective Work.

9.4.3.1. If the **Contractor** fails to take corrective action in accordance with the terms of any such **Owner** written instruction, the **Owner**, directly or through others under contract with the **Owner**, may correct or remove and replace the Defective Work.

In any such case, the **Contractor** shall bear its proportionate share of all resulting claims, costs, losses, and damages. If the **Owner** and the **Contractor** are unable to agree as to the amounts due by the **Contractor** to the **Owner** under the provisions of this paragraph, the **Owner** may deliver a claim, in accordance with the procedures and within the deadlines set forth in Article 15. If the discovery of the Defective Work takes place after final payment and the **Contractor** fails to pay the **Owner** any of the amounts due under the provisions of this paragraph, the **Owner** shall demand due performance under Section 00610 Performance Bond and Article 14 or deliver a claim, in accordance with the procedures and within the deadlines set forth in Article 15, or both.

9.4.4 **After the Correction Period** – Until the period of limitation provided by Michigan Law, the **Contractor** shall promptly correct Defective Work upon receipt of written notice from the **Owner**. If appropriate under the circumstances or, in the event of an Emergency or unacceptable risk of loss or damage, the **Owner**, directly or through others under contract with the **Owner**, may correct or remove and replace the Defective Work.

9.4.5. It is not the intent of paragraph 9.4 or paragraph 9.5 to establish a period of limitations for the **Contractor's** warranty or to limit the obligations of the **Contractor** to warrant that the Work will not be Defective. The specified correction of Work requirements relates only to the specific obligation of the **Contractor** to correct or remove and replace Defective Work. The specified correction of Work requirements has no limitation on the rights of the **Owner** to have Defective Work corrected or removed and replaced, if rejected, except as otherwise provided by Michigan Law.

## 9.5 Special Correction Period Requirements:

9.5.1. Whenever the **Owner** undertakes Partial Use of any portion of the Work specifically designated as eligible for Partial Use in the Contract Documents, the warranties for all materials and equipment incorporated into that portion of the Work shall remain in full force and effect between the start of such Partial Use and the date when the Correction Period starts. If no separate price for such special correction period was requested in Section 00300 Bid Form and made part of the Contract Documents, the **Owner** will appropriately adjust the Contract Price.

9.5.2. Whenever the **Owner** undertakes Partial Use of any portion of the Work because any act or omission within the control of the **Contractor** Delays completion of the Work, or any portion of the Work, within a designated Contract Time, the warranties for all materials and equipment incorporated into that portion of the Work shall, at no adjustment in Contract Price, be maintained in full force and effect between the beginning date of such Partial Use and the date when the Correction Period starts.

9.5.3. The correction period for any Defective Work that is corrected or rejected and replaced within the last three (3) months of the Correction Period shall be extended by an additional six (6) months, starting on the date such Work was made non-Defective.

9.5.4. The Contract Documents may require the Correction Period to start on a date later than the date of Substantial Completion of the entire Work. If such is the case, and the **Owner** advances or defers the start of the Correction Period, the **Contractor** shall maintain the warranties for materials and equipment until the revised starting date of the Correction Period. If no separate price for such advance or deferment was requested in Section 00300 Bid Form and made part of the Contract Documents, the **Owner** will amend the Contract Documents to appropriately adjust the Contract Price.

## 9.6 Special Maintenance Requirements:

9.6.1. If the Contract Documents specify that the entire Work, or a portion of the Work, upon reaching Substantial Completion, shall not be placed in use by the **Owner**, the **Contractor** shall maintain the Work, or specified part of the Work, in good order and proper working condition and shall take all other actions necessary for its protection between the certified date of Substantial Completion and the date when the Work, or designated part of the Work, is placed in use.

9.6.2. If no separate price for such special maintenance period was requested in Section 00300 Bid Form and made part of the Contract Documents, the **Owner** will amend the Contract Documents to appropriately increase the Contract Price.

## ARTICLE 10 CHANGES

### 10.1 Changes in the Work:

10.1.1. **Changes in the Work** – The **Owner** is entitled to make changes within the general scope of the Work consisting of (a) additions, deletions or other revisions in the Specifications and Drawings, any Means and Methods or the **Owner**-furnished lands, equipment, materials, or services, or (b) directing acceleration of the Work. Changes in the Work may be accomplished through negotiated, *bilateral* Change Orders or *unilateral* Change Orders or result from any other properly authorized written order from the **Owner** or **Professional** which represents a constructive change.

10.1.2. **Negotiated Changes** – The **Owner** may negotiate changes in the Work by directing the **Professional** to prepare a Bulletin in numerical sequence describing the change being considered. Upon receiving a Bulletin, the **Contractor** (with the appropriate Subcontractors) shall evaluate the described change and quote the Bulletin. In estimating adjustments in Contract Price and/or Contract Time, the **Contractor** shall follow the provisions, including the breakdown requirements, specified in Article 11.



10.1.3. Constructive Changes – Any written order (including instruction, interpretation, determination, authorization, or approval) from the **Owner** or **Professional** that causes a change in the Contract Documents shall constitute a change in the Work, provided the **Contractor** or the **Owner** gives prompt, written notice of a change to the other (with copy to the **Professional**) stating the date, circumstances, and source of the change.

10.1.3.1. Upon receipt and evaluation of the written notice, if the **Owner** agrees, with the **Professional's** advice, that a change within the general scope of the Work has been ordered, the **Owner** shall, by Change Order or Change Authorization, correspondingly amend the Contract Documents. If the **Owner** finds that a change within the general scope of the Work has not been ordered, and the **Contractor** disagrees, the **Contractor** may deliver notice of a claim and a claim Submittal in accordance with the procedures and within the deadlines set forth in Article 15.

10.1.3.2. **No proposal or claim** by the **Contractor** on account of changes under paragraphs 3.2.1, 10.1.3 or any other matter for which Contractor asserts added cost or time **shall be allowed unless initiated by written notice** of such proposal or claim to the Professional and Owner **within 21 days after the occurrence of the event giving rise to such proposal or claim or within 21 days after the contractor first recognizes the condition giving rise to the proposal or claim**. A full and detailed breakdown of cost and time requested, with supporting documentation, if not provided with initial notice shall be delivered to Professional and Owner within 15 days of the notice, as noted in article 11.1.2, unless otherwise agreed in writing, by the Owner prior to expiration of such time.

10.1.4. Unilateral Changes – If, in negotiations, the **Owner** and **Contractor** are unable to agree on the adjustment in Contract Price or Contract Time corresponding to any change in the Work, the **Owner** may issue a *unilateral* Change Order. Upon receiving any such Change Order, the **Contractor** shall promptly proceed or continue with the Work Involved as required by the Change Order.

10.1.4.1. *Unilateral* Change Orders may adjust Contract Price and/or Contract Time, as the **Owner**, with the advice of the **Professional**, may determine appropriate. Contract Price may be adjusted on a *lump sum* basis or an *actual cost, not to exceed* basis. If the **Contractor** disagrees with the extent of the adjustments in Contract Price and/or Contract Time made by any such *unilateral* Change Order, the **Contractor** may deliver notice of a claim and a claim Submittal in accordance with the procedures and within the deadlines set forth in Article 15.

## 10.2 Differing Subsurface or Physical Site Conditions:

10.2.1. The Contract Documents make available Authorized Technical Data concerning subsurface site conditions and physical conditions of existing surface and subsurface facilities at the site. Consistent with Section 00100 Instructions to Bidders, except for reasonable reliance on the accuracy of Authorized Technical Data, the **Owner** does not warrant that Authorized Technical Data is necessarily sufficient and complete for the purposes of selecting Means and Methods, initiating, maintaining, and supervising safety precautions and programs or discharging any other obligation assumed by the **Contractor** under the Contract Documents.

10.2.2. The **Contractor** or **Owner** shall notify the other in writing if the **Contractor** or **Owner**, respectively, discovers that (I) actual subsurface conditions or latent physical conditions of existing surface and subsurface facilities encountered at the site differ materially from those shown or indicated in the Contract Documents, or (II) unknown subsurface conditions or unknown physical conditions of existing surface and subsurface facilities encountered at the site, of an unusual nature, differ materially from those ordinarily encountered and recognized as inherent in work similar in character to the Work. A written notice from the **Contractor** shall be delivered promptly before the conditions are disturbed and before proceeding with the affected Work. A written notice from the **Owner** shall be delivered promptly after the **Owner** has knowledge of the differing subsurface or physical conditions.

10.2.2.1. Upon receipt or delivery of any such notice, the **Owner** shall investigate the differing conditions asserted. If, with the **Professional's** advice, the **Owner** determines that conditions on which the **Contractor** is entitled to rely do differ materially, the **Owner** will amend the Contract Documents to provide for any changes in the Work and adjustments in Contract Price and Contract Time made necessary by the differing conditions and any resulting Delay which is not reasonably anticipatable under the circumstances and which is attributable to the **Owner** and/or **Professional**. Unless the **Owner** and **Contractor** otherwise agree, no increase in Contract Time shall be made for any suspension of Work made necessary by any differing subsurface conditions, if the suspension of Work lasts less than ten (10) Calendar Days.

10.2.2.2. If the **Owner** determines that the actual conditions encountered and those conditions on which the **Contractor** is entitled to rely do not differ materially, and the **Contractor** disagrees with the **Owner's** determination, the **Contractor** may deliver notice of a claim and a claim Submittal in accordance with the procedures and within the deadlines set forth in Article 15.

10.2.2.3. No proposal or claim by the **Contractor** due to differing site conditions shall be allowed (a) if the **Contractor** knew of their existence before submitting its Bid or if those conditions could have been discovered by any reasonable examinations for which the **Contractor**, as Bidder, was made responsible under the Bidding Requirements, and/or (b) unless the **Contractor's written notice** is provided **within not more than 21 days after the contractor first recognizes the condition giving rise to the proposal or claim and gives the Owner adequate opportunity to investigate the asserted differing site conditions**. A full and detailed breakdown of cost and time requested, with supporting documentation, if not provided with initial notice shall be delivered to Professional and Owner within 15 days of the notice, as noted in article 11.1.2, unless otherwise agreed in writing, by the Owner prior to expiration of such time.

10.2.3. The provisions of paragraph 10.2.2 through 10.2.2.3 also shall apply to situations where the **Contractor** or **Owner** discovers that any reference points provided by the **Owner** need correction to enable the **Contractor** to proceed with the Work.

**10.3 Responsibilities for Underground Utilities:**

10.3.1. The **Contractor** shall comply with 2013 PA 174, as amended, MCL 460.721 et seq., and all other Laws concerning Underground Utilities. In addition, the **Contractor** shall be responsible for immediately notifying the **Owner** of any contact with or damage to Underground Utilities, and for the safety, protection of and repairing of any damage done to any Work and any surface and subsurface facilities. Except as provided under 2013 PA 174, as amended, MCL 460.721 et seq., paragraph 10.3.2 or by any Allowance specific to Underground Utilities, the **Contractor** shall bear an appropriate portion of the Delay and costs relating to the obligations set forth in this paragraph.

10.3.2. Shown or Indicated – If the **Contractor** encounters Underground Utilities shown or indicated (whether in the Contract Documents or those documents itemized in Section 00210 Information for Bidders) that are inaccurately shown or are inaccurately located, responsibility for any damage shall be as provided in MCL 460.701 et seq. To the extent the Drawings and/or Specifications inaccurately show or locate, through error or omission, the actual physical conditions and/or location of existing Underground Utilities (when compared with the information and data provided by the owners of such Underground Utilities), the **Owner** will amend the Contract Documents to provide for a corresponding adjustment in Contract Price and/or Contract Time.

10.3.3. Not Previously Located – If the **Contractor** encounters not previously located Underground Utilities, which could not reasonably have been foreseen, the **Owner** will amend the Contract Documents to provide for any changes in the Work and corresponding adjustments in Contract Price and/or Contract Time made necessary by such changes in the Work and by any resulting Delay which is not reasonably anticipatable under the circumstances and which is attributable to the **Owner** and/or **Professional**.

**10.4 Hazardous Material Conditions:**

10.4.1. The **Contractor** shall use, handle, store, dispose of, process, transport and transfer any material considered a Hazardous Material in accordance with all federal, state, and local Laws. If the **Contractor** encounters material reasonably believed to be a Hazardous Material and which may present a substantial danger, the **Contractor** shall immediately stop all affected Work, give written notice to the **Owner** of the conditions encountered, and take appropriate health and safety precautions.

10.4.2. Upon receipt of the written notice, the **Owner** will investigate the conditions. If (a) the material is a Hazardous Material that may present a substantial danger and which was not described in the Drawings and/or Specifications, or identified in the Contract Documents as Work under the Contract Documents, and (b) the Hazardous Material was not brought to the site by the **Contractor**, or does not result in whole or in part from any violation by the **Contractor** of any Laws covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Materials, the **Owner** shall order a suspension of Work in writing. The **Owner** shall proceed to have the Hazardous Material removed or rendered harmless by negotiating a change in the Work with the **Contractor**, by means of separate contract or as the **Owner** may deem otherwise expedient. In the alternative, the **Owner** shall terminate the affected Work or the Contract for the **Owner's** convenience.

10.4.3. Once the Hazardous Material has been removed or rendered harmless by any of the means outlined in paragraph 10.4.2, the affected Work shall be resumed as directed in writing by the **Owner**. Any determination by the Michigan Department of Health & Humans Services and/or the Michigan Department of Environment, Great Lakes, and Energy (whichever is applicable) that the Hazardous Material has either been removed or rendered harmless shall be binding upon the **Owner** and **Contractor** for the purposes of resuming the Work. If any such incident with Hazardous Material results in Delay not reasonable anticipatable under the circumstances and which is attributable to the **Owner** or **Professional**, the **Owner** will amend the Contract Documents to provide for a corresponding adjustment in Contract Price or Contract Time, or both, made necessary by such Delay.

10.4.4. If the Hazardous Material was brought to the site by the **Contractor**, or results in whole or in part from any violation by the **Contractor** of any Law covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Materials or from any other act or omission within its control, the **Contractor** shall bear its proportionate share of the Delay and costs involved in cleaning up the site and removing and rendering harmless the Hazardous Material to the satisfaction of the **Owner**, State and all Political Subdivisions with jurisdiction. If the **Contractor** fails to proceed with due diligence to take appropriate action pursuant to applicable Law and consistent with the **Owner** requirements, the **Owner** may act accordingly, in which case the **Contractor** shall defend, indemnify, and hold harmless the **Owner** from and against all claims, as construed in paragraph 1.4, arising from the **Owner's** exercise of such appropriate action.

**10.5 Incidents with Archaeological Features:**

10.5.1. The **Contractor** shall at once notify in writing the **Owner** of any Archaeological Feature deposits that are encountered or unearthed during the execution of the Work. The **Contractor** shall protect the deposits in a satisfactory manner and no further disturbance of the Archaeological Features shall take place until Work is allowed to be resumed in the affected areas.

10.5.2. If the **Owner**, with the advice of the **Professional**, concludes that the Contract Documents require changes because of Archaeological Features encountered, the **Owner** will amend the Contract Documents to provide for any changes in the Work and corresponding adjustment in Contract Price and/or Contract Time made necessary by the changes due to the Archaeological Features encountered and by any resulting Delay which is not reasonably anticipatable under the circumstances, and which is attributable to the **Owner** and/or **Professional**.

**10.6 Unit Price Work:**

10.6.1. If the Contract Documents specify Unit Price Work, the Contract Price shall contain the sum of each unit price times its estimated quantity. The **Contractor** shall be responsible for completing, within the Contract Times, one hundred twenty (120%) of the estimated quantities of Specified Unit Price Work and reasonable quantities of Contingent Unit Price Work.

10.6.2. The **Contractor** shall promptly, **before proceeding with any affected Unit Price Work**, deliver a written notice to the **Professional** (a) whenever actual quantities for an item of Specified Unit Price Work differs materially from those estimated and request an adjustment in the estimated quantity, or (b) requesting authorization to provide any or differing quantities of any item of Contingent Unit Price Work. The **Contractor** or the **Owner** shall submit to the other and the **Professional**, a proposal for adjusting that item's unit price and/or the Contract Time. The proposal shall be properly substantiated.

10.6.2.1. Promptly after being notified by the **Contractor**, the **Professional** will evaluate the affected Unit Price Work and provide its determination to the **Owner** and **Contractor**. If the **Owner** adjusts the estimated quantity of Specified Unit Price Work or authorizes any, or any additional, quantities of Contingent Unit Price Work, the **Contractor** shall proceed with that Unit Price Work as directed by the **Professional**. The **Contractor** shall proceed with the Unit Price Work regardless of whether the **Owner**, after conferring with the **Professional** determines that a variation in quantity justifies an adjustment in the unit price, or that the existing unit price is valid for the additional or reduced quantities, or that no adjustment in the Contract Time is warranted. In the event the **Contractor** disagrees with any such determination, the **Contractor** shall deliver a notice of claim and a claim submittal in accordance with the procedures and within the deadlines set forth in Article 15.

10.6.2.2. Any adjusted Unit Price agreed upon by the **Owner** will only apply to the actual quantities above one hundred twenty percent (120%) or to the actual quantities less than eighty percent (80%) of the estimated quantity. For additional quantities over one hundred twenty percent (120%) or reduced quantities below eighty percent (80%) of the estimated quantity, the **Owner** may negotiate a Unit Price with the **Contractor**, or direct a unilateral change as provided by Article 10 or rebid that Work. In no case, however, will a Unit Price change resulting from a reduction in quantity be renegotiated such that the changed Unit Price produces a modified Bid Price for any line item that exceeds the initial Bid Price for that line item.

10.6.3. No adjustment due to quantity variations shall be allowed (a) unless the **Contractor** met the notice requirements of paragraph 10.6.2, (b) to the extent that the Bid Price for a line item will increase due to reduced quantities at a higher unit, (c) for under runs in any quantities of Contingent Unit Price Work, unless the unit price times the estimated quantity exceeds the lesser of \$50,000.00 or two percent (2%) of the Contract Price, or (d) if any unit price increase results in whole or in part from any act or omission within the control of the Contractor (errors in the Contractor's Bid, unbalanced unit prices, etc.).

**10.7 Cash Allowances; Provisionary Allowances:**

10.7.1. The **Contractor** shall obtain the **Professional's** written acceptance before providing materials, equipment or other items covered by a Cash Allowance. Payments under a Cash Allowance shall be on actual costs, and exclude costs for supervision, handling, unloading, storage, installation, testing, etc., which shall be considered to be included within other elements of the Contract Price. Payments within the limits of an Allowance shall exclude Fee and Bond and insurance premiums since these are already included within other elements of the Contract Price.

10.7.2. The **Contractor** shall complete Work covered by Provisionary/Contingency Allowances as approved in writing by the **Owner** and directed by the **Professional**. The Cost of the Work Involved for Work authorized under any Provisionary/Contingency Allowance shall be determined pursuant to Article 11, except those payments within the limits of any Allowance shall exclude Bond and insurance premiums under paragraph 11.8.1.5, since these costs are already included within other elements of the Contract Price.

**10.8 Change Orders; Change Authorizations:**

10.8.1. The terms "Change Order" and "Change Authorization" are defined in Section 00020 Glossary. Further, Division 1 includes prototype Change Order and Change Authorization forms which shall be used by the **Owner** and **Contractor** in connection with modifications to the Contract.

\*10.8.2. A *bilateral* Change Order which does not incorporate a **Contractor** reservation of rights to claim additional adjustments, shall memorialize the **Owner's** and **Contractor's** agreement as to the adjustments in Contract Price and/or Contract Time made by the Change Order. Any such *bilateral* Change Order shall constitute an all-inclusive settlement for all changes, Delay, and costs, whatsoever, and the **Contractor's** signature on the Bulletin and proposal incorporated into that Change Order represents a waiver of all rights to file a subsequent proposal or a claim under Article 15 on account of that Change Order or the Work.

10.8.3. A presumed *bilateral* Change which includes a proposal signed by the **Contractor** with a reservation to claim additional adjustments shall be regarded as a notice of claim as to those adjustments and shall be pursued as provided in Article 15, except as the **Owner** and **Contractor** may otherwise agree.

10.8.4. A Change Order issued by the **Owner** after unsuccessful Contract Price and/or Contract Time negotiations with the **Contractor** and stating the **Owner's** proposed basis for the necessary adjustments in Contract Price and/or Contract Time shall be a *unilateral* Change Order.

10.8.5. The **Owner** will issue Change Orders to amend the Contract Documents for changes in the Work and for any adjustments in Contract Price or Contract Time agreed to in total or in part by both the **Owner** and **Contractor**; or to correspondingly adjust the Contract Price for Work furnished under Cash Allowances, Work completed that was authorized under Provisionary/Contingency Allowances and actual quantities of Unit Price Work. Amounts for Work Involved in a Change Order signed by the **Owner** may be included in subsequent Requests for Payment.

10.8.6. The **Owner** may use Change Authorizations (a) to document agreed-upon minor variations in the Work, and/or (b) to document or order changes in the Work not warranting any adjustment in Contract Price or Contract Time. Examples of the second category include but are not limited to the **Owner's** authorization for drawing payments against a Provisionary/Contingency Allowance or the **Owner's** consent to quantity variations not increasing the Contract Price.

10.8.7. Before, or in conjunction with, the **Professional's** certification of final payment, an appropriate Change Order will be issued, with the **Professional's** advice, to correspondingly adjust the Contract Price for the value of Work furnished under Cash Allowances, Work completed that was authorized under Provisionary/Contingency Allowances and actual quantities of Unit Price Work.

10.8.8. Subject to the provisions of paragraphs 10.8.2 through 10.8.4, it is a requirement of the Contract Documents that all Change Orders duly signed and issued by the **Owner** shall incorporate Bulletins, which are duly signed by the **Contractor**, regardless of whether the **Contractor** uses a reservation of rights.

## ARTICLE 11 CHANGES IN CONTRACT PRICE; CHANGES IN CONTRACT TIME

### 11.1 General Provisions:

11.1.1. Contract Price or Contract Time may be changed only by Change Order duly signed by the **Owner**. Neither Contract Price nor Contract Time may be changed by Change Authorization (subject to the provisions for constructive changes).

11.1.2. **Contractor** proposals for adjusting Contract Price and/or Contract Time shall be due within fifteen (15) Calendar Days after the **Contractor** receives a Bulletin or delivers to the **Owner** a notice of a change or a Delay. Proposals not complying with the requirements of paragraphs 11.1.4 and 11.1.5 shall be returned for resubmission. This turnaround period is of the essence and any Delay in delivering a bulletin or resulting from resubmission of an incomplete Bulletin shall not justify any increase in Contract Price or Contract Time. The **Owner**, in its sole discretion, may extend or shorten the 15-Day period for Bulletin quotations estimated at more than \$250,000 or less than \$25,000.

11.1.3. The **Professional** will review each **Contractor** proposal, and the **Professional** will recommend to the **Owner**, within a reasonable time, whether or not the Bulletin quotation is acceptable. Due to the time required to obtain **Board** and **Director** approvals, a **Contractor** proposal shall be irrevocable for sixty (60) Calendar Days after it is submitted to the **Professional**.

11.1.4. **Contractor** proposals or claims for Work Involved shall detail all affected items of Work, whether increased, revised, added, or deleted, and shall be fully documented and itemized as to (a) individual adds and deducts in Work quantities and labor manhours; (b) corresponding itemized Cost of Work Involved (paragraphs 11.4 through 11.9; and (c) Fee. Proposals or claims including Fee of five percent (5%) for Work Involved of a Subcontractor shall nominate the performing Subcontractor and enclose the Subcontractor's pricing data, if available.

11.1.5. For **Contractor** proposals or claims for adjustments in Contract Price arising from Delays (whether or not such Delays extend any Contract Time or any early completion date), the **Contractor's** estimates shall be as comprehensive and detailed as may be appropriate to support the proposal or claim. Examples of germane information include labor productivity, labor manpower levels, production data and Progress Schedule revisions.

11.1.6. If the **Contractor's** surety requires notice of any adjustment in Contract Price and/or Contract Time, whether made pursuant to Article 11 or otherwise; any "or equal" material or equipment or substitution approved by the **Professional**; any change within the scope of Article 10; or any other addition, deletion or revision in the requirements of the Contract Documents, whether made by Change Order or Change Authorization, it shall be the **Contractor's** responsibility, and not the **Owner's**, to give notice to the **Contractor's** surety. It is agreed that none of these modifications to the Contract Documents and/or the Work shall invalidate the Agreement.

### 11.2 Changes in Contract Time:

11.2.1. An extension in Contract Time will be justified only to the extent that the **Contractor** demonstrates, with comprehensive and detailed documentation, that the Delay is not reasonably anticipatable under the circumstances, is not caused by act or omission within the control of the **Contractor**, and, furthermore, that the Delay necessarily extends the Work, or portion of the Work in question, beyond the pertinent Contract Time.

If the **Owner** determines that the **Contractor's** documentation is insufficient to allow a thorough evaluation of the time extension request, the **Contractor** shall further support the request through a detailed analysis of the Progress Schedule Revision Submittal.

11.2.2. Examples of events that may justify an extension in Contract Time include acts of God or the public enemy; acts of the U.S. Government, the State or a Political Subdivision, each acting in its public capacity (including acts as permitting agency); acts of a Public Utility acting in its public capacity; fires, floods, epidemics, quarantine restrictions; strikes, freight embargoes; unusual weather (unusual in the sense of frequency or severity vis-à-vis the prior five (5) year average); unusually severe shortages of construction materials (considering all feasible sources of supply); Underground Utilities which the Contract Documents, through error or omission, inaccurately show or indicate; Underground Utilities not previously located; objection, for the **Owner's** convenience, to a nominated Subcontractor; Archaeological Features; suspension of Work; changes in the Work, differing site conditions; variation in quantities; and Delay, as provided in this paragraph, of Subcontractors or Suppliers, at any tier, not caused in whole or in part by any act or omission within the control of both the **Contractor** and any such Subcontractors and Suppliers.

11.2.3. If upon evaluation of the **Contractor's** analysis, the **Owner** approves an extension in Contract Time for Delay not caused in whole or in part by any act or omission within the control of the **Owner** and/or **Professional**, the **Owner** shall authorize the necessary adjustment in Contract Time only. If the **Owner** approves an extension in Contract Time for Delay caused in whole or in part by any act or omission within the control of the **Owner** and/or **Professional**, the **Owner** shall authorize the necessary adjustments in Contract Time and Contract Price.

### 11.3 Methods for Making Adjustments in Contract Price:

11.3.1. The method to be used to determine any adjustment in Contract Price shall be selected by the **Owner** from one of the methods in paragraph 11.3.1.1 through 11.3.1.3, or otherwise shall be limited to the methods in paragraph 11.3.1.4 or 11.3.1.5.

11.3.1.1. If any Work Involved is covered by lump sum prices or unit prices contained in the Contract Documents, those prices shall be used (subject to the terms and conditions of paragraph 10.6 Unit Price Work). In the latter case, the unit prices shall be applied to the quantity of Unit Price Work Involved.

11.3.1.2. If any Work Involved is not covered by lump sum or unit prices contained in the Contract Documents, then application of a lump sum price may be negotiated using the **Contractor's** itemized estimate of the *anticipated* Cost of the Work Involved, as specified in this Article, and a Fee for the Work Involved, as specified in paragraph 11.11.1.

11.3.1.3. If the Work Involved is not covered by the first two methods, the **Owner** may direct the **Contractor** to proceed with the Work Involved on an *actual cost* basis, with or without a guaranteed maximum, based on an itemized breakdown of the *actual* Cost of the Work Involved, as specified in this Article, and a Fee for the Work Involved, as specified in paragraph 11.11.2.

11.3.1.4. If the Work Involved is not covered by the first two methods, the **Owner** may direct the **Contractor** to proceed through a *unilateral* Change Order on a lump sum basis or a not-to-exceed basis, based on the **Professional's** estimate of the anticipated Cost of Work Involved and a Fee for the Work Involved, as specified in paragraph 11.11.1 or 11.11.2.

11.3.1.5. If payment for the Work Involved is to be determined by the Michigan Court of Claims or a AAA arbitration panel, it is agreed by the **Contractor** that the *actual cost and Fee* method in paragraph 11.3.1.3 shall represent the appropriate method for determining such payment.

11.3.2. Items making-up the Cost of the Work Involved shall be allowable to the extent (a) consistent with those prevailing in the Project locality, (b) necessary, reasonable, and clearly allocable to the Work Involved, and (c) limited to labor costs, Subcontract costs, material and equipment costs, construction equipment costs and general conditions costs, as specified in this Article.

### 11.4 Labor, Subcontract and Material/Equipment Costs:

11.4.1. The Cost of any Work Involved includes the **Contractor's** payroll costs for craft workers resident at the site (through crew foremen) assigned to furnishing and incorporating materials and equipment into the Work Involved. If craft labor manhours exceed those that can be gleaned from the Means Cost Data, or other cost guide acceptable to the **Owner**, the **Contractor** shall provide proper justification, which shall be acceptable to the **Professional**.

11.4.1.1. Payroll costs shall include wages, labor burdens and a factor for field supplies and purchase costs (less market value if not consumed) of tools not owned by the workers. Labor burdens shall be certified by an authorized financial representative of the **Contractor** and may include social security, unemployment taxes, workers' compensation, health and retirement benefits, vacation, and holiday pay. The factor for field supplies and tools (individually valued at less than \$1,000.00) shall not exceed four percent (4%) of the wages without burdens, unless the **Contractor** furnishes detailed data which supports a higher factor. For actual payroll costs, **Contractor** time sheets verified by the **Professional** and/or certified payrolls shall be the only valid Records. For actual payroll costs under paragraph 11.3.1.5, time sheets shall be valid only if they expressly correlate to the Work Involved and were recorded at that time and/or used for certified payrolls.

11.4.2. The Cost of the Work Involved includes the **Contractor's** costs for the labor costs, (lower tier) Subcontract costs, material and equipment costs and general conditions costs of Subcontractors nominated for the Work Involved. Except for a higher six percent (6%) limit on the factor for field supplies and small tools, the methods for calculating Subcontractors' costs shall be the same as those for **Contractor** costs, except that the term "Subcontractor" shall replace the term "**Contractor**," context permitting. If the **Owner** and **Contractor** agree in advance, the **Contractor** shall obtain detailed quotations and shall nominate at least two (2) Subcontractors, acceptable to both the **Contractor** and **Professional**, for selection by the **Owner**.

11.4.3. The Cost of any Work Involved includes the **Contractor's** costs for materials and equipment, including transportation, storage, and necessary Suppliers' field services. All trade discounts, rebates and refunds and returns from surplus sales that can be realized at the time of pricing shall accrue to the **Owner**, and the **Contractor** shall make arrangements so that they may be obtained. If the Bulletin for the Work Involved lists specific Suppliers, the **Contractor** shall obtain written quotations from them and shall nominate one of the listed Suppliers to allow a comprehensive review of the proposal by the **Professional**. Invoices segregating items relating to the Work Involved shall be valid Records in support of actual Supplier costs.

#### 11.5 Construction Equipment Costs:

11.5.1. The cost of any Work Involved includes costs for individual construction equipment with replacement value in excess of \$1,000.00. Transportation, loading and unloading, installation, dismantling and removal and shipping costs shall be allowed to the extent required by the Work Involved and reasonable under the circumstances. Equipment costs shall cease when the equipment is no longer needed for the Work Involved. Payroll costs for labor operating the equipment are as specified in paragraph 11.4.1. Equipment costs shall be computed using the same accounting and estimating rules and prices, whether related to added or deleted Work.

11.5.2. When determining actual construction equipment costs (a) under paragraph 11.3.1.3, daily logs of the equipment, operators, and actual usage, verified by the **Professional**, shall be the valid Records; (b) under paragraph 11.3.1.5, such daily Records shall be valid only if developed when any such Work Involved was performed and used for accounting purposes.

11.5.3. Rented (or owned) equipment, idled solely by actions of the **Owner** or **Professional**, shall be paid at the rate for rented equipment (or at fifty percent (50%) of the rate for owned equipment) provided the idle period exceeds what is normal for the equipment and occurs during normal working hours.

#### 11.6 Rented or Leased Construction Equipment:

11.6.1. Construction equipment rented or leased from third parties shall be priced using the rates negotiated between the **Owner** and **Contractor**. If no agreement is reached, those rates listed in the Rental Rate "Blue Book" published by PRIMEDIA Information Inc. of San Jose, Ca, for the region where the Project is

located applicable to the equipment (model number and year) shall be used. For equipment leased or rented on an hourly basis, the rate for second or third shifts shall not exceed fifty percent (50%) of the base rate. Operating costs shall not exceed the hourly operation rate in the Blue Book. Hourly rates for equipment previously in use at the site for a month or longer shall use the monthly rate divided by 176 hours. Equipment previously in use for only one week or not previously in use at the site shall be invoiced to the **Owner** using the following schedule of equipment use:

|                                        |              |
|----------------------------------------|--------------|
| Less than 8 hours                      | Hourly Rate  |
| 1 Day but less than 7 Calendar Days    | Daily Rate   |
| 1 week but less than 30 Calendar Days  | Weekly Rate  |
| 30 Calendar Days or more (when in use) | Monthly Rate |

#### 11.7 Owned Construction Equipment:

11.7.1. Construction equipment owned by the **Contractor** or rented or leased from lessors associated with or owned by the **Contractor**, shall be priced using the rates negotiated between the **Owner** and **Contractor** based on the **Contractor's** normal accounting practices. If no agreement is reached, the hourly rates in the "Contractor's Equipment Cost Guide," published by PRIMEDIA Information Inc. for the region where the Project is located shall be used. Operating costs shall not exceed the hourly operation rate in the Blue Book. For multiple shifts, rates shall not exceed the shift Work adjustments recommended in the Cost Guide.

#### 11.8 General Conditions Costs:

11.8.1. The Cost of any Work Involved may include necessary general conditions costs to the extent those costs increase or decrease on account of, or are directly attributable to, the performance of Work Involved, or are required due to an extension in Contract Time or Delay under paragraph 11.13.5. Categories of general conditions which are allowable under this paragraph (subject to the provisions of paragraph 11.9) include:

11.8.1.1. To the extent agreed to in advance by the **Owner**, payroll costs for the **Contractor's** project manager or construction manager, but not both, for Work activities conducted at the site.

11.8.1.2. Payroll costs for the **Contractor's** superintendent and full-time general foremen, if any are assigned to the Work, for Work Involved performed beyond normal working hours and/or to the extent those costs and subsistence expenses arise solely from an extension in Contract Time or Delay under paragraph 11.13.5.

11.8.1.3. If agreed to in advance by the **Owner**, payroll costs for management personnel resident and working at the site and for workers not covered under paragraph 11.4.1, resident at the site and engaged as support workers (i.e., loading/unloading, clean-up, etc.) to workers covered under paragraph 11.4.1.

11.8.1.4. Costs of office and temporary facilities at the site, including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities, internet, and telephone service at the site, provided those cost arise solely from an extension in Contract Time or Delay under paragraph 11.13.5.

11.8.1.5. Costs of liability insurance premiums for insurance not included within the labor burdens charged under paragraph 11.4.1, and costs of Bond premiums.

11.8.1.6. Costs of consultants not in the direct employ of the **Contractor**, or Subcontractors not covered under paragraph 11.4.2; to the extent authorized by the **Owner** before proceeding with the Work Involved, and provided that those costs are neither covered by paragraph 11.4 nor excluded by paragraph 11.10; and

11.8.1.7. Taxes on the Work Involved, and for which the **Contractor** is liable; and royalty payments and fees for permits and licenses, provided they relate solely to the Work Involved.

### **11.9 Limitations on Allowable Costs:**

11.9.1. The **Contractor** shall not include as part of the Cost of any Work Involved any construction equipment costs, small tool costs, or general conditions costs that do not increase on account of, or are not directly attributable to, the furnishing and/or performance of any Work Involved. Examples of such unallowable costs include:

11.9.1.1. Charges for **Contractor's** superintendent, general foremen and management personnel assigned full-time to the Work, if the charges relate to Work Involved which does not extend the Contract Time or cause Delay under paragraph 11.13.5, or to Work Involved not performed beyond normal working hours.

11.9.1.2. Fixed percent mark-ups for construction equipment (as opposed to specific construction equipment costs); or

11.9.1.3. Cost of field supplies and/or small tools solely for extensions in Contract Time or Delay under paragraph 11.13.5.

11.9.2. Changes in Contract Price for extensions in Contract Time or Delay under paragraph 11.13.5 shall exclude any costs that are unaffected or do not relate to the extension in Contract Time or the Delay in early completion. Examples include:

11.9.2.1. Operating costs of construction equipment assigned to the Work for the duration, to the extent used in the incorporation of materials and equipment into the Work, provided the equipment is not subject to increased usage because of the extension in Contract Time or the Delay in early completion.

11.9.2.2. Operating costs plus owned/rental costs of construction equipment brought to the site for a specific activity (crane used for specific lifts, concrete pump used for pours, etc.), provided the equipment is not subject to increased usage because of the extension in Contract Time or the Delay in early completion.

11.9.2.3. Construction equipment and site facilities which are fully paid under the Contract Price for the Work, as awarded.

11.9.3. The **Contractor** shall not include as part of the Cost of any Work Involved acceleration costs incurred, for the **Contractor's** benefit, to make-up Delay which warrant extensions in Contract Time but do not justify increases in Contract Price.

### **11.10 Costs Covered by the Fee for the Work Involved (and not Allowable as Cost of the Work Involved):**

11.10.1. **Contractor** administrative costs and home office overhead, whether at the **Contractor's** principal or branch offices, shall not be allowable as elements of the Cost of Work Involved. Rather, those administrative costs and home office overhead shall be non-reimbursable expenses covered by the Fee for the Work

Involved. Examples of administrative costs or home office overhead covered by this provision include, without limitation:

11.10.1.1. Payroll costs and other compensation of executives, general and administrative managers, estimators (except to the extent agreed to in advance by the **Owner**), claim consultants, attorneys, accountants, labor relation coordinators, purchasers, expeditors, and other administrative staff, whether resident at the **Contractor's** principal or branch offices.

11.10.1.2. Payroll costs and other compensation of project managers, construction managers, architects, engineers, schedulers, detailers, safety personnel, clerks, and other administrative staff not resident at the site and who are not part of the **Contractor's** general conditions personnel contingent.

11.10.1.3. Costs of engineers, architects, accountants, consultants, attorneys, and others, in the direct employ of the **Contractor** or otherwise, utilized for services related to a controversy or claim about the acceptability of the Work.

11.10.1.4. Costs incurred in the preparation of Contract Change Orders (whether or not ultimately authorized by the **Owner**), except as otherwise authorized by the **Owner**; and costs incurred in the preparation or filing of claims; and

11.10.1.5. Any interest on the Work Involved, unless otherwise allowed by the Michigan Court of Claims or an arbitration panel; charges for delinquent payments; lost interest on unpaid withholdings; lost profits and lost opportunities; and home office storage and yard facilities.

#### 11.11 Limits on the Fee for the Work Involved:

11.11.1. Any adjustment in Contract Price made by *bilateral* Change Order which stipulates a lump sum price (developed from the **Contractor's** itemized estimate of the *anticipated* Cost of the Work Involved) without incorporating a **Contractor** reservation of rights to claim additional adjustments, shall include a Fee for costs under paragraph 11.10 and for profit, not to exceed the following:

11.11.1.1. For Work Involved to be self-performed by the **Contractor**, the **Contractor's** Fee shall not exceed fifteen percent (15%) of the Cost of the Work Involved. For Work Involved to be performed by any nominated Subcontractor, regardless of tier, the nominated, performing Subcontractor's Fee also shall not exceed fifteen percent (15%) of the Cost of the Work Involved.

11.11.1.2. For Work Involved to be performed by any nominated Subcontractor, the **Contractor's** Fee shall be five percent (5%) of the performing Subcontractor's Cost of the Work Involved, excluding that Subcontractor's Fee. For Work Involved of any nominated lower tier Subcontractor, any corresponding higher tier Subcontractors and the Contractor shall share equally a Fee of five percent (5%) of the performing lower tier Subcontractor's Cost of the Work Involved, excluding the lower tier Subcontractor's Fee.

11.11.2. Any adjustment in Contract Price made by a *bilateral* Change Order (whether based on a *lump sum* or on the *actual cost* of the Work Involved) which incorporates a **Contractor** reservation of rights to claim additional adjustments, shall include a Fee of only two-thirds (2/3) of the Fee otherwise resulting from the application of paragraphs 11.11.1 or 11.11.2.

11.11.3. The credit to be allowed to the **Owner** for any individual change consisting of deletions, or additions and deletions, that yields a negative net Cost of the Work Involved, shall be the amount of the net decrease and, if the negative net Cost of the Work Involved exceeds \$10,000.00, a Fee credit of one-fifth of the Fee resulting from the application of paragraphs 11.11.1.1 through 11.11.1.3 shall be added to that amount.

11.11.4. For any change in the Work combining additions, revisions, and deletions, one single Fee for the Work Involved shall be added to the net Cost of the Work Involved, unless the change in the Work combines self-performed **Contractor** Work and Subcontractor Work, or Work of more than one Subcontractor, or both, in which case separate Fees for the **Contractor** Work and for the Subcontractor Work shall be calculated, as appropriate.

11.11.6. In the event unrelated changes in the Work are grouped in a Bulletin, or included in a claim, and each of the changes yields a net increase or decrease in the Cost of the Work Involved, the combined Fee for the changes in the Work so grouped shall be computed as the sum of the individual Fees otherwise calculated under paragraphs 11.11.1 through 11.11.5.

#### 11.12 Fee for Unabsorbed Home Office Overhead:

11.12.1. It is intended that the Fee for the Work Involved allowed under paragraph 11.11 shall be included with any adjustment in Contract Price for any Cost of Work Involved. However, the Fee under paragraph 11.11.1 shall not be intended to cover unabsorbed home office overhead resulting from an extension of the Contract Time stated in paragraph 4.1.1 of Section 00500 Agreement. When justified under the Contract Documents, Fee for unabsorbed home office overhead shall be calculated as detailed in paragraph 11.12.2.

11.12.2. If an extension of the Contract Time stated in paragraph 4.1.1 of Section 00500 Agreement and an increase in Contract Price for such an extension in Contract Time is justified under the Contract Documents, the **Owner** shall negotiate with the **Contractor** the reimbursement of an amount for the **Contractor's** home office overhead (under paragraph 11.10) that will be or were unabsorbed before the expiration of that Contract Time. Any such reimbursement shall be based on the lesser of: (a) the product of the ratio of the **Contractor's** home office overhead to its contract billings times the Contract Price in paragraph 3.1 of Section 00500 Agreement that remains unbilled on the expiration of that Contract Time, or (b) that amount derived from the Eichleay formula.



**11.13 Changes in Contract Time for Early Completion:**

11.13.1. The Contract Times specified in paragraph 4.1 of Section 00500 Agreement represent the **Professional's** best estimate of the time required to complete the Work and take into account comparisons with completed work similar in scope and character to the Work and constructed under similar conditions.

11.13.2. Since "time is of the essence" in performing this Contract, any early completion Rev. 0 Progress Schedule considered acceptable by the **Owner** shall be construed as setting forth a corresponding amount of Contract Float, unless the **Contractor** delivers notice of a request for a shortening of the Contract Time within thirty (30) Calendar Days after receiving the **Owner's** written notice of "no objection" to such Rev. 0 Progress Schedule.

11.13.3. If the **Contractor** requests that the Contract Times be shortened to eliminate the Contract Float on any such early completion Progress Schedule, and the **Owner** agrees to the **Contractor's** request, the **Owner** and **Contractor** may negotiate a reduction in the affected Contract Time. Concurrently, the **Owner** will develop a level of liquidated damages appropriate to the revised Contract Time(s) or, if more appropriate under the circumstances, the **Owner** will specify actual damages, applicable from the negotiated, earlier Contract Time to the Contract Time under revision. In such case, the aggregate actual damages shall not exceed the sum liquidated damages that may have resulted from the originally specified liquidated damages. Such agreement shall be memorialized through an appropriate Change Order.

11.13.4. If the **Owner** and **Contractor** are unable to agree to such reduction in the Contract Times, or the **Contractor** rejects the **Owner's** assessment of liquidated or the stipulation of actual damages, or both, the Contract Times in question shall remain unaltered and the early completion Progress Schedule shall be employed as provided in the Contract Documents.

11.13.5. To the extent that the Progress Schedule supports an early completion date, and a Delay extends performance of the Work beyond the **Contractor's** early completion date but not beyond the corresponding Contract Time, if the **Contractor** pursues an increase in Contract Price for such Delay in early completion, the **Owner** shall consider such request, subject to the following: (a) the early completion is reasonably achievable, i.e., includes proper allowances for weather, **Owner** and **Professional** activities, rework and other foreseeable events within the control of the **Contractor**, (b) the Progress Schedule used to support the request is loaded with Activity manpower data, and (c) the adjustment in Contract Price shall equal fifty percent (50%) of the **Contractor's** Delay costs otherwise allowable under this Article.

11.13.6. As a point of emphasis, under these provisions, an increase in Contract Time and an increase in Contract Price equaling the **Contractor's** costs occasioned by the Delay (as opposed to only fifty percent (50%) of the **Contractor's** Delay costs), shall be justified only if the Delay attributable to the **Owner** and/or **Professional** necessarily extends Substantial Completion of the Work, or the portion of the Work having a specified Contract Time, beyond the correspondingly specified Contract Time.

**11.14 Access to Records:**

11.14.1. The **Contractor** shall maintain and keep and shall require all Subcontractors and Suppliers to maintain and keep, in accordance with generally accepted accounting principles, Records pertaining to the bidding, award and performance of the Work, including, but not limited to payroll and employment Records and all data used in estimating the **Contractor's** Bid and in pricing and negotiating Work covered by any Change Order, Change Authorization, proposal or claim.

11.14.2. For changes payable on an *actual cost* basis, or in the event of any claim, dispute, litigation, audit exception or appeal or termination, the **Owner** and any of the **Owner's** duly authorized representatives shall have access to those Records for the purpose of inspection, audit/review and scanning/copying. The **Contractor** shall provide appropriate facilities for access promptly after receiving a request. The **Owner** and any of its duly authorized representatives shall have the right to interview **Contractor** employees. The **Contractor** shall make employees available on Business Days between 8:00 AM and 4:00 PM, as requested.

11.14.3. Certified payroll and other employment Records of workers assigned to the site, including apprentices and trainees, maintained to comply with the requirements of this provision, shall contain the name and address of each worker, correct wage classification, rate of pay (including contributions, or costs assumed to provide, for fringe benefits), daily and weekly number of hours worked, deductions made, and actual wages paid. The **Contractor** shall maintain Records that show: (a) the anticipated costs or actual costs incurred in providing such benefits, (b) that the commitment to provide such benefits is enforceable, and (c) that the plan or program is financially responsible and has been communicated in writing to the workers affected.

11.14.4. Access to Records, as prescribed in this paragraph, shall be allowed at any time during the execution of the Work and shall remain in full force and effect for five (5) years after final payment, or termination (in the event of termination), or date of final resolution of any dispute, litigation, audit exception or appeal – whichever event actually applies to this Contract.

**11.15 Price Reduction for Defective Cost and Pricing Data:**

11.15.1. If at any time during the prosecution of the Work, there is good cause to doubt the **Contractor's** compliance with the Defective Cost and Pricing Data requirements of this paragraph 11.15, the **Owner** shall be entitled to make an appropriate withholding from any payment otherwise owed to the **Contractor**.

11.15.2. Whenever the **Contractor** signs a proposal for a Contract Price or Contract Time adjustment, a Change Order or a claim settlement, the **Contractor** will be deemed to have certified, to the **Contractor's** best knowledge and belief, that the representations made and data submitted in pricing and negotiating the Cost of the Work Involved in that price proposal, Change Order, or claim settlement: (a) were made in good faith and are consistent with the facts, (b) are consistent with the provisions of Articles 10 and 11, and (c) are complete, accurate and current as of the date agreement was reached on the corresponding adjustments in Contract Price and/or Contract Time. This certification shall apply in each and every respect to any Subcontractor and Supplier who signs any cost and pricing data attached to any such a proposal for a Contract Price or Contract Time adjustment, Change Order or claim settlement.

11.15.3. If any adjustment in Contract Price or Contract Time made by any Change Order, claim or dispute settlement was increased by a material and significant amount because the **Contractor**, or any Subcontractor or Supplier, at any tier, made representations or furnished cost or pricing data of any kind that were false, contained math errors or were incomplete, the Contract Price shall be correspondingly reduced by Change Order.

## ARTICLE 12 PROGRESS PAYMENTS; FINAL PAYMENT

### 12.1 Schedule of Values:

12.1.1. The Schedule of Values shall be approved by the **Professional** and accepted by the Owner and divide the Work into pay items for significant Sections and areas, facilities, or structures, with subtotals for first tier Subcontractors. If required in Division 1, the Schedule of Values shall be supported by a more detailed breakdown allocating the pay items to the Progress Schedule Activities.

12.1.2. The Schedule of Values shall tabulate labor costs, Subcontract costs and material and equipment costs. Labor costs shall include appropriate sums for construction equipment costs, general conditions costs, administrative costs (paragraph 11.10) and profit, unless separate pay items are itemized for those costs.

\*12.1.3. The Schedule of Values shall include the following close-out pay items: (a) two percent (2%) of the Contract Price for Fire Marshall approval, certificate of occupancy and other code approvals, as specified in the Contract Documents, (b) two percent (2%) of the Contract Price for manufacturer warranties, finalized operating and maintenance documentation, **Owner** training documentation, and test and balance reports, and (c) two percent (2%) of the Contract Price to cover finalized Record Documents.

### 12.2 Requests for Payment:

12.2.1. Once each month, the **Contractor** shall submit to the **Professional** a Request for Payment on the **Owner's** form signed by the **Contractor** certifying Work completed and enclosing all supporting documentation. Each Request for Payment shall certify that all monies owed by the **Contractor** to Subcontractors and Suppliers for which payment previously has been sought has been paid from payments received and include a sworn statement. No Request for Payment shall include amounts for a Subcontractor or Supplier if the **Contractor** does not intend to use the payments requested, when received, to reduce the **Contractor's** outstanding obligations on the Work.

12.2.2. **The State will only disburse payments under this Contract through Electronic Funds Transfer (EFT).** Contractor must register with the State at <http://www.michigan.gov/SIGMAVSS> to receive electronic fund transfer payments. If Contractor does not register, the State is not liable for failure to provide payment. Without prejudice to any other right or remedy it may have, the State reserves the right to set off at any time any amount then due and owing to it by Contractor against any amount payable by the State to Contractor under this Contract.

12.2.3. Payment to the **Contractor**, if approved by the **Owner**, will be made within thirty (30) Calendar Days after the **Owner** receives and approves a certified Request for Payment from the **Professional**. Payment for authorized reimbursable expenses shall be made monthly in the amount incurred before the cut-off date, provided each payment request expense is properly documented in spreadsheet form detailing the information about the request. The **Contractor** will provide a certification in writing that the payment request submittal is true and accurate.

12.2.4. If payment is requested based on materials and equipment stored at the site or at another location agreed to in writing, the Request for Payment also shall be accompanied by (a) consent of surety, (b) a bill of sale, invoice or other documentation warranting that the **Owner** has received the materials and equipment free and clear of all liens, and (c) evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect them and the **Owner's** interests. If the documentation provided by the **Contractor** to comply with the intent of this paragraph is unsatisfactory, the **Owner** shall be entitled to withhold an appropriate amount from that Request for Payment until the **Contractor** provides documentation acceptable to the **Owner**.

12.2.5. The **Contractor** warrants and guarantees that title to all Work, materials and equipment covered by any Request for Payment, whether incorporated in the Work or not, will pass to the **Owner** free and clear of all liens no later than at the time of payment by the **Owner** to the **Contractor**.

### 12.3 Review of Request for Payment; Intent of Review:

12.3.1. Within ten (10) Calendar Days after receipt of a Request for Payment, the **Professional** shall certify to the **Owner** the amount the **Professional** determines to be due or shall return the Request for Payment to the **Contractor** indicating the reasons for withholding certification.

Certification shall be based on the **Professional's** review of the Request for Payment and enclosed documentation, On-Site Inspections, and on-site Project representation, if any has been provided. If a Request for Payment is returned to the **Contractor**, the **Contractor** shall make the necessary corrections and resubmit that Request for Payment.

12.3.2. The **Professional's** certification of any Request for Payment constitutes a representation to the **Owner** that the Work has progressed to the point indicated; that to the best of the **Professional's** knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents; and that the **Contractor** is entitled to payment in the amount certified. Any such representation by the **Professional**, however, shall be subject to an evaluation of the Work as a functioning whole before and upon Substantial Completion; to the results of any subsequent tests called for in the Contract Documents; to a final determination of quantities and classifications of Unit Price Work (if any is specified) and to any other qualifications stated in the certification.

12.3.3. In the case of final payment, the **Professional's** certification of final payment and recommendation that the Work is acceptable shall be a further representation that conditions governing final payment to the **Contractor** have been met.

#### 12.4 Refusal to Make or to Recommend Payment:

12.4.1. The **Owner** may withhold from any payment an amount based on the **Professional's** refusal to recommend payment or the **Owner's** estimate of the fair value of items entitling the **Owner** to a withholding. Such may include, but not be limited to liquidated damages, claims made against the **Owner** arising out of or related to the Work, payment claims, or failure by the **Contractor** to reimburse the **Owner** any costs the **Owner** is entitled to recover. The **Owner** will give the **Contractor** reasonably prompt written notice supporting such action.

12.4.2. The **Professional** may refuse to recommend all or any part of any payment, or because of subsequently discovered evidence, inspections or tests or the value of the Punch List, nullify all or any portion of any payment previously recommended, as the **Professional** may consider necessary to protect the **Owner** from loss because (a) the Work is Defective or completed Work has been damaged requiring correction or replacement, (b) a defective work/non-compliance notice has not been acknowledged by the Contractor, (c) the Contract Price has been reduced by Change Order, (d) it has been necessary that the **Owner** correct Defective Work or complete Work, (e) reasonable evidence exists that all or a part of the Work will not be completed within the corresponding Contract Time, (f) of the **Contractor's** failure to comply with all material requirements of the Contract, including, but not limited to the failure to submit Progress Schedule Submittals or Record Documents when due, (g) stored materials for which payment has been made or is sought has been determined by the **Professional** to be damaged or missing, (h) amounts are requested for a Supplier which is not the Supplier named in the **Contractor's** completed Section 00440 Schedule of Materials and Equipment or a Supplier approved by the **Professional** through an "or equal" or substitution procedure, or (i) the **Professional** reasonably believes or knows of the occurrence of an event justifying termination for cause.

#### 12.5 Request for Final Payment:

12.5.1. The **Contractor** shall complete the Substantial Completion Punch List within the Contract Time and date fixed by the **Professional**. The **Contractor** shall assemble all requisite documentation before requesting final inspection.

12.5.2. Upon written notice from the **Contractor** that the **Contractor** considers the entire Work, or a part of the Work for which final payment is specified in the Contract Documents, to be complete and ready for final payment, the **Professional** will make a final completion inspection with the **Owner** and **Contractor** and notify the **Contractor** in writing of all instances of incomplete or Defective Work revealed by the final inspection. The **Contractor** shall immediately undertake all necessary measure to complete Work in the final completion inspection.

12.5.3. The **Contractor** may request final payment after completing the incomplete or Defective Work to the satisfaction of the **Professional** and delivering final operating and maintenance documentation (with revisions made after Substantial Completion), warranties, inspection certificates, Record Documents (with revisions made after Substantial Completion), release of payment claim forms and all other required documents.

12.5.4. The **Contractor's** request for final payment shall enclose evidence of completed operations insurance and affidavit certifying that the insurance coverage will not be canceled, materially changed or renewal refused except as provided in paragraph 7.4.3, and an affidavit certifying that the surety agrees that final payment shall not relieve the surety of any of its obligations under the Performance Bond and Payment Bond. The **Contractor's** request for final payment shall further include (a) a **Contractor's** "Guarantee and Statement" (available from the **Owner**, form DTMB-0437) containing a statement of guaranteed indebtedness acceptable to the **Owner** in the full amount of the Contract Price, or a release of payment claims in the form of a release of liens, or a Bond or other security acceptable to the **Owner** to indemnify the **Owner** against any payment claim, and (b) a list of all pending insurance claims arising out of or resulting from the Work being handled by the **Contractor** and/or its insurer.

#### 12.6 Final Payment and Acceptance:

12.6.1. If the **Professional** is satisfied that the Work, or a part of the Work for which separate final payment is specified in the Contract Documents, has been completed and the **Contractor's** other obligations under the Contract Documents have been fulfilled, the **Professional** will, within thirty (30) Calendar Days after receipt of the final payment request, furnish to the **Owner** and **Contractor** the **Professional's** certification of final payment and acceptance. If the **Professional** is not satisfied, the **Professional** will return that request to the **Contractor**, indicating in writing the reasons for not certifying final payment, in which case the **Contractor** shall make the necessary corrections and request that final payment again be considered.

12.6.2. If the **Owner** concurs with the **Professional's** certification of final payment, the **Owner** will, within thirty (30) Calendar Days after receipt by the **Owner** of the **Professional's** certified recommendation of final acceptance, pay the balance of the Contract Price, subject to those provisions governing final payment specified in the Contract Documents. If the **Owner** does not concur with the **Professional's** determination, the **Owner** will return the request for final payment to the **Contractor** indicating in writing the reasons for refusing final payment and acceptance. In that case, the **Contractor** shall make the necessary corrections and shall request that final payment be again considered by the **Owner**. The **Owner's** written determination will be binding upon the **Contractor**, unless the **Contractor** delivers a notice of a claim and a claim Submittal within the deadlines set forth in Article 15.

12.6.3. If final completion of the Work is significantly delayed through no fault of the **Contractor**, the **Owner** may, upon receipt of the **Contractor's** final Request for Payment, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. Payment of the balance due shall be made under the provisions for final payment but shall not constitute a waiver of claims.

12.6.4. The **Owner** shall pay with reasonable promptness any amounts deducted from the final payment, upon resolution of the claims justifying withholding of such monies.

## 12.7 Contractor's Continuing Obligation:

12.7.1. The following does not constitute acceptance of the Work in the event the Work or any Work is not in accordance with the Contract Documents, and therefore does not release the **Contractor** from its obligation to perform and furnish the Work in accordance with the Contract Documents: (a) a certification by the **Professional** of any Request for Payment or final payment; (b) the issuance of a Substantial Completion certificate; (c) any payment by the **Owner** to the **Contractor**; (d) any Partial Use; (e) any act of acceptance by the **Owner** or any failure to do so; (f) any review and approval of a Shop Drawing, sample, test procedure or other Submittal; (g) any review of a Progress Schedule; (h) any On-Site Inspection; (i) any inspection, test or approval; (j) any issuance of a notice of acceptability by the **Professional**; or (k) any correction of Defective Work or any completion of Work by the **Owner**.

## 12.8 Waiver of Claims:

12.8.1. The making and acceptance of final payment do not constitute a waiver by the **Owner** of any rights as to the **Contractor's** continuing obligations under the Contract Documents, nor will it constitute a waiver of any claims by the **Owner** against the **Contractor** still unsettled, or arising from unsettled payment claims, Defective Work appearing after final inspection or failure by the **Contractor** to comply with the Contract Documents or the terms of any special warranties provided by the Contract Documents or by Law.

12.8.2. The making and acceptance of final payment will constitute a waiver of all claims by the **Contractor** against the **Owner**, other than those claims previously made in writing, on a timely basis in accordance with Article 15, and still unsettled.

## ARTICLE 13 OTHER WORK

### 13.1 Related Work at Site:

13.1.1. During the period allowed for the furnishing and performance and completion of the Work, the **Owner** may undertake other work at the site with its own forces, or have other work performed at the site by other parties (including, but not limited to contractors or Public Utilities). If the Contract Documents do not note the performance of any such other work, written notice will be given to the **Contractor** before starting that work.

13.1.2. Whenever work to be performed by the **Contractor** interfaces with other work, the **Contractor** shall coordinate that work with the interfacing work. Paragraphs 13.2 and 13.3 outline representative duties and responsibilities assumed by the **Contractor** under this requirement. Such duties and responsibilities are for the benefit of the parties on the other work to the extent there are comparable provisions for the benefit of the **Contractor** in the contracts between those parties and the **Owner**.

### 13.2 Coordination Requirements:

13.2.1. If other work is ongoing concurrently with the Work, the **Contractor** shall afford the responsible party proper and safe access to the site. The **Contractor** shall afford the other party a reasonable opportunity for the handling, unloading and storage of their materials and equipment and for the execution of their work.

13.2.2. If any part of the Work, for proper execution or results, interfaces on the work of the **Owner** or another party, the **Contractor** shall inspect and promptly report to the **Professional** in writing conditions in that work that render it unavailable or unsuitable for proper execution and results. The **Contractor's** failure to do so will constitute an acceptance of such other work as fit and proper for integration with the Work except for latent or non-apparent defects and deficiencies in the other work.

13.2.3. The **Contractor** shall do all cutting, fitting, patching, and interfacing of the Work that may be required to make any part of the Work come together properly and integrate with other work. The **Contractor** shall not cut, excavate, or otherwise alter any other work without prior written consent of the party responsible for such other work.

The **Contractor** shall supply, install and/or cause items to be built into interfacing Work, verify dimensions of interfacing Work, and notify the **Professional** of interfacing work that is unsatisfactory for, or prevents satisfactory installation of, any Work. Installation of any Work shall constitute acceptance by the **Contractor** of all previously placed interfacing work.

13.2.4. The **Contractor** shall be responsible for cooperating with the **Professional** fully in the coordination of the **Contractor** Submittals with interfacing submittals of other parties whose work in any way integrates with the Work or vice versa. Any such coordinated Submittal of the **Contractor** shall identify, by specific written notation, Work which integrates with the other work and of which the **Contractor** knows or has reason to know.

13.2.5. If the **Owner** contracts for other work, the **Owner** will have authority and responsibility for coordinating the operations of the **Contractor** and the other work. The **Owner** may delegate the specific authority and responsibility for coordinating the operations of the **Contractor** and of those parties performing the other work to another organization either by provision in Section 00800 Supplementary Conditions or at the pre-construction conference.

### 13.3 Claims Between the Contractor and Other Parties:

13.3.1. If the **Contractor** causes damage to the work or property of others, or if a claim arising out of the **Contractor's** execution of Work is made by another party against the **Contractor**, **Owner** or **Professional**, the **Contractor** shall promptly attempt to settle with that party by agreement or otherwise resolve the claim. The **Contractor** shall in any event, defend, indemnify, and hold harmless the **Owner** and **Professional** from and against all claims, as provided in paragraph 1.4, and/or judgments arising out of or resulting from damage by the **Contractor** to the work or property of others.

13.3.2. If another party causes damage to the Work or property of the **Contractor**, or if the performance of other work results in any claim by the **Contractor**, the **Contractor** shall promptly resolve the issue by agreement or otherwise resolve the claim. The **Contractor** shall not begin any action against the **Owner** (or its departments, agencies, boards, commissions, officers, and employees) or **Professional** (or their consultants, agents or any of their directors, officers, shareholders, agents, or employees), or permit any action against them to be maintained in the **Contractor's** name or for the **Contractor's** benefit before any court or tribunal, which action seeks to impose liability or recover damages from the **Owner** or **Professional** for such claim.

13.3.3. If the **Contractor** becomes involved in settling or otherwise resolving claims and disputes with other parties performing other work from events covered under paragraphs 13.3.1 or 13.3.2, or because of any other similar controversy, including damage to the Work or other work, or a dispute about responsibility for clean-up or any other issue, neither the **Owner** or **Professional** nor any of their respective consultants, agents, directors, shareholders, officers or employees will be involved in any way in such action (unless subpoenaed or ordered by a court). If the **Owner** incurs costs or damages of the types barred by the provisions paragraphs 13.3.1 and 13.3.2, the **Contractor** shall reimburse those costs and damages to the **Owner**.

13.3.4. Except as excluded in paragraph 13.3.5, if any party performing other work causes Delay upon the Work and if, upon a request from the **Contractor**, the **Owner** determines that any such Delay justifies an increase in Contract Price and/or Contract Time, the **Owner** shall amend the Contract Documents to provide the necessary adjustment in Contract Price or Contract Time, or both.

13.3.5. If a party performing other work is granted an extension in a contract time only (on account of Delay not reasonably anticipatable under the circumstances nor caused, in whole or in part, by any act or omission of the other party, the **Owner**, **Professional** or the **Owner's** representative on that other work), and if, upon a request from the **Contractor**, the **Owner** determines that the time extension granted to the other work requires a change in a coterminous Contract Time in the Contract Documents, the **Owner** shall amend the Contract Documents to provide for the necessary change in Contract Time only.

## ARTICLE 14 TERMINATION

### 14.1 Notice Requiring Assurance of Due Performance:

14.1.1. The **Owner** may request the **Contractor** (with copy to the surety) to provide written assurance of due performance if, at any time, any of the following non-conformances occur, any of which, if not corrected, may justify defaulting the **Contractor**:

14.1.1.1. The **Contractor** fails to complete the Work, or a specified part of the Work, within the corresponding Contract Time; fails or refuses to supply sufficient management, supervision, workers, materials, or equipment; or otherwise fails to prosecute the Work, or any specified part of the Work, with the diligence required to comply with the Contract Time(s).

\*14.1.1.2. The **Contractor** persistently disregards the authority of the **Professional** or violates or disregards a provision of the Contract Documents or the Laws of any Political Subdivision with jurisdiction; or

14.1.1.3. The **Contractor** admits in writing, or the **Owner** otherwise establishes, the **Contractor's** inability or refusal to pay the **Contractor's** debts generally as they become due; or in response to the **Owner's** demand, fails to provide adequate, written assurance that the **Contractor** has the financial resources necessary to complete the Work within the Contract Time.

14.1.2. Within seven (7) Calendar Days after the **Contractor** receives a notice requiring assurance of due performance, the **Contractor** shall meet with the **Owner** and present the **Contractor's** plan to correct the non-performance with supporting documentation. If the **Owner** determines that the **Contractor's** plan provides adequate assurance of due performance, that determination shall not waive the **Owner's** right to subsequently default the **Contractor** or affect any rights or remedies of the **Owner** against the **Contractor** and/or surety then existing or that may accrue in the future.

#### 14.2 Contractor Default and Termination for Cause:

14.2.1. The **Owner**, after giving the **Contractor** and surety seven (7) Calendar Days' written notice of intent to default, may declare the **Contractor** in default and terminate the services of the **Contractor** of upon the occurrence of one or more of the following events:

14.2.1.1. At or after the meeting referred to in paragraph 14.1.2, the **Owner** determines that there is sufficient cause, giving the issues raised, to default the **Contractor**.

\*14.2.1.2. The **Contractor** fails to comply with the Michigan Residency requirements (1984 PA 431, as amended, MCL 18.1241a); or is found to be in violation of Section 4 of 1980 PA 278 concerning unfair labor practices, or any nondiscrimination requirements imposed by Law.

14.2.1.3. The **Contractor** violates or breaches any material provision of the Contract Documents which provides contractually for the for-cause termination or rescission of the Contract or of the **Contractor's** right to complete the Work.

14.2.1.4. A trustee, receiver, custodian, or agent of the **Contractor** is appointed under contract, as opposed to under bankruptcy Law, whose appointment or authority to take over the **Contractor's** property is for the purpose of enforcing a lien against such property or for the general administration of such property for the benefit of the **Contractor's** creditors; or

14.2.1.5. It is determined that gratuities, including, but not limited to entertainment, gifts or donations were given by or on behalf of the **Contractor** to an official, agent, servant, or employee of the **Owner** or **Professional** to secure the Contract or favorable treatment with respect to the awarding or amending or the making of any determination relative to the execution of the Work.

14.2.2. Unless otherwise agreed between the **Owner** and **Contractor**, at the expiration of the seven (7) Day (intent to default) period, the **Contractor** shall immediately stop all Work and proceed in accordance with the **Owner's** instructions. Following receipt, and expiration, of a second seven (7) Day written notice period intended to allow the surety to complete an investigation of the default, the surety shall immediately:

14.2.2.1. If approved by the **Owner**, arrange for the **Contractor** to continue with performance and prosecution of the Work to completion; or

14.2.2.2. Undertake to perform and complete the Work, in accordance with the Contract Documents, in place of the **Contractor**, either through the surety's agents or by executing Sub agreements with qualified contractors (excluding the **Contractor** and any of the **Contractor's** affiliates), or both; and

14.2.2.3. If agreed to by the **Owner**, waive the surety's rights set forth elsewhere in this Article, and with reasonable promptness under the circumstances, after investigating in good faith and with due care and diligence, determine the amount for which it may be liable to the **Owner**, and present that determination to the **Owner**. If the **Owner** rejects that amount, the surety shall negotiate a sum acceptable to the **Owner** and promptly pay that amount to the **Owner** in full and with interest from the date the termination of the **Contractor's** services became effective. If the **Owner** rejects the sum determined by the surety, or if the surety fails to negotiate an agreement with the **Owner** on the amount of the surety's liability, the **Owner** shall have full power and authority to default the surety.

14.2.3. If the **Owner** has terminated the **Contractor**, and the surety elects to act under paragraph 14.2.2.2, the **Owner** will determine in good faith the amount necessary to cover the total direct, indirect and consequential costs (including, but not limited to liquidated damages, costs of correcting Work, fees and charges of engineers, architects, attorneys and others and any other costs and damages for which the surety is liable under Section 00610 Performance Bond) that the **Owner** believes it will sustain from that default. The **Owner** will communicate its determination to the surety, and the **Owner** will deduct that amount in its entirety from Requests for Payment under the Contract Documents. Upon completion of the Work, if the unpaid balance of the Contract Price is not sufficient to reimburse the **Owner** for all actual direct, indirect, and consequential costs resulting from the default of the **Contractor**, the surety and **Contractor**, jointly and severally, are liable to the **Owner** for the difference, which they shall pay to the **Owner** promptly.

14.2.4. If the **Owner** has terminated the **Contractor**, and the surety elects to act under paragraph 14.2.2.2, the surety's contract with another contractor makes that contractor a Subcontractor under the Contract, in which case: (a) the provisions of Article 11 shall remain in full force and effect, (b) the methods and criteria to be used to compute the surety's (in lieu of the **Contractor's**) and that contractor's Cost of and Fee for any Work involved shall be limited to those provided in Article 11, and (c) all Work performed by any such contractor pursuant to a Sub agreement with the surety shall be governed by the flow-through requirement in paragraph 5.1.6, the waiver of rights of subrogation provision in paragraph 7.8 and any other requirements of the Contract Documents governing Sub agreements.

14.2.5. If the **Owner** has terminated the **Contractor**, any such termination will not affect any rights or remedies of the **Owner** against the **Contractor** or surety, or both, then existing or that may accrue after termination. All provisions of the Contract Documents that, by their nature, survive final acceptance of the Work shall remain in full force and effect after a termination for cause of the **Contractor** or default of the surety, or both.

14.2.6. The **Owner** may, in its sole discretion, permit the **Contractor** to continue to perform Work when the **Contractor** is in default or has been defaulted. Such decision by the **Owner** shall in no way operate as a waiver of any of the **Owner's** rights under the Contract Documents or Section 00610 Performance Bond, nor in the event of a subsequent default, entitle the **Contractor** or surety to continue to perform or prosecute the Work to completion.

#### 14.3 Surety Default:

14.3.1. If upon receipt of a notice of termination for cause, the surety fails to proceed immediately and as provided in paragraph 14.2.2, the **Owner** shall declare the surety in default under Section 00610 Performance Bond in accordance with the terms and conditions of this paragraph.

14.3.1.1. No default of the surety under the Section 00610 Performance Bond shall be declared, however, until the expiration of fifteen (15) Calendar Days after receipt by the surety of an additional written notice from the **Owner** demanding that the surety perform its obligations under Section 00610 Performance Bond.

14.3.2. If the **Owner** declares the surety in default, the **Owner** shall have full power and authority to exclude the surety and **Contractor** from the site, assume any Sub agreements that the **Owner** so selects and take possession of the Work and of all the surety's and **Contractor's** tools, plant and office, and construction equipment at the site (without liability to the surety or **Contractor** for trespass, rent or conversion). The **Owner** will (a) proceed to the full extent that the surety and **Contractor** could have proceeded, (b) incorporate into the Work all materials and equipment stored at the site or elsewhere, and (c) prosecute the Work to completion as the **Owner** may deem expedient. When the **Owner** exercises any of the rights or remedies provided in this paragraph, the **Owner** shall not be required to obtain the lowest price for Work performed.

14.3.3. If the **Owner** has defaulted the surety, any such termination or default will not affect any rights or remedies of the **Owner** against the **Contractor** or surety, or both, then existing or that may accrue after termination. Any retention or payment of monies due the **Contractor** or surety by the **Owner** will not release the **Contractor** or surety from liability. All provisions of the Contract Documents that, by their nature, survive final acceptance of the Work shall remain in full force and effect after a termination for cause of the **Contractor** or default of the surety, or both.

#### 14.4 Termination for Convenience of the Owner:

14.4.1. Upon fifteen (15) Calendar Days' written notice to the **Contractor** and surety, or sooner if reasonable under the circumstances, the **Owner** may, without cause and without prejudice to any other right or remedy it may have, elect to terminate any part of the Work, or the Agreement in whole or in part, as the **Owner** may deem appropriate for its convenience. Upon receipt of any such termination notice, the **Contractor** shall immediately proceed in accordance with any specific instructions, protect and maintain the Work, and make reasonable and diligent efforts to mitigate costs associated with the termination.

14.4.2. In any termination for convenience, the **Contractor** shall be paid for (a) Work completed, in accordance with the Contract Documents, before receipt of the notice of termination, and (b) reasonable termination settlement costs for commitments that had become firm before the termination. The **Contractor** shall not be paid any anticipated and unrealized general conditions costs, administrative expenses, and profit for uncompleted Work. If no agreement can be reached as to reasonable termination costs, the **Owner** will make a determination in writing which shall be final and binding on the **Contractor** unless the **Contractor** delivers notice of a claim and a claim Submittal in accordance with the procedures and within the deadlines set forth in Article 15.

14.4.3. Upon termination for convenience, the **Owner** shall have full power and authority to take possession of the Work, assume any Sub agreements with Subcontractors and Suppliers that the **Owner** selects, and prosecute the Work to completion by contract or as the **Owner** may deem expedient.

14.4.4. If after notice of termination of the services of the **Contractor**, it is determined the **Contractor** was not in default, the termination shall be deemed to have been for the convenience of the **Owner**. In such event the **Contractor** may recover from the **Owner** payment in accordance with paragraph 14.4.2.

#### 14.5 The Contractor May Suspend Work:

14.5.1. In addition to being entitled to earning interest on unpaid Requests for Payment, the **Contractor** may, upon fifteen (15) Calendar Days written notice to the **Owner**, suspend the Work for the **Owner's** convenience if, through no act or fault of the **Contractor**, the **Professional** fails, for thirty (30) Calendar Days, to initiate processing of any Request for Payment or the **Owner** fails, for ninety (90) Calendar Days, to pay the **Contractor** any Request for Payment finally certified by the **Professional** to be due.

14.5.2. Except as specifically provided in paragraph 14.5.1, this provision shall not relieve the **Contractor** of the **Contractor's** obligations to prosecute the Work in accordance with the Progress Schedule and without Delay during any disputes and disagreements with the **Owner**.

## **ARTICLE 15 DISPUTES**

### **15.1 Claims Under This Article:**

15.1.1. All claims, counterclaims, disputes, and other matters in question between the **Owner** and **Contractor** arising out of or relating to the Contract Documents or the breach thereof, shall be submitted in writing to the **Professional** and otherwise processed and resolved as provided in this Article.

15.1.2. A claim means a written demand or assertion by the Owner or Contractor, which is properly certified, seeking an adjustment in Contract Price and/or payment of moneys due, an extension or shortening in Contract Time, the adjustment or interpretation of Contract terms, or other relief arising under or relating to the Contract. If a Bulletin or specific request for proposal has been issued by the Professional or Owner and quoted by the Contractor, it may become a claim or dispute with proper written notice per 15.1.2.1 should the Contractor is object to a written determination and/or rejection by the Professional or Owner under the appropriate provision of the Contract Documents.

15.1.2.1. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker (Professional/PSC). Claims by either party must be initiated within 21 days after the occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognized the condition giving rise to the claim. Provided such timely notice is delivered, a full and detailed breakdown of cost and time requested, with supporting documentation, if not provided with initial notice shall be delivered to Professional and Owner within 15 days of the notice, as noted in Article 11.1.2, unless otherwise agreed in writing, by the Owner prior to expiration of such time.

15.1.2.2. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided under conditions of failure of timely progress payment or Article 14, the Contractor shall ensure the Work diligently proceeds with the performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Owner shall prepare Change Orders and PSC shall certify payment requests in accordance with the decisions of the Initial Decision Maker.

15.1.3. Unless otherwise agreed between the parties, any claim that can be resolved under a provision of the Contract Documents providing for or excluding the relief sought by the claimant shall be resolved in accordance with that provision.

15.1.4. Notice of Claim - Except for **Owner** claims for liquidated damages, no claim shall be valid unless it is based upon written notice delivered by the claimant to the other party and the Professional/PSC within 21 days as per 15.1.2 and 15.1.2.1. The notice shall include a supporting statement stating the nature of the dispute, the amount involved, if any, and the remedy sought. The claim submittal with all supporting data shall be delivered within thirty (30) Calendar Days after Notice (unless the **Professional** allows an extension). The responsibility to substantiate claims shall rest with the claimant.

\*15.1.5. A claim by the **Contractor** shall be submitted to the **Professional** and **Owner** for a recommendation or decision from the **Professional** and, if necessary, an **Owner** determination. A claim by the **Owner** shall be submitted to the **Contractor** and the **Professional** for a written recommendation or decision by the **Professional**. The **Owner** reserves the right to audit, using the provisions in paragraph 11.14, any **Contractor** claim (or claim package) that the **Contractor** values at more than \$50,000.00.

15.1.6. Pending final resolution of any claim under this Article, the **Contractor** shall proceed diligently with the Work and comply with any decision of the **Owner** and/or **Professional**

### **15.2 Requirement for Certification of Contractor Claims:**

15.2.1. For all **Contractor** claims seeking an increase in Contract Price or Contract Time, the **Contractor** shall submit an affidavit, certifying that the amount claimed accurately reflects any Delay and all costs that the **Contractor** is entitled from the occurrence of the claimed event and that supporting cost and pricing data are current, accurate, complete and represent the **Contractor's** best knowledge and belief. The affidavit shall be executed by an officer or partner of the **Contractor** with proper authority or his/her designee.

### **15.3 Recommendations or Decisions from the Professional:**

\*15.3.1. For **Contractor** claims under \$100,000.00, if requested in writing by the **Contractor**, the **Professional** will render a recommendation or decision within thirty (30) Calendar Days after the request and the **Owner** will issue, if necessary, a determination within thirty (30) Calendar Days after the **Professional's** recommendation or decision. For **Contractor** claims exceeding \$100,000.00, the **Professional** will issue its recommendation or decision and the **Owner**, if necessary, will issue its determination, within sixty (60) Calendar Days after completing an audit of the claim, or after deciding not to conduct such an audit or, in the alternative, will notify the **Contractor** of the date when the determination will be made. In the latter case, a final determination will be concluded within sixty (60) Calendar Days from the date of such notification.



\*15.3.2. For **Owner** claims under \$100,000.00, the **Professional** will render a recommendation or decision within thirty (30) Calendar Days of the request. For **Owner** claims over \$100,000.00, the **Professional**, within sixty (60) Calendar Days, will render a recommendation or decision or notify the **Owner** and **Contractor** when such will be rendered.

\*15.3.3. To the extent any **Professional's** decision is to deny a **Contractor** claim or to agree with an **Owner** claim, that decision shall be final and binding on the **Contractor**, without any determination by the **Owner**, unless the **Contractor** files a request for a presentation with the **Director-DCD** within thirty (30) Calendar Days as required by paragraph 15.4.1. Unless a claim is made in accordance with these requirements, it shall be waived.

\*15.3.4. To the extent that any recommendation from the **Professional** is partly or wholly adverse to a claim from the **Owner**, that determination shall be final and binding on both the **Owner** and **Contractor** unless either party files a request for a presentation with the **Director-DCD** as required in paragraph 15.4.1.

\*15.3.5. To the extent the **Professional** recommends payment of any **Contractor** claim which increases the Contract Price, that recommendation shall be subject to a determination from the **Owner** in a written opinion. In the event any such determination from the **Owner** is partly or wholly adverse to the preceding recommendation from the **Professional**, that determination shall be final and binding on the **Contractor** unless the **Contractor** files suit in the Michigan Court of Claims within thirty (30) Calendar Days after receipt of such determination. Unless a claim is made in accordance with these requirements, it shall be waived.

#### 15.4 Determinations by the Director-DCD:

\*15.4.1. If either the **Contractor** or **Owner** is not satisfied with any decision of the **Professional** rendered pursuant to paragraph 15.3.3 or 15.3.4, that party shall, within thirty (30) Calendar Days of receiving that decision, file a written appeal with the **Director-DCD**. If a **Contractor** or **Owner** appeal is timely filed, the claimant shall be entitled to present its claim, unless waived, to the **Director-DCD**, or his/her designee, provided that a claim narrative with complete supporting documentation is delivered to the **Director-DCD**, or his/her designee, within thirty (30) Calendar Days of that party's written notice of appeal.

\*15.4.2. Within thirty (30) Calendar Days after receipt of any such claim narrative, the **Director-DCD**, or his/her designee, shall schedule the time to start the presentations taking into account the dispute's complexity and the urgency of its resolution. Subject to any recognized privilege, discovery shall be available to either party as provided by the **Director-DCD**, and his/her designee, and shall be concluded thirty (30) Calendar Days before the start of the presentations.

\*15.4.3. During the presentations, the **Director-DCD**, or his/her designee, shall hear presentations and receive evidence on the matters in dispute, as supported by the statement of the dispute. The **Director-DCD**, or his/her designee, shall have discretion concerning the allowability of evidence submitted, and shall not be bound to any rules of evidence other than those he/she promulgates.

\*15.4.4. If the right to a presentation is waived or if a presentation is conducted and the dispute remains unresolved, the **Director-DCD**, or his/her designee, at his/her sole option, shall specify in which forum the dispute shall thereafter be conducted by issuing a written determination to the **Contractor** that the dispute if the **Contractor** so elects, be submitted in writing to:

\*15.4.4.1. The Court of Claims maintained by the State of Michigan for the purpose of adjudicating claims against the State or other appropriate court, or

\*15.4.4.2. Arbitration in accordance with the construction industry rules of arbitration of the American Arbitration Association, subject to the provisions of paragraphs 15.5.1 and 15.5.2, unless the parties mutually agree otherwise.

\*15.4.5. The **Director-DCD's**, or his/her designee's, determination on the forum in which the dispute shall be conducted is final and binding upon the **Owner** and **Contractor**. The **Director-DCD's**, or his/her designee's determination on the dispute shall be final and binding on the **Contractor** unless the **Contractor** files a lawful action in the forum so chosen (Michigan Court of Claims or arbitration) within thirty (30) Calendar Days after receiving the **Director-DCD's**, or his/her designee's, determination.

\*15.4.6. If, after such determination from the **Director-DCD**, or his/her designee, the **Contractor** properly submits the dispute to the Michigan Court of Claims or requests arbitration, and the final determination of either forum does not increase the **Contractor's** recovery by thirty (30%) percent or more above that awarded by the **Director-DCD**, or his/her designee, or voluntarily withdraws the action, the **Contractor** shall pay all resulting expenses of the **Owner** (including, but not limited to reasonable charges of attorneys, engineers, others and court or arbitration costs)

#### 15.5 Supplements to AAA Arbitration:

\*15.5.1. No arbitration, arising out of, or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, any additional party not a party to this Contract, except by written consent containing a specific reference to the Agreement and signed by all the parties involved. Consent shall be deemed given by any party who has executed an agreement directly with the **Owner** affected by the Project and containing provisions comparable to those in this Article 15.

Any consent to arbitration involving any additional party or parties shall not constitute consent to arbitration of any dispute not permitted in this Article. The agreement to arbitrate with any additional party or parties duly consented to by the parties to this Contract shall be specifically enforceable under the prevailing arbitration Law.

15.5.2. Subject to any recognized privilege, discovery shall be available to each party to the arbitration as it would be available under the general court rules of the Michigan Court of Claims which shall be enforced by the American Arbitration Association. All discovery and amendments to the prehearing summary shall conclude thirty (30) Calendar Days before the arbitration date. Failure to provide the foregoing discovery shall render any claim supported by witnesses or documents not so disclosed excludable by the arbitration panel in its discretion.

#### **15.6 Interest on a Judgment; Payment of Judgment:**

\*15.6.1. If, subsequent to a determination by the **Director-DCD**, or his/her designee, the **Owner** or **Contractor** files a Michigan Claims Court or AAA arbitration action, and the party filing for such action increases its recovery by thirty (30%) percent or more above that awarded by the **Director-DCD**, or his/her designee, that party shall be entitled to interest calculated in accordance with MCL 600.6013, as amended, whether the action is filed with the Michigan Court of Claims or the American Arbitration Association.

\*15.6.2. After settlement or final adjudication of any claim under this Article if, upon demand, payment by the **Contractor** is not made to the **Owner**, the **Owner** may offset the appropriate amounts against (a) payments due to the **Contractor** under any other contract between the **Owner** and the **Contractor**, or (b) any amounts for which the **Owner** may be obligated to the **Contractor** in any capacity.

#### **15.7 Venue; Flow-Through Provision:**

15.7.1. The **Contractor** agrees to waive jurisdiction and venue, to consent and submit to the jurisdiction of, and not commence any action in other than, a competent State court in Ingham County, Michigan, unless original jurisdiction is vested in the Michigan Court of Appeals, the Michigan Court of Claims, or the Michigan Supreme Court, regardless of residence or domicile, for any action or suit at law or in equity arising out of or under the Contract Documents. The **Contractor** further agrees that it will have each of its Suppliers and Subcontractors provide similar waivers as those required in this paragraph.

15.7.2. The **Contractor** shall insert the provisions of this Article in all Sub agreements, altering those paragraphs only to identify properly the contracting parties.

**END OF SECTION 00700**

**SECTION 00800 SUPPLEMENTARY CONDITIONS**

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**PROFESSIONAL** – G.H. Forbes Associates Architects

WORK – Belle Isle Athletic Shelter HVAC and Fire Protection Improvements

FILE No. 751/24078.SMD

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The provisions of this Section 00800 Supplementary Conditions amend or supplement Section 00700 General Conditions and those other provisions of the Contract Documents, as indicated below. All other provisions of the Contract Documents that are not so amended or supplemented remain in full force and effect.

**Modify Specification Section 00700 Paragraph 4.6.2 as noted in Section 00120 Supplementary Instructions.**

**END OF SECTION 00800**

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**SECTION 01310 PROGRESS SCHEDULE**

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**PART 1 - GENERAL****1.01 SUMMARY**

A. The **Contractor** will submit CPM Progress Schedules to the **Owner** depicting its approach to prosecution of the Work. This includes but is not limited to the **Contractor's** approach to recovering schedule and managing the effect of changes, substitutions, and Delays on Work sequencing.

B. The Progress Schedule will include the Rev. 0 Submittal (par. 3.02), Update Submittals (par. 3.03) and Revision Submittals (par. 3.04). Each Submittal will be assigned a unique number. For a resubmission, the initial number will be modified by the letter A, B, C, etc., as appropriate.

C. Through the Progress Schedule, the **Owner** will seek to stay current on progress, updated Activity and Milestone Dates, and the **Contractor's** approach to Work remaining.

D. References to the Critical Path Method (CPM) are to CPM construction industry standards that are consistent with the requirements of this Section 01310.

**1.02 RELATED SECTIONS**

A. Section 00440 Schedule of Materials and Equipment; Section 00500 Agreement; Section 00700 General Conditions; and Section 00800 Supplementary Conditions.

**1.03 GLOSSARY OF TERMS**

A. Capitalized terms not already defined in any Division 0 Specification have the following intent and meanings:

1. Milestone—A key point of progress, designating interim targets toward the Contract Times. They may pinpoint critical path foundations, key deliveries, building framing, start of MEP rough-in, building enclosure, partitions, interior finishes, conditioned space, commissioning stages, Substantial Completion, and other events of like import.
2. Official Schedule—The most recent Revision Submittal returned to the **Contractor** as Resubmittal Not Required. The Rev. 0 Official Schedule is the *As-Planned* Schedule.
3. Revision 0 Submittal—Progress Schedule submitted by the **Contractor** depicting the entire Work as awarded.
4. Update Submittal—A monthly Progress Schedule update reflecting progress and minor adjustments on the Activities, sequencing and restraints for Work remaining.

**1.04 QUALITY ASSURANCE**

A. The **Contractor** will obtain a written interpretation from the **Professional**, if the **Contractor** believes the selection of Activities, logic ties or restraints requires an interpretation of the Contract Documents. With each submission, the **Contractor** will point out by specific, written notation, any Progress Schedule feature that may reflect variations from any requirements of the Contract Documents.

B. The **Contractor** is responsible to obtain information from each Subcontractor and Supplier when scoping their respective Activities, Values, logic ties and restraints

C. No review of any Progress Schedule by or on behalf of the **Owner** will relieve the **Contractor** from complying with the Contract Times and any required sequence of Work or from completing Work omitted from the Progress Schedule. No review will imply approval of any variation from or interpretation of the Contract Documents, unless approved by the **Professional** through a written interpretation or by means of a separate, written notation.

**1.05 ALLOWANCES**

A. Work covered by Cash Allowances will be completed within the Contract Times. To the extent reasonable and consistent with the **Contractor's** plan, Work authorized by contingency allowances will be completed within the Contract Times. The Progress Schedule will incorporate the **Contractor's** best estimate of the Activities, logic and restraints required, using the information in the Contract Documents, or as indicated by the **Professional** in writing.

**1.06 "OR EQUALS" AND SUBSTITUTIONS**

A. Activities in the Rev. 0 Progress Schedule will be based on materials and equipment required by the Contract Documents and will not reflect any "or equal" or substitute materials or equipment, even if the **Contractor** intends to pursue "or equal" and substitution proposals. This limitation also applies to any Means and Methods indicated in or required by the Contract Documents.

**1.07 MEASUREMENT AND PAYMENT**

A. The Schedule of Values will include a Progress Schedule *pay item*. Fifteen percent (15%) of this *pay item* will be eligible for payment upon delivery of the *complete* Rev. 0 Submittal. The balance of this *pay item* will be eligible for payment, on a prorated basis, with each Request for Payment attaching an Update Submittal.

**PART 2 - WORK PRODUCTS****2.01 PROGRESS SCHEDULE SUBMITTALS**

A. Each Progress Schedule Submittal will consist of an electronic disk with the **Contractor's** files, a narrative and three (3) copies of the required reports and plots.

B. The CPM scheduling software will be Primavera Project Planner®, SureTrak® or Microsoft Project®.

**2.02 PRINTOUTS**

A. Schedule Reports will include Activity (ID) code and description, duration, calendar, Early Dates, Late Dates and Total Float, all of which will comport with the requirements of paragraph 8.3.4 of Section 00700 General Conditions.

1. Late Finish Date for an Activity pinpointing a Contract Time will equal that Contract Time. Early Start Date for an Activity designating a Contract restraint will equal the proper Notice to Proceed date. Schedule Reports may or may not append CPM Plots (time-scaled Activity/logic).

2. For Precedence Diagram Method, separate Schedule Reports will tabulate, for each Activity, all preceding and succeeding logic types and lead times, whether CPM Plots displaying vertical logic ties are appended or not.

B. CPM Schedule Plots will be plotted on a suitable time scale and identify the Contract Times, Critical Paths, and sub-Critical Paths. Activities will be shown on the Early Dates with Total Floats noted by Late Date flags.

C. Line of Balance Plots will reflect industry practice for repetitive construction and will segregate the production lines for all trades within the hammock Activities.

**2.03 NARRATIVE REQUIREMENTS**

A. In general, a narrative will describe the **Contractor's** approach to prosecution of the Work, subject to the requirements of the Contract Documents. Further, each narrative will list the Critical Path Activities and compare Early and Late Dates with Contract Times and Milestone Dates. The basis for restraint dates will be explained.

B. For each Update Submittal, the narrative will compare current Dates to the respective Milestone Dates, describe changes in crewing and construction equipment and identify new Delays. For each Revision Submittal, the narrative also will itemize changes in Activities, logic ties and restraint dates made necessary by each change, Delay, schedule recovery, substitution and **Contractor**-initiated revision occurring since the previous Submittal.

**2.04 ACTIVITY REQUIREMENTS**

A. The Progress Schedule will detail Work sequencing only to the extent necessary to allow the **Owner** to correlate percent complete, compare actual dates with Milestones and Contract Times and the data in Requests for Payment.

B. Separate Activities will designate permits, construction, Submittal preparation/review (and resubmission and re-review, for same); MEP coordination drawings; deliveries; commissioning; and Punch List. Separate Activities will designate **Owner**-furnished items, interface with other work and the **Owner** and **Professional's** responsibilities.

B. Activities will be detailed only to the extent required to show the transition of trade Work. Activities will detail the progression through site/excavation, foundations, building framing, start/completion of interior partitions, MEP rough-in, building enclosure, interior finishes, conditioned space, and commissioning.

1. Submittal Activities will segregate long-lead items, any item requiring structural access and other procurements that, in the **Contractor's** judgment, may bear on the rate of progress. Separate MEP coordination drawing Activities will be used for each floor. Beyond these requirements, it is not necessary to burden the Progress Schedule with Activities for less significant Submittals and deliveries.

2. For multiunit Work (e.g., rough-in overhead MEP for each floor, etc.), detailed Activities will be shown for a typical (often, the first) unit). Other or follow-on units may be replicated, as appropriate, or modeled with a hammock Activity combining the sum total of the typical detailed Activities. Separate Activities, as may be suitable to the Divisions of Work involved, will be identified for single-unit Work. This requirement applies to such scope as Work in mechanical rooms, building framing, commissioning, etc.

3. Activities will not combine separate or non-concurrent items of Unit Price or lump sum Work, Work in separate structures and Work in distinct areas, locations or floors within an area or structure; or rough-in and finish Work.

C. Activity durations will equal the Business Days required to sufficiently complete the Work designated by the Activity (i.e., when finish-to-start successors may start, even if the Activity is not quite 100% complete). Installation Activities will last from twenty (20) to forty (40) Days.

D. Activities will be assigned consistent descriptions and identification codes. Sort codes will group Activities by building or structure, floor or area, Change Order and Change Authorization and other meaningful scheme

**PART 3 – EXECUTION****3.01 FLOAT TOLERANCES**

A. Any Progress Schedule with Early Dates after a Contract Time will yield negative Total and Contract Floats, whether shown/calculated or not. Any Revision Submittal with less than negative twenty (20) Days of Float will be returned as "Revise and Resubmit," unless a time extension is requested, or the **Owner** withholds liquidated damages or asserts intent to do so in the event schedule is not recovered.

B. Floats calculated from the definitions given in Section 00020 Glossary supersede any conflicting Float values calculated within any early completion Progress Schedule.

**3.02 REVISION 0 (Rev. 0) SUBMITTAL**

A. The complete Revision 0 Submittal will be due with the first Request for Payment. The Rev. 0 Submittal will show the Work as awarded, without Delays, "or equal" or substitutions, Change Orders or Change Authorizations.

1. The Rev. 0 narrative will detail the **Contractor's** management of the site (lay down, parking, etc.). Further, the Rev. 0 narrative will identify shifts, weekend Work, Activity calendars, Delays since award and all pending and anticipated "or equal" and substitution proposals.

E. Once endorsed by the **Owner** and returned as "Resubmittal Not Required," the Rev. 0 Progress Schedule (or Rev. 0A, etc.) will be the As-Planned Schedule and the basis for Update Submittals until the Rev. 1 Official Schedule is established. Once the As-Planned Schedule is established, the **Owner** will select Milestones and note Milestone Early and Late Dates. As the Official Schedule evolves, Milestone Dates will be revised accordingly.

F. If the **Owner** refuses to endorse the Rev. 0 Submittal (or Rev. 0A, for a resubmission) as "Resubmittal Not Required," the As-Planned Schedule will not be established. In that event, the **Contractor** will continue to submit Update and Revision Submittals reflecting progress and the **Contractor's** approach to remaining Work. The **Owner** will rely on the available Update and Revision Submittals, subject to whatever adjustments it determines appropriate.

**3.03 UPDATE SUBMITTALS**

A. Update Submittals with progress up to the closing date and updated Early and Late Dates for progress and remaining Activities will be due with each Request for Payment. As-built data will consist of actual start dates, percent complete, actual finish dates, changes, Delays, and other significant events occurring before the closing date.

**3.04 REVISION SUBMITTALS**

A. Progress Schedule Revisions will be submitted with the third Request for Payment and every two (2) months after that, or more often, if necessary due to schedule recovery or other Progress Schedule revisions. Revisions will revise the Update Submittal attached to the prior Request for Payment.

B. Progress Schedule revisions will detail all impacts on pre-existing Activity scope, logic ties and restraint dates and reflect the Contractor's current approach to Work remaining. Revisions may be required because of changes in the Work, substitutions, schedule recovery and Delays.

C. Once endorsed by the **Owner** and returned as "Resubmittal Not Required," a Revision Submittal becomes the Rev. 1, Rev. 2, etc. Official Schedule and the basis for subsequent Update Submittals until a more current Official Schedule is established. If the **Owner** refuses to endorse a Revision Submittal as "Resubmittal Not Required," the **Contractor** will continue to submit Update and Revision Submittals when and as required in this Section.

**3.05 RETROSPECTIVE DELAY ANALYSIS**

A. If the **Owner** refuses to endorse any Revision Submittal as "Resubmittal Not Required," the **Contractor** and **Owner** will use the latest Official Schedule when evaluating the effect of Delays on Contract Time and/or Contract Price. The procedure will consist of progressively revising the latest Official Schedule at key Revision Submittal closing dates. For each Progress Schedule iteration, slippage between actual Milestone Dates and Rev. 0 Milestone Dates will be correlated to Delays occurring solely in that iteration. Revisions affecting Work after any iteration will be included only to the extent consented by the **Owner** at that time and/or if actually confirmed by as-built progress.

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**END OF SECTION 01310**

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This 01310 Specification uses the FORMSPEC™ Section 01310 Model Progress Schedule Specification (CPM Short Form). Title to and use of this Specification is strictly restricted. Except as may be appropriate for use in the bidding and execution of the Work, reproduction, translation or substantial use or quotation of any part of this Specification beyond that permitted by the 1976 United States Copyright Act without prior written permission of PMA Consultants LLC is unlawful.

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# **APPENDIX I**

## **SPECIAL WORKING CONDITIONS**



**DEPARTMENT OF NATURAL RESOURCES**

The Work comprising this Project will be performed at a site of the Department of Natural Resources. The Contractor must comply with all rules and regulations pertaining to such sites and must conform to the following rules:

1. The Contractor must provide a competent Superintendent satisfactory to the Department of Natural Resources on the work site at all times during working hours with full authority to act for him. It must be the Contractor's responsibility to furnish the Department of Natural Resources with the name, address, and telephone number of the responsible person to contact for Emergency during after hour, weekend, and holiday periods.
2. Access to and egress from the site must be via routes specifically designated by the Department of Natural Resources authorized representative.
3. No Work must be performed at the site on Saturdays, Sundays, holidays or during night hours without the written permission from the Department of Natural Resources; and DTMB.
4. Areas on the site for employee parking, toolboxes, material lay down, etc., must be assigned by the Department of Natural Resources. All firearms, weapons, alcoholic beverages, or explosives must be removed from vehicles before entering the site.
5. Heavy equipment such as bulldozers and power shovels must be locked or immobilized in an acceptable manner when not in use. No tools, small pipe, copper, or wire must remain on the site overnight, unless acceptably locked inside shanties or tool chests. There will be no exchange, loaning or borrowing of tools, equipment or manpower between the Department of Natural Resources and the Contractor.

## **APPENDIX II**

# **SPECIAL PROJECT PROCEDURES**

## SOIL EROSION AND SEDIMENTATION CONTROL PROJECT PROCEDURES FOR CONTRACTORS ON DTMB OWNED AND MANAGED PROPERTIES

1. Comply with Part 91, Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act 1994 PA 451, as amended.
2. Contact the DTMB, SFA, Design and Construction Division to discuss the implementation of soil erosion and sedimentation control (SESC) on the Project with DTMB SESC Officer. Phone (517) 388-3045 or Email [DTMB-SESC@michigan.gov](mailto:DTMB-SESC@michigan.gov).
3. Following the award of a contract, the Contractor will be required to prepare and issue for approval an SESC Implementation Plan, which indicates the Contractor's intended implementation of SESC on the project including a schedule and sequence. The Environmental Health and Safety Section, upon approval of the implementation plan, will issue to the Contractor an "Authorization to Proceed with Earth Change" document, which is to be posted at the job site. This document is issued in lieu of a permit from the county. Earthwork shall not begin prior to the issuance of this Authorization. Upon receipt of the Authorization document, the Contractor may begin earth change activities.
4. See below the "Checklist for Contractor's SESC Implementation Plan" for details of the required information necessary for the Contractor to create the SESC Implementation Plan. The intent of this plan is to ensure that the Contractor has reviewed and understands the SESC provisions within the plans and specifications.
5. CHECKLIST FOR CONTRACTOR'S SOIL EROSION AND SEDIMENTATION CONTROL IMPLEMENTATION PLAN (For projects that include earth changes or disturb existing vegetation):

DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
STATE FACILITIES ADMINISTRATION, DESIGN AND CONSTRUCTION DIVISION  
SOIL EROSION AND SEDIMENTATION CONTROL PROGRAM  
P.O. Box 30026, Lansing, Michigan 48909

**PROJECT TITLE:** BELLE ISLE ATHLETIC SHELTER HVAC & FIRE PROTECTION IMPROVEMENTS

**PROJECT LOCATION:** 330 VISTA AVE. DETROIT MI, 48207

**PROJECT FILE NUMBER:** 751/24078.SMD

**INDEX NUMBER:**

Prior to the start of earthwork, the Contractor must submit a Soil Erosion and Sedimentation Control (SESC) Implementation Plan to the Michigan Department of Technology, Management and Budget, Soil Erosion and Sedimentation Control Program. The intent of this plan is to ensure that the Contractor has reviewed and understands the SESC provisions within the plans and specifications. The following checklist will provide Contractors with assistance in creating the SESC Implementation Plan.

The SESC Implementation Plan must include:

1. ☐ A written plan or letter demonstrating:
  - ☐ The Contractor's means and methods for the implementation of SESC provisions included within the plans and specifications and compliance with the provisions of Part 91 of PA 451 of 1994, as amended.
  - ☐ The Contractor's plan for dust control.
  - ☐ The Contractor's plan for inspection and maintenance of temporary SESC's.
2. ☐ A map, location plan, drawing, or amended copy of the Project SESC or grading plan showing:
  - ☐ The locations of any stockpiles of soil associated with the Project
  - ☐ The temporary SESC controls associated with stockpiles of soil
  - ☐ The Contractor's suggested or proposed additions or relocations of any temporary or permanent SESC's. associated with the Project plans and specifications (subject to approval by Engineer and DTMB)
  - ☐ Location of site entrances, exits and vehicle routes
  - ☐ Location of site superintendent's/project manager's site trailer or office (for SESC Inspector check-in)
3. ☐ A schedule for the installation and removal of temporary controls and the installation of permanent soil erosion and sedimentation controls in relation to the overall construction schedule.

Submit the above items to the above address.

Upon approval of the Contractor's plan, an "Authorization to Proceed with Earth Change" will be issued by DTMB, Design and Construction Division

## DEMOLITION/REMODELING PROJECT PROCEDURES

Furnish all equipment, materials, labor, and services necessary to complete all building demolition required in connection with the existing building, in order to permit the installation of new Work. The goal of the Owner is to generate the least amount of waste or debris possible. However, inevitable waste and debris that are generated shall be reused, salvaged, or recycled, and disposal in landfills shall be minimized to the extent economically feasible. The Contractor will be required to prepare waste management plan for the collection, handling, storage, transportation, and disposal of the waste generated at the construction site for the Owner's review and approval. The Contractor will be required to produce waste management progress reports.

1. Locations: Notations are made in various places on the Drawings to call attention to building demolition which is required; however, these Drawings are not intended to show each and every item to be removed. The Contractor and the Subcontractors for the various trades must remove the materials related to their respective trades as required to permit the construction of the new Work as shown.
2. Permits: The Contractor must secure from the appropriate agencies all required permits necessary for proper execution of the work before starting work on the project site. All fees for securing the permits must be paid by the Contractor, including all inspection costs which may be legally assessed by the Bureau of Construction Codes in accordance with the authority granted under the Public Act 1980 PA 371, as amended.
3. Enclosures: Where it is necessary to make alterations to walls, floors or roof of the existing building, the Contractor must provide and maintain dustproof partitions to separate the parts where Work is being done from the adjoining parts occupied by the State Agency. Where any parts are opened and exposed to the elements, the Contractor must provide weather tight enclosures to fully protect the structure and its contents.
4. Waste Management Plan: The management plan must address waste source identification and separation, returns, reuse and salvage, recycling, landfill options, alternatives to landfilling, materials handling procedures and transportation.
5. Preparation: Protect all existing Work that is to remain and restore in an approved manner any such Work that becomes damaged.
  - 5.1 Rubbish and debris resulting from the Work must be removed immediately from the site by the Contractor. However, any recyclable materials must be recycled; the Contractor will be required to use alternatives to landfills for waste disposal such as reuse or recycle of asphalt, bricks, concrete, masonry, plastics, paint, glass, carpet, metals, wood, drywall, insulation, and any other waste materials to the extent practical.
  - 5.2 Unless otherwise specified, the Agency will remove existing furniture, drapery tracks, draperies, window blinds, and other equipment items, which might interfere with the new construction.
6. Coordination: Demolition work, in connection with any new unit of Work, must not be commenced until all new materials required for completion of that new item of Work are at hand.
7. Waste Management Plan Progress Reports: Submit an updated report with the payment requests. The progress reports shall include:
  - a. The amount of waste sent to a landfill, tipping fees paid and the total disposal cost. Include supporting documents such as manifests, weight tickets, receipts and/or invoices.
  - b. Records for each material recycled/reused/salvaged from the project including the amount, date removed from the job site, final destination, transportation cost, recycled materials, and the net cost/ savings.
  - c. Breakdown of waste by type generated to date.
  - d. Recycling/salvage/landfill rates.
  - e. Percent of waste recycled/salvaged to date.

## HAZARDOUS MATERIALS PROJECT PROCEDURES

1. The Contractor must use, handle, store, dispose of, process, transport and transfer any material considered a Hazardous Material in accordance with all federal, state, and local Laws. If the Contractor encounters material reasonably believed to be a Hazardous Material and which may present a substantial danger, the Contractor must immediately stop all affected work, give written notice to the Owner of the conditions encountered, and take appropriate health and safety precautions.
2. This project has been identified by the DTMB-SFA as having a possibility of containing Hazardous Waste materials to be legally removed from the Project job site in order to complete the Work as described in the Proposal And Contract. If removal of friable asbestos material is required, the Contractor must contact the Air Quality Division, Department of Environment, Great Lakes, and Energy, at **(517) 284-6773**, for a permit and furnish all training, labor, materials, services, insurance, and equipment necessary to carry out the removal operations of all Hazardous Materials from the Project job site, as identified by the Scope of Work, or encountered on the Project job site, in accordance with State and Federal Hazardous Waste Codes. A Contract Change Order will be written to modify the existing Contract to pay for the additional cost.
3. Environmental Hazards (air, water, land and liquid industrial) are handled by the Waste and Hazardous Materials Division, Michigan Department of Environment, Great Lakes, and Energy (EGLE) in carrying out the requirements of the Federal Environmental Protection Agency (EPA). For general information and/or a copy of the latest regulations and publications call (517) 335-2690.
4. The Michigan Occupational Safety and Health Administration (MIOSHA) provides protection and regulations for the safety and health of workers. The Department of Licensing and Regulatory Affairs provides for the safety of workers. The Department of Health & Human Services provides for the health of workers (517/373-3740) (TDD 517/373-3573).
  - 4.1 Contractor must post any applicable State and/or Federal government regulations at the job site in a prominent location.
  - 4.2 Contractor must be responsible for training their workers in safe work practices and in proper removal methods when coming in contact with hazardous chemicals.
5. Applicable Regulations:
  - 5.1 Natural Resources and Environmental Protection Act – PA 451 of 1994, as amended, including Part 111 – Hazardous Waste Management, Part 121 – Liquid Industrial Waste and Part 147 – PCB compounds.
  - 5.2 RCRA, 1976 - Resource Conservation and Recovery Act: This federal statute regulates generation, transportation, treatment, storage, or disposal of hazardous wastes nationally.
  - 5.3 TSCA, 1979 – Toxic Substances Control Act: This statute regulates the generation, transportation, storage, and disposal of industrial chemicals such as PCBs.
6. Definitions: Hazardous substances are ignitable, corrosive, reactive, and/or toxic, based on their chemical characteristics.
  - 6.1 Under Federal and Michigan Law, a Small Quantity Generator of hazardous waste provides from 220 to less than 2,000 lbs./month or never accumulates 2,200 lbs. or more.
  - 6.2 A Generator size provider of hazardous waste provides 2,200 lbs. or more/month or accumulates above 2,200 lbs.
7. Disposals: To use an off-site hazardous waste disposal facility, the Contractor must use the Uniform Hazardous Waste Manifest (shipping paper). Small quantities of hazardous waste may not be disposed of in sanitary landfills used for solid waste.
8. Federal, state, and local Laws and regulations may apply to the storage, handling and disposal of Hazardous Materials and wastes at each State Agency. Contact the **Environmental Assistance Center** of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) at **1-800-662-9278**, Fax to: 517-241-0673 or e-mail to: [DEQ-EAD-env-assist@michigan.gov](mailto:DEQ-EAD-env-assist@michigan.gov) for general EGLE information including direct and referral assistance on air, water and wetlands permits; contaminated site clean-ups; underground storage tank removals and remediation; hazardous and solid waste disposal; pollution prevention and recycling; and compliance-related assistance. The Center provides businesses, municipalities, and the general public with a single point of access to EGLE's environmental programs.

## ASBESTOS ABATEMENT PROJECT PROCEDURES

Should this Work require the renovation or demolition of a building or structure initially constructed on or prior to 1980, the Contractor will use the attached copy of a Comprehensive Asbestos Building Survey for those portions of the building or structure being impacted and must plan his or her work to minimize disturbance of any known or assumed asbestos containing materials (ACM). In addition, if this building or structure was constructed on or prior to 1980, the Contractor's On-Site Superintendent and all Subcontractor On-Site Superintendents for trades that could potentially disturb known or assumed ACM, must, as a minimum, have and provide documentation of current Asbestos Awareness Training.

If the Comprehensive Asbestos Building Survey identifies known or assumed ACM that will potentially be disturbed as a part of the Contractor's renovation or demolition activities, the Contractor must remove, transport, and dispose of these materials at no additional cost to the Owner and prior to any other work taking place within the immediate vicinity of said material. If required, the Contractor must provide the Owner a minimum of 10 working day notification prior to the start of any asbestos abatement activities with abatement in occupied buildings being completed even if they will be conducted during off hours (nights, weekends, and state holidays).

If the Contractor encounters a suspected ACM that was not previously identified within the Comprehensive Asbestos Building Survey, the Contractor must immediately stop all affected work, give written notice to the Owner of the conditions encountered, and take appropriate health and safety precautions. If, after providing Owner notification, the Contractor is directed to sample and/or remove the suspected ACM in question, a Contract Change Order will be written to modify the existing Contract to pay for the additional cost. Any abatement shall be completed in accordance with the requirements of this Section.

If removal of ACM is required, removal must be completed by a contractor currently licensed to remove asbestos by the State of Michigan, Department of Licensing and Regulatory Affairs (DLARA) Asbestos Program and abatement must be performed in accordance with all federal, state, and local Laws and Regulations. Prior to commencing any asbestos abatement activities, the licensed abatement contractor must submit, as required by Federal, State and Local Laws and Regulations, a "Notification of Intent to Renovate/Demolish" to both the State of Michigan, Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division and to the DLARA, Asbestos Program, to comply with National Emission Standards for Hazardous Air Pollutants (NESHAP), and the Clean Air Act (CAA). All regulated ACM must be disposed of at an approved Type II (general refuse) landfill and must be in leak-tight wrapping or containers. ACM that is non friable and is not in poor condition or will not become regulated ACM at any time can be disposed of in a Type III (construction debris) landfill.

At the completion of each abatement activity, the Contractor must perform clearance testing in accordance with National Institute for Occupational Safety and Health (NIOSH) 582 "Sampling and Evaluating Airborne Asbestos Dust". All air samples shall indicate concentrations of less than 0.01 fibers/cc for clearance to be met. Clearance testing shall be performed by a third-party Asbestos Consultant. The Asbestos Consultant selected by the Contractor shall be experienced and knowledgeable about the methods for asbestos air sampling and be able to select representative numbers and locations of samples. It is mandatory that the Asbestos Consultant's on-site hygienist performing sampling and analysis have certification that he/she has passed a NIOSH 582 or equivalent course.

The NESHAP asbestos regulations, notification form, guidelines and fact sheets are available on EGLE's web site [www.michigan.gov/egle](http://www.michigan.gov/egle) under heading Air; then click on Compliance; then click on Asbestos NESHAP Program. For guidelines on submitting notifications pursuant to the Asbestos Contractors Licensing Act, contact the DLARA, Occupational Health Division, Asbestos Program at (517) 322-1320 or visit DLARA's web site [www.michigan.gov/asbestos](http://www.michigan.gov/asbestos).

## LEAD ABATEMENT PROJECT PROCEDURES

Should this Work require the renovation or demolition of a building or structure, the workers are assumed to be exposed to lead or materials containing lead above acceptable levels until proven otherwise through personal air sampling and analysis. The Contractor shall take all steps necessary to assure that his/her employees, are not exposed to lead at concentrations greater than the Permissible Exposure Limit as per the State of Michigan Department of Licensing and Regulatory Affairs Occupational Health Standards Part 603 "Lead Exposure in Construction". In addition, the Contractor shall convey this same requirement to all subcontractors that may be under his/her control.

The employer shall comply with the Michigan Lead Abatement Act, as amended, and the Lead Hazard Control rules and must communicate information concerning lead hazards according to the requirements of Michigan Occupational Safety and Health Administration (MIOSHA) Part 603 and the Occupational Safety and Health Administration's (OSHA's) Hazard Communication Standard for the construction industry, 29 CFR 1926.59, including but not limited to safety equipment (e.g. personal fit-tested and approved respirators and protective clothing), worker rotation (on a short-cycle and regular basis), working practices (e.g. sanding, cutting, grinding, abrased, burning and heat-gun stripping of lead based paint are not allowed), the requirements concerning warning signs and labels, material safety data sheets (MSDS), and employee information and training. Employers shall comply with the requirements of 29 CFR 1926.62(I) - Employee Information and Training.

If lead or materials containing lead will be disturbed as a part of the work to be performed, the Contractor must remove, transport, and dispose of these materials at no additional cost to the Owner and prior to any other work taking place within the immediate vicinity of said material. The Contractor must provide the Owner a minimum 10 working day notification prior to the start of any lead abatement activities with abatement in occupied buildings being completed even if they will be conducted during off hours (nights, weekends, and state holidays). Abatement is defined as an activity specifically designed to permanently remove lead paint, lead-contaminated dust or other lead containing materials, the installation of a permanent enclosure or encapsulation of lead paint or other lead containing materials, the replacement of lead-painted surfaces or fixtures, the removal or covering of lead-contaminated soil, and any preparation, cleanup, disposal, and post-abatement clearance testing associated with these activities. Renovation, remodeling, landscaping, or other activity, that is not designed to permanently eliminate lead paint hazards, but is instead designed to repair, restore, or remodel a structure, or housing unit even though the activity may incidentally result in a reduction or elimination of a lead paint hazard is not considered abatement.

If abatement of lead or materials containing lead is required, abatement must be completed by a qualified Lead Abatement Contractor. In addition, Specifications for the Lead Abatement should be based upon a Lead Inspection/Risk Assessment report. The Lead Inspection/Risk Assessment report and clearance testing upon completion should be performed by a Certified Inspector or Risk Assessor. Lead abatement including clearance testing shall be performed in accordance with the State of Michigan, Lead Abatement Act, Part 54A Lead Abatement and with all other federal, state, and local Laws and Regulations that may apply

For additional information about certifications, guidance, and regulations for lead hazard control activities, visit [www.michigan.gov/lead](http://www.michigan.gov/lead).

## **APPENDIX III PREVAILING WAGE RATE SCHEDULES**





GRETCHEN WHITMER  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF LABOR AND ECONOMIC OPPORTUNITY  
WAGE AND HOUR DIVISION

SUSAN CORBIN  
DIRECTOR

## Prevailing Wage Rates for State Funded Projects Official Rate Schedule

|                                           |                                                   |
|-------------------------------------------|---------------------------------------------------|
| <b>ORS#:</b>                              | ORS-003256                                        |
| <b>Date Issued:</b>                       | 08/08/2025                                        |
| <b>Contract Award By Date:</b>            | 11/06/2025                                        |
| <b>Contracting Agency:</b>                | DTMB Design & Construction Division (CA-0007)     |
| <b>Contracting Agency Representative:</b> | Don Klein (KleinD4@michigan.gov)                  |
| <b>Project Number:</b>                    | 751/24078.SMD                                     |
| <b>Project Name:</b>                      | Belle Isle Athletic Shelter                       |
| <b>Project Description:</b>               | HVAC Replacement and Fire Protection Improvements |

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### **FOR ALL AWARDED CONTRACTS ONLY**

- Every Contractor and Subcontractors shall keep Posted on the Construction Site, in a conspicuous place, a copy of all applicable prevailing wage rate schedules contained in a contract.
- The Prevailing rate schedule provides an hourly rate which includes wage and fringe benefit totals for designated classifications.
- Please refer to WHD-9917 & WHD 9918 for any additional information.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                          | Category                                                                     | Last Updated      |
|----------------------------------------------|------------------------------------------------------------------------------|-------------------|
| <b>Asbestos &amp; Lead Abatement Laborer</b> | <b>Asbestos Abatement Worker<br/>or Environmental<br/>Remediation Worker</b> | <b>04/04/2025</b> |

**Classification Description:** Asbestos & Lead Abatement Laborer

4 ten hour days @ straight time allowed Monday-Saturday, must be consecutive calendar days

| Wage Rates                                | Straight<br>Time | Time and a<br>Half | Double<br>Time |
|-------------------------------------------|------------------|--------------------|----------------|
| Total Hourly Wage                         | \$50.60          | \$65.37            | \$80.13        |
| Apprentice: Trainee 600 hours + 1<br>year | \$34.07          | \$18.89            | \$20.54        |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$65.37 |
| 10th hour       | \$65.37 |
| Beyond 10 hours | \$65.37 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$65.37 |
| 9th hour        | \$65.37 |
| 10th hour       | \$65.37 |
| Beyond 10 hours | \$65.37 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$80.13</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category           | Last Updated      |
|---------------------|--------------------|-------------------|
| <b>Boilermaker</b>  | <b>Boilermaker</b> | <b>04/04/2025</b> |

**Classification Description:** Boilermaker

| Wage Rates             | Straight Time | Time and a Half | Double Time |
|------------------------|---------------|-----------------|-------------|
| Total Hourly Wage      | \$72.47       | \$107.56        | \$142.63    |
| Apprentice: 1st Period | \$53.53       | \$79.15         | \$104.75    |
| Apprentice: 2nd Period | \$55.14       | \$81.57         | \$107.97    |
| Apprentice: 3rd Period | \$56.73       | \$83.94         | \$111.15    |
| Apprentice: 4th Period | \$58.31       | \$86.32         | \$114.31    |
| Apprentice: 5th Period | \$59.85       | \$88.62         | \$117.39    |
| Apprentice: 6th Period | \$63.03       | \$93.39         | \$123.75    |
| Apprentice: 7th Period | \$66.17       | \$98.10         | \$130.03    |
| Apprentice: 8th Period | \$69.32       | \$102.83        | \$136.33    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$107.55 |
| 10th hour       | \$107.55 |
| Beyond 10 hours | \$107.55 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$107.55 |
| 9th hour        | \$107.55 |
| 10th hour       | \$107.55 |
| Beyond 10 hours | \$107.55 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$142.63</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                                     | Category          | Last Updated      |
|-----------------------------------------------------------------------------------------|-------------------|-------------------|
| <b>Bricklayers, Stone Mason, Pointer, Cleaner &amp; Caulker - BAC 2 - Metro Detroit</b> | <b>Bricklayer</b> | <b>04/04/2025</b> |

**Classification Description:** Bricklayers, Stone Mason, Pointer, Cleaner & Caulker

| Wage Rates                                   | Straight Time | Time and a Half | Double Time |
|----------------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                            | \$65.01       | \$97.53         | \$130.02    |
| Apprentice: Bricklayer Apprentice Level 5    | \$52.46       | \$78.71         | \$104.92    |
| Apprentice: Bricklayer Apprentice Level 6    | \$54.31       | \$81.48         | \$108.62    |
| Apprentice: Bricklayers Apprentice 2nd Level | \$46.91       | \$70.38         | \$93.82     |
| Apprentice: Bricklayers Apprentice 4th Level | \$50.61       | \$75.93         | \$101.22    |
| Apprentice: Bricklayers Apprentice Level 1   | \$45.06       | \$67.61         | \$90.12     |
| Apprentice: Bricklayers Apprentice Level 3   | \$48.76       | \$73.16         | \$97.52     |
| Apprentice: Bricklayers Apprentice Level 7&8 | \$56.16       | \$84.26         | \$112.32    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$65.01 |
| 10th hour       | \$65.01 |
| Beyond 10 hours | \$65.01 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$65.01 |
| 9th hour        | \$65.01 |
| 10th hour       | \$65.01 |
| Beyond 10 hours | \$65.01 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$130.02</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Between Nov. 1 and Apr 30, if inclement weather, or other conditions beyond the Employer's control, Saturdays may be worked as make-up days. Make-up time shall be paid at the straight time rate until forty hrs are worked unless the standard workweek included a holiday, then 32 hrs straight time

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                | Category         | Last Updated      |
|------------------------------------|------------------|-------------------|
| <b>Carpenter/Piledriver-687-Z1</b> | <b>Carpenter</b> | <b>04/04/2025</b> |

**Classification Description:** Carpenter/Piledriver

| Wage Rates           | Straight Time | Time and a Half | Double Time |
|----------------------|---------------|-----------------|-------------|
| Total Hourly Wage    | \$72.05       | \$92.86         | \$113.66    |
| Apprentice: 1st year | \$47.22       | \$59.81         | \$72.39     |
| Apprentice: 2nd year | \$53.43       | \$68.07         | \$82.71     |
| Apprentice: 3rd year | \$59.64       | \$76.34         | \$93.03     |
| Apprentice: 4th year | \$65.85       | \$84.60         | \$103.35    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$92.86 |
| 10th hour       | \$92.86 |
| Beyond 10 hours | \$92.86 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$92.86 |
| 9th hour        | \$92.86 |
| 10th hour       | \$92.86 |
| Beyond 10 hours | \$92.86 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$113.66</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Yes, but Saturdays may not be used as a make-up day. One and a half (1 ½) the straight time rate applies to all Saturday hours, and those over 40 hours per week. Double time applies on all Sundays, Holidays, and all time over 12 hours per day.

**Base Rate Comment:** 4-10s allowed Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                       | Category         | Last Updated      |
|-------------------------------------------|------------------|-------------------|
| <b>Carpet &amp; Resilient Floor Layer</b> | <b>Carpenter</b> | <b>04/04/2025</b> |

**Classification Description:** Carpet and Resilient Floor Layer, (does not include installation of prefabricated formica & parquet flooring which is to be paid carpenter rate)

| Wage Rates                      | Straight Time | Time and a Half | Double Time |
|---------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage               | \$64.51       | \$82.93         | \$101.34    |
| Apprentice: Apprentice 1st Year | \$42.73       | \$53.88         | \$65.03     |
| Apprentice: Apprentice 2nd Year | \$48.17       | \$61.14         | \$74.10     |
| Apprentice: Apprentice 3rd Year | \$53.61       | \$68.39         | \$83.17     |
| Apprentice: Apprentice 4th Year | \$59.07       | \$75.67         | \$92.27     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$64.51 |
| 10th hour       | \$64.51 |
| Beyond 10 hours | \$82.92 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$82.92  |
| 9th hour        | \$82.92  |
| 10th hour       | \$82.92  |
| Beyond 10 hours | \$101.34 |

|                       |               |
|-----------------------|---------------|
| <b>Sunday/Holiday</b> | <b>\$0.00</b> |
|-----------------------|---------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category         | Last Updated      |
|----------------------------|------------------|-------------------|
| <b>Diver Tender-687-Z1</b> | <b>Carpenter</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman-Diver Tender

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$71.16       | \$91.97         | \$112.77    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$91.97 |
| 10th hour       | \$91.97 |
| Beyond 10 hours | \$91.97 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$91.97 |
| 9th hour        | \$91.97 |
| 10th hour       | \$91.97 |
| Beyond 10 hours | \$91.97 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$112.77</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Yes, but Saturdays may not be used as a make-up day. One and a half (1 ½) the straight time rate applies to all Saturday hours, and those over 40 hours per week. Double time applies on all Sundays, Holidays, and all time over 12 hours per day.

**Overtime Rate Comment:** Double time over 12 hours/day.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated      |
|---------------------|--------------|-------------------|
| <b>Class I</b>      | <b>Diver</b> | <b>04/04/2025</b> |

**Classification Description:** Class I - diver/wet tender, engineer, blaster, leverman

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$82.82       | \$107.82        | \$132.82    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$32.82  |
| 10th hour       | \$107.82 |
| Beyond 10 hours | \$107.82 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$107.82 |
| 9th hour        | \$107.82 |
| 10th hour       | \$107.82 |
| Beyond 10 hours | \$107.82 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$132.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated      |
|---------------------|--------------|-------------------|
| <b>Diver-687-Z1</b> | <b>Diver</b> | <b>04/04/2025</b> |

**Classification Description:** Diver

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$82.48       | \$107.41        | \$132.34    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$107.41 |
| 10th hour       | \$107.41 |
| Beyond 10 hours | \$107.41 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$107.41 |
| 9th hour        | \$107.41 |
| 10th hour       | \$107.41 |
| Beyond 10 hours | \$107.41 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$132.34</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Yes, but Saturdays may not be used as a make-up day. One and a half (1 ½) the straight time rate applies to all Saturday hours, and those over 40 hours per week. Double time applies on all Sundays, Holidays, and all time over 12 hours per day.

**Overtime Rate Comment:** Double time due when over 12 hours worked per day

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category         | Last Updated      |
|----------------------|------------------|-------------------|
| <b>Drywall Taper</b> | <b>Drywaller</b> | <b>04/04/2025</b> |

**Classification Description:** Drywall Taper

Four 10s allowed Monday-Thursday

| Wage Rates                  | Straight Time | Time and a Half | Double Time |
|-----------------------------|---------------|-----------------|-------------|
| Total Hourly Wage           | \$45.91       | \$59.74         | \$73.56     |
| Apprentice: 4th 6 months    | \$41.76       | \$53.51         | \$65.26     |
| Apprentice: First 3 months  | \$32.08       | \$38.99         | \$45.90     |
| Apprentice: Second 3 months | \$34.85       | \$43.14         | \$51.44     |
| Apprentice: Second 6 months | \$37.62       | \$47.30         | \$56.98     |
| Apprentice: Third 6 months  | \$40.38       | \$51.44         | \$62.50     |

### Overtime Provisions

**Over 8-hour day/40-hour week**

|                 |         |
|-----------------|---------|
| 9th hour        | \$59.74 |
| 10th hour       | \$59.74 |
| Beyond 10 hours | \$73.56 |

**Saturday**

|                 |         |
|-----------------|---------|
| First 8 hours   | \$59.74 |
| 9th hour        | \$73.56 |
| 10th hour       | \$73.56 |
| Beyond 10 hours | \$73.56 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$73.56</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes**Make Up Day Allowed?** - Yes

Friday make-up day for bad weather or holidays

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name      | Category    | Last Updated |
|--------------------------|-------------|--------------|
| Communication Technician | Electrician | 04/04/2025   |

**Classification Description:** Communication Technician

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$67.89       | \$98.24         | \$128.58    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.24 |
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$128.58</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

ONLY due to inclement weather or customer requirements may Friday be used as a make up day if the normal scheduled work week was interrupted and time lost of five (5) hours or more was incurred by workmen covered under the terms of the 6-17-C/6-876-T agreement.

**Base Rate Comment:** Foreman (112.5% above JL Rate)

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category           | Last Updated      |
|----------------------------|--------------------|-------------------|
| <b>Fiber Optic Splicer</b> | <b>Electrician</b> | <b>04/04/2025</b> |

**Classification Description:** Fiber Optic Splicer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$67.89       | \$98.24         | \$128.58    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.24 |
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$128.58</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

ONLY due to inclement weather or customer requirements may Friday be used as a make up day if the normal scheduled work week was interrupted and time lost of five (5) hours or more was incurred by workmen covered under the terms of the 6-17-C/6-876-T agreement.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name              | Category           | Last Updated      |
|----------------------------------|--------------------|-------------------|
| <b>Journeyman Inside Wireman</b> | <b>Electrician</b> | <b>04/04/2025</b> |

**Classification Description:** -Duties: Install, repair, and maintain electrical systems, install lighting, receptacles, and fixtures  
-Materials: Wire and electrical cable, Conduit, Lighting, receptacles, and fixtures  
-Equipment: pliers, screwdrivers, wire cutters, measuring tapes, drills, electric screw guns, and hydraulic benders, voltmeters and ammeters

| Wage Rates             | Straight Time | Time and a Half | Double Time |
|------------------------|---------------|-----------------|-------------|
| Total Hourly Wage      | \$75.36       | \$107.79        | \$140.22    |
| Apprentice: 1st Period | \$46.28       | \$61.78         | \$73.67     |
| Apprentice: 2nd Period | \$53.43       | \$70.24         | \$83.46     |
| Apprentice: 3rd Period | \$56.08       | \$74.22         | \$88.75     |
| Apprentice: 4th Period | \$58.71       | \$78.18         | \$94.03     |
| Apprentice: 5th Period | \$61.36       | \$82.14         | \$99.32     |
| Apprentice: 6th Period | \$66.64       | \$90.07         | \$109.89    |

### Overtime Provisions

| Over 8-hour day/40-hour week |          |
|------------------------------|----------|
| 9th hour                     | \$101.02 |
| 10th hour                    | \$101.02 |
| Beyond 10 hours              | \$101.02 |
| Saturday                     |          |
| First 8 hours                | \$101.02 |
| 9th hour                     | \$101.02 |
| 10th hour                    | \$101.02 |
| Beyond 10 hours              | \$101.02 |
| Sunday/Holiday               |          |
|                              | \$126.68 |

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                 | Category           | Last Updated      |
|-------------------------------------|--------------------|-------------------|
| <b>Journeyman Signal Technician</b> | <b>Electrician</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman Signal Technician

| Wage Rates                          | Straight Time | Time and a Half | Double Time |
|-------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                   | \$67.89       | \$98.24         | \$128.58    |
| Apprentice: Apprentice 1st 6 months | \$43.61       | \$61.82         | \$80.02     |
| Apprentice: Apprentice 2nd 6 months | \$46.65       | \$66.38         | \$86.10     |
| Apprentice: Apprentice 3rd 6 months | \$49.68       | \$70.92         | \$92.16     |
| Apprentice: Apprentice 4th 6 months | \$52.71       | \$75.47         | \$98.22     |
| Apprentice: Apprentice 5th 6 months | \$55.75       | \$80.03         | \$104.30    |
| Apprentice: Apprentice 6th 6months  | \$61.82       | \$89.13         | \$116.44    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.24 |
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$128.58</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

ONLY due to inclement weather or customer requirements may Friday be used as a make up day if the normal scheduled work week was interrupted and time lost of five (5) hours or more was incurred by workmen covered under the terms of the 6-17-C/6-876-T agreement.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name          | Category           | Last Updated      |
|------------------------------|--------------------|-------------------|
| <b>Journeyman Specialist</b> | <b>Electrician</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman Specialist

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$76.98       | \$111.88        | \$146.76    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$111.87 |
| 10th hour       | \$111.87 |
| Beyond 10 hours | \$111.87 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$111.87 |
| 9th hour        | \$111.87 |
| 10th hour       | \$111.87 |
| Beyond 10 hours | \$111.87 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$146.76</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

ONLY due to inclement weather or customer requirements may Friday be used as a make up day if the normal scheduled work week was interrupted and time lost of five (5) hours or more was incurred by workmen covered under the terms of the 6-17-C/6-876-T agreement.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name     | Category           | Last Updated      |
|-------------------------|--------------------|-------------------|
| <b>Tower Technician</b> | <b>Electrician</b> | <b>04/04/2025</b> |

**Classification Description:** Tower Technician

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$67.89       | \$98.24         | \$128.58    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.24 |
| 9th hour        | \$98.24 |
| 10th hour       | \$98.24 |
| Beyond 10 hours | \$98.24 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$128.58</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

ONLY due to inclement weather or customer requirements may Friday be used as a make up day if the normal scheduled work week was interrupted and time lost of five (5) hours or more was incurred by workmen covered under the terms of the 6-17-C/6-876-T agreement.



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                    | Last Updated      |
|--------------------------------------|-----------------------------|-------------------|
| <b>Elevator Constructor Mechanic</b> | <b>Elevator Constructor</b> | <b>04/04/2025</b> |

**Classification Description:** Elevator Constructor Mechanic

| Wage Rates                      | Straight Time | Time and a Half | Double Time |
|---------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage               | \$96.27       | \$124.00        | \$151.73    |
| Apprentice: 1st Year Apprentice | \$70.42       | \$85.67         | \$100.92    |
| Apprentice: 2nd Year Apprentice | \$75.97       | \$94.00         | \$112.02    |
| Apprentice: 3rd Year Apprentice | \$78.74       | \$98.15         | \$117.56    |
| Apprentice: 4th Year Apprentice | \$84.29       | \$106.48        | \$128.66    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$151.73 |
| 10th hour       | \$151.73 |
| Beyond 10 hours | \$151.73 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$151.73 |
| 9th hour        | \$151.73 |
| 10th hour       | \$151.73 |
| Beyond 10 hours | \$151.73 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$151.73</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category | Last Updated |
|---------------------|----------|--------------|
| Glazier             | Glazier  | 04/04/2025   |

**Classification Description:** Glazier

If 4 10 hour day workweek is scheduled, four 10s must be consecutive, M-F.

| Wage Rates               | Straight Time | Time and a Half | Double Time |
|--------------------------|---------------|-----------------|-------------|
| Total Hourly Wage        | \$53.55       | \$70.10         | \$86.65     |
| Apprentice: 1st 6 months | \$37.00       | \$45.27         | \$53.55     |
| Apprentice: 2nd 6 months | \$37.75       | \$46.40         | \$55.05     |
| Apprentice: 3rd 6 months | \$41.97       | \$52.73         | \$63.49     |
| Apprentice: 4th 6 months | \$43.62       | \$55.21         | \$66.79     |
| Apprentice: 5th 6 months | \$45.27       | \$57.68         | \$70.09     |
| Apprentice: 6th 6 months | \$46.93       | \$60.17         | \$73.41     |
| Apprentice: 7th 6 months | \$48.59       | \$62.66         | \$76.73     |
| Apprentice: 8th 6 months | \$51.89       | \$67.61         | \$83.33     |

### Overtime Provisions

**Over 8-hour day/40-hour week**

|                 |         |
|-----------------|---------|
| 9th hour        | \$70.10 |
| 10th hour       | \$70.10 |
| Beyond 10 hours | \$70.10 |

**Saturday**

|                 |         |
|-----------------|---------|
| First 8 hours   | \$70.10 |
| 9th hour        | \$70.10 |
| 10th hour       | \$70.10 |
| Beyond 10 hours | \$70.10 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$86.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                       | Category                 | Last Updated |
|-------------------------------------------|--------------------------|--------------|
| Heat & Frost Insulator - Spray Insulation | Heat and Frost Insulator | 04/04/2025   |

**Classification Description:** Spray Insulation

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$25.29       | \$36.51         | \$47.73     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$36.51 |
| 10th hour       | \$36.51 |
| Beyond 10 hours | \$36.51 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$36.51 |
| 9th hour        | \$36.51 |
| 10th hour       | \$36.51 |
| Beyond 10 hours | \$36.51 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$36.51</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name             | Category                 | Last Updated |
|---------------------------------|--------------------------|--------------|
| Heat & Frost Insulator Asbestos | Heat and Frost Insulator | 04/04/2025   |

**Classification Description:** Heat and Frost Insulators and Asbestos Workers 4-10s must be worked a minimum of 2 weeks consecutively, Monday thru Thursday. Hours worked in excess of 10 will be paid at double time. Hours worked on the fifth day, Monday thru Friday @ time and half

| Wage Rates           | Straight Time | Time and a Half | Double Time |
|----------------------|---------------|-----------------|-------------|
| Total Hourly Wage    | \$62.65       | \$78.41         | \$94.16     |
| Apprentice: 1st Year | \$46.90       | \$54.78         | \$62.66     |
| Apprentice: 2nd Year | \$50.05       | \$59.50         | \$68.96     |
| Apprentice: 3rd Year | \$53.20       | \$64.23         | \$75.26     |
| Apprentice: 4th Year | \$56.35       | \$68.96         | \$81.56     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$78.41 |
| 10th hour       | \$78.41 |
| Beyond 10 hours | \$78.41 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$78.41 |
| 9th hour        | \$78.41 |
| 10th hour       | \$78.41 |
| Beyond 10 hours | \$78.41 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$94.16</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                        | Category          | Last Updated      |
|--------------------------------------------|-------------------|-------------------|
| <b>Ironworker - Rigger Machinery Mover</b> | <b>Ironworker</b> | <b>04/04/2025</b> |

**Classification Description:** Rigging Work

| Wage Rates          | Straight Time | Time and a Half | Double Time |
|---------------------|---------------|-----------------|-------------|
| Total Hourly Wage   | \$78.78       | \$96.21         | \$113.63    |
| Apprentice: Level 1 | \$54.18       | \$65.03         | \$75.87     |
| Apprentice: Level 2 | \$54.18       | \$65.03         | \$75.87     |
| Apprentice: Level 3 | \$57.29       | \$69.02         | \$80.75     |
| Apprentice: Level 4 | \$60.00       | \$72.45         | \$84.89     |
| Apprentice: Level 5 | \$63.12       | \$76.45         | \$89.78     |
| Apprentice: Level 6 | \$65.82       | \$79.86         | \$93.90     |
| Apprentice: Level 7 | \$68.94       | \$83.87         | \$98.80     |
| Apprentice: Level 8 | \$72.05       | \$87.87         | \$103.69    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.21  |
| 10th hour       | \$96.21  |
| Beyond 10 hours | \$113.63 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.21  |
| 9th hour        | \$96.21  |
| 10th hour       | \$96.21  |
| Beyond 10 hours | \$113.63 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$113.63</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name   | Category   | Last Updated |
|-----------------------|------------|--------------|
| Reinforced Ironworker | Ironworker | 04/04/2025   |

**Classification Description:** Reinforced Iron Work

| Wage Rates          | Straight Time | Time and a Half | Double Time |
|---------------------|---------------|-----------------|-------------|
| Total Hourly Wage   | \$65.70       | \$82.42         | \$99.13     |
| Apprentice: Level 1 | \$54.67       | \$66.54         | \$78.41     |
| Apprentice: Level 2 | \$57.24       | \$69.61         | \$81.98     |
| Apprentice: Level 3 | \$59.13       | \$71.84         | \$84.54     |
| Apprentice: Level 4 | \$62.02       | \$75.56         | \$89.10     |
| Apprentice: Level 5 | \$64.92       | \$79.30         | \$93.67     |
| Apprentice: Level 6 | \$72.26       | \$88.98         | \$105.69    |
| Apprentice: Level 7 | \$72.26       | \$88.98         | \$105.69    |
| Apprentice: Level 8 | \$72.26       | \$88.98         | \$105.69    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$82.41 |
| 10th hour       | \$82.41 |
| Beyond 10 hours | \$99.13 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$82.41 |
| 9th hour        | \$82.41 |
| 10th hour       | \$82.41 |
| Beyond 10 hours | \$99.13 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$99.13 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - Yes

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name          | Category          | Last Updated      |
|------------------------------|-------------------|-------------------|
| <b>Structural Ironworker</b> | <b>Ironworker</b> | <b>04/04/2025</b> |

**Classification Description:** Structural, ornamental, welder and pre-cast

| Wage Rates          | Straight Time | Time and a Half | Double Time |
|---------------------|---------------|-----------------|-------------|
| Total Hourly Wage   | \$78.91       | \$105.80        | \$132.69    |
| Apprentice: Level 1 | \$54.18       | \$65.03         | \$75.87     |
| Apprentice: Level 2 | \$55.00       | \$66.20         | \$77.40     |
| Apprentice: Level 3 | \$57.29       | \$69.02         | \$80.75     |
| Apprentice: Level 4 | \$60.00       | \$72.45         | \$84.89     |
| Apprentice: Level 5 | \$63.12       | \$76.45         | \$89.78     |
| Apprentice: Level 6 | \$65.82       | \$79.86         | \$93.90     |
| Apprentice: Level 7 | \$68.94       | \$83.87         | \$98.80     |
| Apprentice: Level 8 | \$72.05       | \$87.87         | \$103.69    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.69  |
| 10th hour       | \$96.69  |
| Beyond 10 hours | \$114.46 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.69  |
| 9th hour        | \$96.69  |
| 10th hour       | \$96.69  |
| Beyond 10 hours | \$114.46 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$114.46</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Friday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name             | Category               | Last Updated      |
|---------------------------------|------------------------|-------------------|
| <b>Class A Laborer - Zone A</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Construction Laborer, Demolition Laborer, Mason Tender, Carpenter Tender, Drywall Handler, Concrete Laborer, Cement Finisher tender, concrete chute and concrete Bucket Handler, Concrete Laborer, Cement Finisher Tender

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$50.10       | \$64.48         | \$78.85     |
| Apprentice: 0-1,000 Hours     | \$42.91       | \$53.69         | \$64.47     |
| Apprentice: 1,001-2,000 Hours | \$44.35       | \$55.85         | \$67.35     |
| Apprentice: 2,001-3,000 Hours | \$45.79       | \$58.01         | \$70.23     |
| Apprentice: 3,001-4,000 Hours | \$48.66       | \$62.31         | \$75.97     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$64.48 |
| 10th hour       | \$64.48 |
| Beyond 10 hours | \$64.48 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$64.48 |
| 9th hour        | \$64.48 |
| 10th hour       | \$64.48 |
| Beyond 10 hours | \$64.48 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$78.85</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category               | Last Updated      |
|----------------------|------------------------|-------------------|
| <b>Laborer - A-E</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Cleaner/sweeper laborer, furniture laborer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$44.65       | \$56.30         | \$67.95     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$56.30 |
| 10th hour       | \$56.30 |
| Beyond 10 hours | \$56.30 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$56.30 |
| 9th hour        | \$56.30 |
| 10th hour       | \$56.30 |
| Beyond 10 hours | \$56.30 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$67.95</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category               | Last Updated      |
|----------------------|------------------------|-------------------|
| <b>Laborer - A-F</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Expediter man, topman and/or bottom man (blast furnace work or battery work)

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$51.51       | \$66.69         | \$81.87     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$66.59 |
| 10th hour       | \$66.59 |
| Beyond 10 hours | \$66.59 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$66.59 |
| 9th hour        | \$66.59 |
| 10th hour       | \$66.59 |
| Beyond 10 hours | \$66.59 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$81.67</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category               | Last Updated      |
|----------------------|------------------------|-------------------|
| <b>Laborer - A-W</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer -Wall and ceiling material handler, plasterer tender, mortar mixer and plastering machine operator

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$46.90       | \$59.78         | \$72.65     |
| Apprentice: 0-1,000 Hours     | \$40.46       | \$55.20         | \$69.93     |
| Apprentice: 1,001-2,000 Hours | \$41.75       | \$57.13         | \$72.50     |
| Apprentice: 2,001-3,000 Hours | \$43.04       | \$59.06         | \$75.08     |
| Apprentice: 3,001-4,000 Hours | \$45.61       | \$62.92         | \$80.23     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$59.78 |
| 10th hour       | \$59.78 |
| Beyond 10 hours | \$59.78 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$59.78 |
| 9th hour        | \$59.78 |
| 10th hour       | \$59.78 |
| Beyond 10 hours | \$59.78 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$72.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday make up day due to conditions beyond control or holiday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 2 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 2: Mixer operator, (less than 5 sacks), air or electric tool operator (jack hammer, etc.), spreader, boxman (asphalt, stone, gravel, etc.), concrete paddler, power chain saw operator, paving batch truck dumper, tunnel mucker (highway work only), concrete saw operator (under 40 hp), dry pack machine, and roto-mill grounds person.

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$48.07       | \$62.64         | \$77.21     |
| Apprentice: 0-1,000 hours     | \$41.43       | \$52.36         | \$63.29     |
| Apprentice: 1,001-2,000 hours | \$42.88       | \$54.54         | \$66.19     |
| Apprentice: 2,001-3,000 hours | \$44.34       | \$56.73         | \$69.11     |
| Apprentice: 3,001-4,000 hours | \$47.25       | \$61.09         | \$74.93     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$62.64 |
| 10th hour       | \$62.64 |
| Beyond 10 hours | \$62.64 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$62.64 |
| 9th hour        | \$62.64 |
| 10th hour       | \$62.64 |
| Beyond 10 hours | \$62.64 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$77.21</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 3 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 3: Tunnel miner (highway work only), finishers tenders, guard rail builder, highway and median barrier installer, Earth Retention Barrier and wall and M.S.E. wall installer (including sound, retaining and crash barriers), fence erector, bottom man, powder man, wagon drill, and air track operator, curb and side rail setter's tender, diamond and core drills (per agreement between the Laborers and Operating Engineers International Union dated February 3, 1954), grade checker and certified welder.

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$48.25       | \$62.91         | \$77.57     |
| Apprentice: 0-1,000 hours     | \$41.56       | \$52.55         | \$63.55     |
| Apprentice: 1,001-2,000 hours | \$43.03       | \$54.76         | \$66.49     |
| Apprentice: 2,001-3,000 hours | \$44.49       | \$56.95         | \$69.41     |
| Apprentice: 3,001-4,000 hours | \$47.42       | \$61.35         | \$75.27     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$62.91 |
| 10th hour       | \$62.91 |
| Beyond 10 hours | \$62.91 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$62.91 |
| 9th hour        | \$62.91 |
| 10th hour       | \$62.91 |
| Beyond 10 hours | \$62.91 |

#### Sunday/Holiday

\$77.57

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 4 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 4: asphalt raker

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$48.33       | \$62.53         | \$77.23     |
| Apprentice: 0-1,000 hours     | \$41.62       | \$52.15         | \$63.17     |
| Apprentice: 1,001-2,000 hours | \$43.09       | \$54.35         | \$66.11     |
| Apprentice: 2,001-3,000 hours | \$44.56       | \$56.55         | \$69.05     |
| Apprentice: 3,001-4,000 hours | \$47.50       | \$60.97         | \$74.93     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$63.03 |
| 10th hour       | \$63.03 |
| Beyond 10 hours | \$63.03 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$63.03 |
| 9th hour        | \$63.03 |
| 10th hour       | \$63.03 |
| Beyond 10 hours | \$63.03 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$77.73</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 5 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 5: pipe layers, oxy-gun

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$48.54       | \$63.35         | \$78.15     |
| Apprentice: 0-1,000 hours     | \$41.78       | \$52.89         | \$63.99     |
| Apprentice: 1,001-2,000 hours | \$43.26       | \$55.11         | \$66.95     |
| Apprentice: 2,001-3,000 hours | \$44.74       | \$57.33         | \$69.91     |
| Apprentice: 3,001-4,000 hours | \$47.70       | \$61.77         | \$75.83     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$63.34 |
| 10th hour       | \$63.34 |
| Beyond 10 hours | \$63.34 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$63.34 |
| 9th hour        | \$63.34 |
| 10th hour       | \$63.34 |
| Beyond 10 hours | \$63.34 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$78.15</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 6 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 6: line form setter for curb or pavement, asphalt screed checker/screw man on asphalt paving machines

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$48.84       | \$63.80         | \$78.75     |
| Apprentice: 0-1,000 hours     | \$42.00       | \$53.22         | \$64.43     |
| Apprentice: 1,001-2,000 hours | \$43.50       | \$55.47         | \$67.43     |
| Apprentice: 2,001-3,000 hours | \$44.99       | \$57.70         | \$70.41     |
| Apprentice: 3,001-4,000 hours | \$47.98       | \$62.19         | \$76.39     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$63.80 |
| 10th hour       | \$63.80 |
| Beyond 10 hours | \$63.80 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$63.80 |
| 9th hour        | \$63.80 |
| 10th hour       | \$63.80 |
| Beyond 10 hours | \$63.80 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$78.75</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category               | Last Updated      |
|--------------------------------|------------------------|-------------------|
| <b>Laborer - Class 7 - RZ1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 7: Concrete Specialist - The Classification of Concrete Specialist shall include the finishing and troweling, of cast in place or precast concrete by any and all methods. Laborers who have the necessary skills to be classified as a Concrete Specialist and perform the work shall be paid the following wage and fringe benefit scale.

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$49.91       | \$65.40         | \$80.89     |
| Apprentice: 0-1,000 hours     | \$42.80       | \$54.42         | \$66.03     |
| Apprentice: 1,001-2,000 hours | \$44.35       | \$56.74         | \$69.13     |
| Apprentice: 2,001-3,000 hours | \$45.90       | \$59.06         | \$72.23     |
| Apprentice: 3,001-4,000 hours | \$47.78       | \$64.72         | \$81.66     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$65.40 |
| 10th hour       | \$65.40 |
| Beyond 10 hours | \$65.40 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$65.40 |
| 9th hour        | \$65.40 |
| 10th hour       | \$65.40 |
| Beyond 10 hours | \$65.40 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$80.89</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                      | Category               | Last Updated      |
|--------------------------------------------------------------------------|------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class II - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Class II - Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.28       | \$51.82         | \$62.36     |
| Apprentice: 0-1,000 work hours     | \$35.58       | \$44.85         | \$54.11     |
| Apprentice: 1,001-2,000 work hours | \$36.62       | \$46.41         | \$56.19     |
| Apprentice: 2,001-3,000 work hours | \$37.66       | \$47.97         | \$58.27     |
| Apprentice: 3,001-4,000 work hours | \$39.74       | \$51.09         | \$62.43     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$51.82 |
| 10th hour       | \$51.82 |
| Beyond 10 hours | \$51.82 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$51.82 |
| 9th hour        | \$51.82 |
| 10th hour       | \$51.82 |
| Beyond 10 hours | \$51.82 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$62.36</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                      | Category               | Last Updated      |
|--------------------------------------------------------------------------|------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class IV - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.52       | \$52.18         | \$62.84     |
| Apprentice: 0-1,000 work hours     | \$35.76       | \$45.12         | \$54.47     |
| Apprentice: 1,001-2,000 work hours | \$36.82       | \$46.71         | \$56.59     |
| Apprentice: 2,001-3,000 work hours | \$37.87       | \$48.28         | \$58.69     |
| Apprentice: 3,001-4,000 work hours | \$39.97       | \$51.44         | \$62.89     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$52.18 |
| 10th hour       | \$52.18 |
| Beyond 10 hours | \$52.18 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$52.18 |
| 9th hour        | \$52.18 |
| 10th hour       | \$52.18 |
| Beyond 10 hours | \$52.18 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$62.84</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category               | Last Updated      |
|-----------------------------------------------------|------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class I - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Construction Laborer

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$36.91       | \$47.01         | \$57.10     |
| Apprentice: 0-1,000 work hours     | \$35.39       | \$44.56         | \$53.73     |
| Apprentice: 1,001-2,000 work hours | \$36.42       | \$46.11         | \$55.79     |
| Apprentice: 2,001-3,000 work hours | \$37.44       | \$47.64         | \$57.83     |
| Apprentice: 3,001-4,000 work hours | \$39.49       | \$50.72         | \$61.93     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$47.01 |
| 10th hour       | \$47.01 |
| Beyond 10 hours | \$47.01 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$47.01 |
| 9th hour        | \$47.01 |
| 10th hour       | \$47.01 |
| Beyond 10 hours | \$47.01 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$57.10</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                  | Category               | Last Updated      |
|------------------------------------------------------|------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class II - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.

| Wage Rates                         | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|------------------------------------|---------------|-----------------|-------------|-------------------------------------|
|                                    |               |                 |             | <b>Over 8-hour day/40-hour week</b> |
| Total Hourly Wage                  | \$37.05       | \$47.22         | \$57.38     | 9th hour \$47.22                    |
| Apprentice: 0-1,000 work hours     | \$35.47       | \$44.68         | \$53.89     | 10th hour \$47.22                   |
| Apprentice: 1,001-2,000 work hours | \$36.50       | \$46.23         | \$55.95     | Beyond 10 hours \$47.22             |
| Apprentice: 2,001-3,000 work hours | \$37.54       | \$47.79         | \$58.03     |                                     |
| Apprentice: 3,001-4,000 work hours | \$39.60       | \$50.88         | \$62.15     | <b>Saturday</b>                     |
|                                    |               |                 |             | First 8 hours \$47.22               |
|                                    |               |                 |             | 9th hour \$47.22                    |
|                                    |               |                 |             | 10th hour \$47.22                   |
|                                    |               |                 |             | Beyond 10 hours \$47.22             |
|                                    |               |                 |             | <b>Sunday/Holiday</b> \$57.38       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                  | Category               | Last Updated      |
|------------------------------------------------------|------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class IV - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Trench or excavating grade man.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$40.76       | \$52.62         | \$64.47     |
| Apprentice: 0-1,000 work hours     | \$35.57       | \$44.84         | \$54.09     |
| Apprentice: 1,001-2,000 work hours | \$36.61       | \$46.40         | \$56.17     |
| Apprentice: 2,001-3,000 work hours | \$37.65       | \$47.96         | \$58.25     |
| Apprentice: 3,001-4,000 work hours | \$39.72       | \$51.06         | \$62.39     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$51.14 |
| 10th hour       | \$51.14 |
| Beyond 10 hours | \$51.14 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$51.14 |
| 9th hour        | \$51.14 |
| 10th hour       | \$51.14 |
| Beyond 10 hours | \$51.14 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$61.52</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                  | Category               | Last Updated      |
|------------------------------------------------------|------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class VI - Z1</b> | <b>Laborer, Common</b> | <b>04/04/2025</b> |

**Classification Description:** Grouting man, top man assistant, audio visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work and the installation and repair of water service pipe and appurtenan

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$38.27       | \$48.88         | \$59.49     |
| Apprentice: 0-1,000 work hours     | \$33.70       | \$42.03         | \$50.35     |
| Apprentice: 1,001-2,000 work hours | \$34.62       | \$43.41         | \$52.19     |
| Apprentice: 2,001-3,000 work hours | \$35.53       | \$44.78         | \$54.01     |
| Apprentice: 3,001-4,000 work hours | \$37.36       | \$47.52         | \$57.67     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$47.41 |
| 10th hour       | \$47.41 |
| Beyond 10 hours | \$47.41 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$47.41 |
| 9th hour        | \$47.41 |
| 10th hour       | \$47.41 |
| Beyond 10 hours | \$47.41 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$56.54</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category        | Last Updated |
|----------------------------|-----------------|--------------|
| Pipe and Manhole Rehab - 1 | Laborer, Common | 04/04/2025   |

**Classification Description:** General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$28.20       | \$38.20         | \$48.19     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$38.20 |
| 10th hour       | \$38.20 |
| Beyond 10 hours | \$38.20 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$38.20 |
| 9th hour        | \$38.20 |
| 10th hour       | \$38.20 |
| Beyond 10 hours | \$38.20 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$38.20</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                       | Category                  | Last Updated      |
|-------------------------------------------|---------------------------|-------------------|
| <b>Laborer - Hazardous - Class A - Z1</b> | <b>Laborer, Hazardous</b> | <b>04/04/2025</b> |

**Classification Description:** Class A performing work in conjunction with site preparation and other preliminary work prior to actual removal, handling, or containment of hazardous waste substances not requiring use of personal protective equipment required by state or federal regulat

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$46.90       | \$64.85         | \$82.80     |
| Apprentice: 0-1,000 work hours     | \$40.46       | \$55.19         | \$69.92     |
| Apprentice: 1,001-2,000 work hours | \$41.75       | \$57.13         | \$72.50     |
| Apprentice: 2,001-3,000 work hours | \$43.04       | \$59.07         | \$75.08     |
| Apprentice: 3,001-4,000 work hours | \$45.61       | \$62.92         | \$80.22     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$59.78 |
| 10th hour       | \$59.78 |
| Beyond 10 hours | \$59.78 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$59.78 |
| 9th hour        | \$59.78 |
| 10th hour       | \$59.78 |
| Beyond 10 hours | \$59.78 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$72.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th or T-F; inclement weather makeup day Friday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                       | Category                  | Last Updated      |
|-------------------------------------------|---------------------------|-------------------|
| <b>Laborer - Hazardous - Class B - Z1</b> | <b>Laborer, Hazardous</b> | <b>04/04/2025</b> |

**Classification Description:** Class B performing work in conjunction with the removal, handling, or containment of hazardous waste substances when the use of personal protective equipment levels "A", "B" or "C" is required.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$47.90       | \$66.35         | \$84.80     |
| Apprentice: 0-1,000 work hours     | \$41.21       | \$56.32         | \$71.42     |
| Apprentice: 1,001-2,000 work hours | \$42.55       | \$58.33         | \$74.10     |
| Apprentice: 2,001-3,000 work hours | \$43.89       | \$60.34         | \$76.78     |
| Apprentice: 3,001-4,000 work hours | \$46.56       | \$64.35         | \$82.12     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$61.28 |
| 10th hour       | \$61.28 |
| Beyond 10 hours | \$61.28 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$61.28 |
| 9th hour        | \$61.28 |
| 10th hour       | \$61.28 |
| Beyond 10 hours | \$61.28 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$74.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th or T-F; inclement weather makeup day Friday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                    | Last Updated      |
|---------------------|-----------------------------|-------------------|
| <b>Class A</b>      | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Irrigation Foremen and Construction Foremen. Skilled Landscape Operator includes air, gas and diesel equipment operators, lawn sprinkler installers, skid steer/track loaders, mini excavators, off-road dump vehicle, articulated haulers, hydroseeder, backhoe loaders, wheel loaders, excavators, ride and walk-behind trenchers and telescope handlers.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$37.22       | \$50.00         | \$62.78     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$37.22 |
| 10th hour       | \$37.22 |
| Beyond 10 hours | \$37.22 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$37.22 |
| 9th hour        | \$37.22 |
| 10th hour       | \$37.22 |
| Beyond 10 hours | \$37.22 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$37.22</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                    | Last Updated      |
|---------------------|-----------------------------|-------------------|
| <b>Class B</b>      | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Skilled Landscape Laborer includes small power tool operator, lawn sprinkler installers' tender, irrigation installers' tender and material mover.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$35.00       | \$48.17         | \$61.34     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$35.00 |
| 10th hour       | \$35.00 |
| Beyond 10 hours | \$35.00 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$35.00 |
| 9th hour        | \$35.00 |
| 10th hour       | \$35.00 |
| Beyond 10 hours | \$35.00 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$35.00</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                    | Last Updated      |
|---------------------|-----------------------------|-------------------|
| <b>Class D</b>      | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Inexperienced Landscape Laborer is defined as an individual who has not worked ninety (90) calendar days under the terms and conditions of this or a similar collective bargaining agreement. An Inexperienced Laborer may be employed by the Contractor Foreman. The ratio may be utilized by the Contractor on a company-wide basis or a project basis. The ratio may be modified by mutual agreement of the Local Union having jurisdiction and the Contractor. The Local Union having jurisdiction on the project shall have first opportunity to refer new employees. See Article 3, Section 3.6.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$21.74       | \$32.61         | \$43.48     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$21.74 |
| 10th hour       | \$21.74 |
| Beyond 10 hours | \$21.74 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$21.74 |
| 9th hour        | \$21.74 |
| 10th hour       | \$21.74 |
| Beyond 10 hours | \$21.74 |

#### Sunday/Holiday

\$21.74

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                        | Category                    | Last Updated      |
|--------------------------------------------|-----------------------------|-------------------|
| <b>Laborer - Landscape - Class B1 - Z1</b> | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Class B1: Landscape Operator includes air, gas, and diesel equipment operator, lawn sprinkler installer, skidsteer, mini excavators, backhoe loaders, ride and walk behind trenchers, off road dump vehicle, articulated haulers, hydroseeder, wheel loaders

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$32.40       | \$42.43         | \$52.95     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$42.93 |
| 10th hour       | \$42.93 |
| Beyond 10 hours | \$42.93 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$42.93 |
| 9th hour        | \$42.93 |
| 10th hour       | \$42.93 |
| Beyond 10 hours | \$42.93 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$53.45</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                        | Category                    | Last Updated      |
|--------------------------------------------|-----------------------------|-------------------|
| <b>Laborer - Landscape - Class B1 - Z1</b> | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Class B1: Landscape Operator includes air, gas, and diesel equipment operator, lawn sprinkler installer, skidsteer, mini excavators, backhoe loaders, ride and walk behind trenchers, off road dump vehicle, articulated haulers, hydroseeder, wheel loaders

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$34.62       | \$46.26         | \$57.89     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$11.35 |
| 10th hour       | \$46.26 |
| Beyond 10 hours | \$46.26 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$46.26 |
| 9th hour        | \$46.26 |
| 10th hour       | \$46.26 |
| Beyond 10 hours | \$46.26 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$57.89</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                        | Category                    | Last Updated      |
|--------------------------------------------|-----------------------------|-------------------|
| <b>Laborer - Landscape - Class B2 - Z1</b> | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Class B2: Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, irrigation installers' tender, material mover

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$30.40       | \$39.93         | \$49.45     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$39.93 |
| 10th hour       | \$39.93 |
| Beyond 10 hours | \$39.93 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$39.93 |
| 9th hour        | \$39.93 |
| 10th hour       | \$39.93 |
| Beyond 10 hours | \$39.93 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$49.45</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                       | Category                    | Last Updated      |
|---------------------------------------------------------------------------|-----------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class VII - Z1</b> | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Class VII - Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes and flagstones.

| Wage Rates                         | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|------------------------------------|---------------|-----------------|-------------|-------------------------------------|
|                                    |               |                 |             | <b>Over 8-hour day/40-hour week</b> |
| Total Hourly Wage                  | \$35.58       | \$43.17         | \$50.76     | 9th hour \$43.17                    |
| Apprentice: 0-1,000 work hours     | \$31.39       | \$38.56         | \$45.73     | 10th hour \$43.17                   |
| Apprentice: 1,001-2,000 work hours | \$32.15       | \$39.70         | \$47.25     | Beyond 10 hours \$43.17             |
| Apprentice: 2,001-3,000 work hours | \$32.91       | \$40.84         | \$48.77     |                                     |
| Apprentice: 3,001-4,000 work hours | \$34.43       | \$43.12         | \$51.81     | <b>Saturday</b>                     |
|                                    |               |                 |             | First 8 hours \$43.17               |
|                                    |               |                 |             | 9th hour \$43.17                    |
|                                    |               |                 |             | 10th hour \$43.17                   |
|                                    |               |                 |             | Beyond 10 hours \$43.17             |
|                                    |               |                 |             | <b>Sunday/Holiday</b> \$50.76       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                   | Category                    | Last Updated      |
|-------------------------------------------------------|-----------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class VII - Z1</b> | <b>Laborer, Landscaping</b> | <b>04/04/2025</b> |

**Classification Description:** Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes, flagstones etc.

| Wage Rates                         | Straight Time | Time and a Half | Double Time | Overtime Provisions           |
|------------------------------------|---------------|-----------------|-------------|-------------------------------|
|                                    |               |                 |             | Over 8-hour day/40-hour week  |
| Total Hourly Wage                  | \$34.89       | \$43.81         | \$52.73     | 9th hour \$42.34              |
| Apprentice: 0-1,000 work hours     | \$31.17       | \$38.24         | \$45.29     | 10th hour \$42.34             |
| Apprentice: 1,001-2,000 work hours | \$31.91       | \$39.34         | \$46.77     | Beyond 10 hours \$42.34       |
| Apprentice: 2,001-3,000 work hours | \$32.66       | \$40.47         | \$48.27     | <b>Saturday</b>               |
| Apprentice: 3,001-4,000 work hours | \$34.15       | \$42.70         | \$51.25     | First 8 hours \$42.34         |
|                                    |               |                 |             | 9th hour \$42.34              |
|                                    |               |                 |             | 10th hour \$42.34             |
|                                    |               |                 |             | Beyond 10 hours \$42.34       |
|                                    |               |                 |             | <b>Sunday/Holiday</b> \$49.78 |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category                | Last Updated      |
|----------------------|-------------------------|-------------------|
| <b>Laborer - A-B</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Signal man (on sewer & caisson work); air,electric or gasoline tool operator (including concrete vibrator operator,acetylene torch & air hammer operator); scaffold builder, caisson worker

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$50.40       | \$64.93         | \$79.45     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$64.93 |
| 10th hour       | \$64.93 |
| Beyond 10 hours | \$64.93 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$64.93 |
| 9th hour        | \$64.93 |
| 10th hour       | \$64.93 |
| Beyond 10 hours | \$64.93 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$79.45</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category                | Last Updated      |
|----------------------|-------------------------|-------------------|
| <b>Laborer - A-C</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Lansing Burner, Blaster & Powder Man; Air, electric Gasoline Tool Operator (Blast furnace work or battery work)

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$50.96       | \$65.77         | \$80.57     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$65.77 |
| 10th hour       | \$65.77 |
| Beyond 10 hours | \$65.77 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$65.77 |
| 9th hour        | \$65.77 |
| 10th hour       | \$65.77 |
| Beyond 10 hours | \$65.77 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$80.57</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday,

If conditions beyond the employer/employee's control prevent one or more hours of working during Mon-Fri, the employer may choose to work up to 10 hour straight time weekdays.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name  | Category                | Last Updated      |
|----------------------|-------------------------|-------------------|
| <b>Laborer - A-D</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Furnance battery heater tender, burning bar & oxy-acetylene gun

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-------------------|---------------|-----------------|-------------|-------------------------------------|
|                   |               |                 |             | <b>Over 8-hour day/40-hour week</b> |
| Total Hourly Wage |               |                 |             |                                     |
| \$50.67           |               |                 |             | 9th hour \$65.33                    |
| \$65.33           |               |                 |             | 10th hour \$65.33                   |
| \$79.99           |               |                 |             | Beyond 10 hours \$65.33             |
|                   |               |                 |             | <b>Saturday</b>                     |
|                   |               |                 |             | First 8 hours \$65.33               |
|                   |               |                 |             | 9th hour \$65.33                    |
|                   |               |                 |             | 10th hour \$65.33                   |
|                   |               |                 |             | Beyond 10 hours \$65.33             |
|                   |               |                 |             | <b>Sunday/Holiday</b> \$79.99       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Saturday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category                | Last Updated      |
|--------------------------------|-------------------------|-------------------|
| <b>Laborer - Class 1 - RZ1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Laborer Road Class 1: Asphalt Shoveler or loader, asphalt plant misc., asphalt raker tender, burlap man, carpenters' tender, yard man, guard rail builder's tender, Earth Retention barrier and wall and M.S.E. Wall installers Tender, Highway and median barrier installers tender (including sound, retaining and crash barriers), fence erector's tender, dumper (wagon, Truck, etc.), joint filling labor, misc., unskilled labor, sprinkler labor, form setting labor, form stripper, pavement reinforcing, handling and placing (e.g., wire mesh, steel mats, dowel bars, etc.), mason's or bricklayer's tender on manholes, manhole builder, headwalls, etc., waterproofing, (other than buildings) seal coating and slurry mix, shoring, underpinning, bridge painting, etc., (spray, roller and brush), sandblasting, pressure grouting, bridge pin and hanger removal, Material Recycling Laborer, Horizontal Paver Laborer (brick, concrete, clay, stone and asphalt), Ground Stabilization and Modification Laborer, grouting, waterblasting, Top Man, and railroad track and trestle laborer, sign installer and remote control operated equipment.

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$47.82       | \$62.33         | \$76.83     |
| Apprentice: 0-1,000 hours     | \$41.33       | \$52.21         | \$63.09     |
| Apprentice: 1,001-2,000 hours | \$42.78       | \$54.39         | \$65.99     |
| Apprentice: 2,001-3,000       | \$44.23       | \$56.56         | \$68.89     |
| Apprentice: 3,001-4,000 hours | \$47.13       | \$60.91         | \$74.69     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$62.33 |
| 10th hour       | \$62.33 |
| Beyond 10 hours | \$62.33 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$62.33 |
| 9th hour        | \$62.33 |
| 10th hour       | \$62.33 |
| Beyond 10 hours | \$62.33 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$76.83</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                     | Category                | Last Updated      |
|-------------------------------------------------------------------------|-------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class I - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Class I - Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.17       | \$51.66         | \$62.14     |
| Apprentice: 0-1,000 work hours     | \$34.45       | \$43.16         | \$51.85     |
| Apprentice: 1,001-2,000 work hours | \$36.54       | \$46.29         | \$56.03     |
| Apprentice: 2,001-3,000 work hours | \$37.57       | \$47.84         | \$58.09     |
| Apprentice: 3,001-4,000 work hours | \$39.64       | \$50.94         | \$62.23     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$51.66 |
| 10th hour       | \$51.66 |
| Beyond 10 hours | \$51.66 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$51.66 |
| 9th hour        | \$51.66 |
| 10th hour       | \$51.66 |
| Beyond 10 hours | \$51.66 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$62.14</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                       | Category                | Last Updated      |
|---------------------------------------------------------------------------|-------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class III - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Class III - Air tool operator (jack hammer man, bush hammer man and grinding man), first bottom man, second bottom man, cage tender, car pusher, carrier man, concrete man, concrete form man, concrete repair man, cement invert laborer, cement finisher, con

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.34       | \$51.91         | \$62.48     |
| Apprentice: 0-1,000 work hours     | \$35.63       | \$44.92         | \$54.21     |
| Apprentice: 1,001-2,000 work hours | \$36.67       | \$46.48         | \$56.29     |
| Apprentice: 2,001-3,000 work hours | \$37.71       | \$48.04         | \$58.37     |
| Apprentice: 3,001-4,000 work hours | \$39.80       | \$51.18         | \$62.55     |

### Overtime Provisions

#### Over 8-hour day/40-hour

##### week

|                 |         |
|-----------------|---------|
| 9th hour        | \$51.91 |
| 10th hour       | \$51.91 |
| Beyond 10 hours | \$51.91 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$51.91 |
| 9th hour        | \$51.91 |
| 10th hour       | \$51.91 |
| Beyond 10 hours | \$51.91 |

#### Sunday/Holiday

\$62.48

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                     | Category                | Last Updated      |
|-------------------------------------------------------------------------|-------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class V - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Class V - Tunnel, shaft and caisson miner, drill runner, keyboard operator, power knife operator, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars)

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.77       | \$52.56         | \$63.34     |
| Apprentice: 0-1,000 work hours     | \$35.95       | \$45.40         | \$54.85     |
| Apprentice: 1,001-2,000 work hours | \$37.02       | \$47.01         | \$56.99     |
| Apprentice: 2,001-3,000 work hours | \$38.08       | \$48.60         | \$59.11     |
| Apprentice: 3,001-4,000 work hours | \$40.21       | \$51.80         | \$63.37     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$52.56 |
| 10th hour       | \$52.56 |
| Beyond 10 hours | \$52.56 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$52.56 |
| 9th hour        | \$52.56 |
| 10th hour       | \$52.56 |
| Beyond 10 hours | \$52.56 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$63.34</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                      | Category                | Last Updated      |
|--------------------------------------------------------------------------|-------------------------|-------------------|
| <b>Laborer Underground - Tunnel, Shaft &amp; Caisson - Class VI - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Class VI - Dynamite man and powder man.

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$41.90       | \$54.33         | \$66.75     |
| Apprentice: 0-1,000 work hours     | \$36.20       | \$45.78         | \$55.35     |
| Apprentice: 1,001-2,000 work hours | \$37.28       | \$47.40         | \$57.51     |
| Apprentice: 2,001-3,000 work hours | \$38.36       | \$49.02         | \$59.67     |
| Apprentice: 3,001-4,000 work hours | \$40.52       | \$52.26         | \$63.99     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$52.85 |
| 10th hour       | \$52.85 |
| Beyond 10 hours | \$52.85 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$52.85 |
| 9th hour        | \$52.85 |
| 10th hour       | \$52.85 |
| Beyond 10 hours | \$52.85 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$63.80</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                   | Category                | Last Updated      |
|-------------------------------------------------------|-------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class III - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodder, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars, etc.), cement finisher, welder, pipe jacking and boring man, wagon

| Wage Rates                         | Straight Time | Time and a Half | Double Time |
|------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                  | \$40.68       | \$52.50         | \$64.31     |
| Apprentice: 0-1,000 work hours     | \$35.51       | \$44.74         | \$53.97     |
| Apprentice: 1,001-2,000 work hours | \$36.54       | \$46.29         | \$56.03     |
| Apprentice: 2,001-3,000 work hours | \$37.58       | \$47.85         | \$58.11     |
| Apprentice: 3,001-4,000 work hours | \$39.65       | \$50.96         | \$62.25     |

### Overtime Provisions

#### Over 8-hour day/40-hour

##### week

|                 |         |
|-----------------|---------|
| 9th hour        | \$51.02 |
| 10th hour       | \$51.02 |
| Beyond 10 hours | \$51.02 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$51.02 |
| 9th hour        | \$51.02 |
| 10th hour       | \$51.02 |
| Beyond 10 hours | \$51.02 |

#### Sunday/Holiday

\$61.36

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                | Last Updated      |
|-----------------------------------------------------|-------------------------|-------------------|
| <b>Laborer -Underground Open Cut - Class V - Z1</b> | <b>Laborer, Skilled</b> | <b>04/04/2025</b> |

**Classification Description:** Pipe Layer (including crock, metal pipe, mulitplate or other conduits)

| Wage Rates                         | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|------------------------------------|---------------|-----------------|-------------|-------------------------------------|
|                                    |               |                 |             | <b>Over 8-hour day/40-hour week</b> |
| Total Hourly Wage                  | \$40.82       | \$52.71         | \$64.59     | 9th hour \$51.23                    |
| Apprentice: 0-1,000 work hours     | \$35.62       | \$44.91         | \$54.19     | 10th hour \$51.23                   |
| Apprentice: 1,001-2,000 work hours | \$36.66       | \$46.47         | \$56.27     | Beyond 10 hours \$51.23             |
| Apprentice: 2,001-3,000 work hours | \$37.70       | \$48.03         | \$58.35     | <b>Saturday</b>                     |
| Apprentice: 3,001-4,000 work hours | \$39.78       | \$51.15         | \$62.51     | First 8 hours \$51.23               |
|                                    |               |                 |             | 9th hour \$51.23                    |
|                                    |               |                 |             | 10th hour \$51.23                   |
|                                    |               |                 |             | Beyond 10 hours \$51.23             |
|                                    |               |                 |             | <b>Sunday/Holiday</b> \$61.64       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category         | Last Updated |
|----------------------------|------------------|--------------|
| Pipe and Manhole Rehab - 4 | Laborer, Skilled | 04/04/2025   |

**Classification Description:** Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$33.20       | \$45.70         | \$58.19     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$45.70 |
| 10th hour       | \$45.70 |
| Beyond 10 hours | \$45.70 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$45.70 |
| 9th hour        | \$45.70 |
| 10th hour       | \$45.70 |
| Beyond 10 hours | \$45.70 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$45.70 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category         | Last Updated |
|----------------------------|------------------|--------------|
| Pipe and Manhole Rehab - 5 | Laborer, Skilled | 04/04/2025   |

**Classification Description:** Combo Unit driver & Jetter-Vac Operator

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$33.20       | \$45.70         | \$58.19     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$45.70 |
| 10th hour       | \$45.70 |
| Beyond 10 hours | \$45.70 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$45.70 |
| 9th hour        | \$45.70 |
| 10th hour       | \$45.70 |
| Beyond 10 hours | \$45.70 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$45.70 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category         | Last Updated |
|----------------------------|------------------|--------------|
| Pipe and Manhole Rehab - 6 | Laborer, Skilled | 04/04/2025   |

**Classification Description:** Pipe Bursting & Slip-lining Equipment Operator

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$34.20       | \$47.20         | \$60.19     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$47.20 |
| 10th hour       | \$47.20 |
| Beyond 10 hours | \$47.20 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$47.20 |
| 9th hour        | \$47.20 |
| 10th hour       | \$47.20 |
| Beyond 10 hours | \$47.20 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$47.20 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                  | Last Updated      |
|---------------------|---------------------------|-------------------|
| <b>Class II (A)</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Class II (A) - Crane/backhoe operator, material handler, all self-propelled drill rigs, mechanic/welder, hydraulic dredge, diver tender

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$81.32       | \$105.57        | \$129.82    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$32.82  |
| 10th hour       | \$105.57 |
| Beyond 10 hours | \$105.57 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$105.57 |
| 9th hour        | \$105.57 |
| 10th hour       | \$105.57 |
| Beyond 10 hours | \$105.57 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$129.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                  | Last Updated      |
|---------------------|---------------------------|-------------------|
| <b>Class II (B)</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Class II (B) - friction, lattice boom, tug or tug boat operator

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$84.32       | \$110.07        | \$135.82    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$110.07 |
| 10th hour       | \$110.07 |
| Beyond 10 hours | \$110.07 |

##### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$110.07 |
| 9th hour        | \$110.07 |
| 10th hour       | \$110.07 |
| Beyond 10 hours | \$110.07 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$135.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                  | Last Updated      |
|---------------------|---------------------------|-------------------|
| <b>Class III</b>    | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Class III - Deck equip. operator, maintenance of crane or excavator, tug/launch operator, loader/dozer on barge/deck machinery, truck-able tug, lead surveyor, ROV operator, AB deckhand, welder

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$76.82       | \$98.82         | \$120.82    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.82 |
| 10th hour       | \$98.82 |
| Beyond 10 hours | \$98.82 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.82 |
| 9th hour        | \$98.82 |
| 10th hour       | \$98.82 |
| Beyond 10 hours | \$98.82 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$120.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                  | Last Updated      |
|---------------------|---------------------------|-------------------|
| <b>Class IV</b>     | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Class IV - Deck equipment operator, machineryman/fireman, off road trucks, deck hand, tug engineer, assistant tug operator, blaster helper, deck hand, jet machine, subsea plow, trencher, tug engineer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$72.32       | \$92.07         | \$111.82    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$32.82 |
| 10th hour       | \$92.07 |
| Beyond 10 hours | \$92.07 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$92.07 |
| 9th hour        | \$92.07 |
| 10th hour       | \$92.07 |
| Beyond 10 hours | \$92.07 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$111.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                  | Last Updated      |
|-----------------------------------------------------|---------------------------|-------------------|
| <b>Extended Boom Forklift Operator - Over 5,000</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift/forktruck over 5,000lb capacity, 1 drum hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$41.43       | \$54.43         | \$67.42     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$54.43 |
| 10th hour       | \$54.43 |
| Beyond 10 hours | \$67.42 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$54.43 |
| 9th hour        | \$54.43 |
| 10th hour       | \$54.43 |
| Beyond 10 hours | \$67.42 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$67.42</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                  | Last Updated      |
|-----------------------------------------------------|---------------------------|-------------------|
| <b>Extended Boom Forklift Operator - Over 5,000</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift/forktruck over 5,000lb capacity, 1 drum hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-------------------|---------------|-----------------|-------------|-------------------------------------|
|                   |               |                 |             | <b>Over 8-hour day/40-hour week</b> |
| Total Hourly Wage | \$58.82       | \$73.32         | \$87.81     |                                     |
|                   |               |                 |             | 9th hour \$73.32                    |
|                   |               |                 |             | 10th hour \$73.32                   |
|                   |               |                 |             | Beyond 10 hours \$87.81             |
|                   |               |                 |             | <b>Saturday</b>                     |
|                   |               |                 |             | First 8 hours \$73.32               |
|                   |               |                 |             | 9th hour \$73.32                    |
|                   |               |                 |             | 10th hour \$73.32                   |
|                   |               |                 |             | Beyond 10 hours \$87.81             |
|                   |               |                 |             | <b>Sunday/Holiday</b> \$87.81       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                  | Last Updated      |
|-----------------------------------------------------|---------------------------|-------------------|
| <b>Extended Boom Forklift Operator - Over 5,000</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift/forktruck over 5,000lb capacity, 1 drum hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$64.70       | \$81.75         | \$98.80     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$81.75 |
| 10th hour       | \$81.75 |
| Beyond 10 hours | \$98.80 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$81.75 |
| 9th hour        | \$81.75 |
| 10th hour       | \$81.75 |
| Beyond 10 hours | \$98.80 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$98.80</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                  | Last Updated      |
|-----------------------------------------------------|---------------------------|-------------------|
| <b>Extended Boom Forklift Operator - Over 5,000</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift/forktruck over 5,000lb capacity, 1 drum hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-------------------|---------------|-----------------|-------------|-------------------------------------|
| Total Hourly Wage | \$69.61       | \$88.88         | \$108.15    | <b>Over 8-hour day/40-hour week</b> |
|                   |               |                 |             | 9th hour \$88.88                    |
|                   |               |                 |             | 10th hour \$88.88                   |
|                   |               |                 |             | Beyond 10 hours \$108.15            |
|                   |               |                 |             | <b>Saturday</b>                     |
|                   |               |                 |             | First 8 hours \$88.88               |
|                   |               |                 |             | 9th hour \$88.88                    |
|                   |               |                 |             | 10th hour \$88.88                   |
|                   |               |                 |             | Beyond 10 hours \$108.15            |
|                   |               |                 |             | <b>Sunday/Holiday</b> \$108.15      |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                 | Category                  | Last Updated      |
|-----------------------------------------------------|---------------------------|-------------------|
| <b>Extended Boom Forklift Operator - Over 5,000</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift/forktruck over 5,000lb capacity, 1 drum hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$63.29       | \$79.73         | \$96.16     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$79.73 |
| 10th hour       | \$79.73 |
| Beyond 10 hours | \$96.16 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$79.73 |
| 9th hour        | \$79.73 |
| 10th hour       | \$79.73 |
| Beyond 10 hours | \$96.16 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$96.16</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category           | Last Updated |
|---------------------|--------------------|--------------|
| Fireman or Oiler    | Operating Engineer | 04/04/2025   |

**Classification Description:** Fireman or Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$59.08       | \$75.85         | \$92.62     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$59.08 |
| 10th hour       | \$59.08 |
| Beyond 10 hours | \$88.24 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$59.08 |
| 9th hour        | \$88.24 |
| 10th hour       | \$88.24 |
| Beyond 10 hours | \$88.24 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$88.24 |
|-----------------------|---------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name         | Category                  | Last Updated      |
|-----------------------------|---------------------------|-------------------|
| <b>Journeyman - Class I</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman - Class I

Asphalt Transfer Machine (Shuttle Buggy)

Concrete/Asphalt Pavers

Excavators Installing Utilities over 20 feet in depth

GPS or Electronic Grade Equipment (employee must be able to set up and use it on machine themselves, and employee can install it and calibrate it on their own)

Hydraulic/Lattice Lifting Cranes over 25 tons

Mechanic

**\*\*On bridge construction projects when a Class I Crane Operator is erecting structural components as part of a composite crew with Structural Ironworkers, the Base Rate and Vacation and Holiday pay shall be at the Crane Operator rate as set forth in the current agreement between the Union and the Great Lakes Fabricators and Erectors Association.**

| Wage Rates                                   | Straight Time | Time and a Half | Double Time |
|----------------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                            | \$69.17       | \$88.16         | \$107.14    |
| Apprentice: Apprentice Engineer 0-6 months   | \$56.03       | \$71.32         | \$86.60     |
| Apprentice: Apprentice Engineer 13-18        | \$60.40       | \$77.87         | \$95.34     |
| Apprentice: Apprentice Engineer 19-24 months | \$62.21       | \$80.59         | \$98.96     |
| Apprentice: Apprentice Engineer 25-30 months | \$64.76       | \$84.42         | \$104.06    |
| Apprentice: Apprentice Engineer 31-36 months | \$67.08       | \$87.90         | \$108.70    |
| Apprentice: Apprentice Engineer 7-12 months  | \$58.21       | \$74.58         | \$90.96     |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather, Monday through Thursday, the Friday work may be scheduled for ten (10) hours, at straight time, as a make-up day.

### Overtime Provisions

| <b>Over 8-hour day/40-hour week</b> |          |
|-------------------------------------|----------|
| 9th hour                            | \$88.16  |
| 10th hour                           | \$88.16  |
| Beyond 10 hours                     | \$88.16  |
| <b>Saturday</b>                     |          |
| First 8 hours                       | \$88.16  |
| 9th hour                            | \$88.16  |
| 10th hour                           | \$88.16  |
| Beyond 10 hours                     | \$88.16  |
| <b>Sunday/Holiday</b>               | \$107.14 |

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name          | Category                  | Last Updated      |
|------------------------------|---------------------------|-------------------|
| <b>Journeyman - Class II</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman - Class II

Air Compressors in Manifold with throttle valve + 750 cfm  
Asphalt Bituminous Compactor / Roller  
Asphalt Planner self-propelled  
Asphalt Plant on project including operating from on site or operating remotely  
Asphalt Screed or Screw (per Employer Past Practice)  
Auto Grade or similar type machine  
Backhoe on Farm Type Tractor 45 H.P. & over  
Ballast Jack Tamper  
Ballast Regulator (R.R.)  
Batch Plant (concrete-central mix)  
Bituminous Paver (self-propelled)  
Blade Grader  
Bull Dozer  
Caisson Drilling Machine  
Cherry Picker – 15 ton or over  
Chip Spreader  
Concrete Batch or Drum Mix Plant on project including operating from on site or operating remotely  
Concrete Belt Placer (Formless)  
Concrete Cure / Finish Machine (burlap, tinning or grooving)  
Concrete Mixer 21 cu. Ft. Or over  
Concrete Pump (Truck Mount)  
Concrete Pump (3 inch and over)  
Concrete / Asphalt Saw Power Driven (3 yrs experience or more)  
Conveyor Loader (Euclid type)  
Core Drilling Machine  
Curb-Barrier Wall Machine CMI type  
Directional Drill / Boring Machine  
Dredge Engineer  
Dredge  
Drilling Machine on which the drill is an integral part  
Earth Mover – rubber tired – (paddle wheel, Cat 619, 631, TS-24 or similar type)  
Earth Mover rubber tired-tandem

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$68.02       | \$86.51         | \$104.99    |

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$86.50 |
| 10th hour       | \$86.50 |
| Beyond 10 hours | \$86.50 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$86.50 |
| 9th hour        | \$86.50 |
| 10th hour       | \$86.50 |
| Beyond 10 hours | \$86.50 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$104.99</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name           | Category                  | Last Updated      |
|-------------------------------|---------------------------|-------------------|
| <b>Journeyman - Class III</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman - Class III

Air Compressor with Throttle Valve or Clever Brooks type comb.  
Backhoe less than 1 cyd. Including Farm Type  
Bituminous Plant Engineer  
Chemical / Grout Machine 21 cft. Or larger  
Cherry Picker under 15 ton  
Chip Spreader (self-propelled)  
Crusher  
Concrete Barrier Moving Machine (per Employer Past Practice)  
Concrete Pump  
Concrete Spreader--Power Driven  
End Loader under 1-1/2 cu yd.  
Grease Truck  
Gunit Machine  
Lowboy (per Employer Past Practice)  
Mesh or Steel Placer (motorized)  
Multiple Tamping Machine (R.R.)  
Refrigerating Machine--Freezing operation  
Roller-Waterbound Macadam, Bituminous Macadam, Brick  
Ross Carrier  
Self-propelled convey transfer devise.  
Side Boom Tractor (smaller than D-4 type or equivalent)  
Sweeper (Wayne type and similar equipment)  
Macadam, Brick Surface  
Trench Machine 24" and under  
Tube Float (motorized)

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$61.29       | \$76.85         | \$92.41     |

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$30.17 |
| 10th hour       | \$76.85 |
| Beyond 10 hours | \$76.85 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$76.85 |
| 9th hour        | \$76.85 |
| 10th hour       | \$76.85 |
| Beyond 10 hours | \$76.85 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$92.41</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name          | Category                  | Last Updated      |
|------------------------------|---------------------------|-------------------|
| <b>Journeyman - Class IV</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman - Class IV

Air Compressor  
All mulching equipment  
All Walk Behind or Remote Control Powered Equipment (autonomous equipment)  
Assistant to Engineer Automatic Dry Batch Plant Belt Spreader (motorized including transfer device by remote, wireless or cable)  
Bituminous Distributor  
Bituminous Patching Machine  
Broom & Belt Machine  
Chair Cart (self-propelled)  
Concrete Pumps (under 3")  
Concrete Breaker  
Curb Machine  
Curing Equipment (self-propelled)  
Deck Hand  
Digger Post Hole (power-driven)  
Dump Truck  
End Dumps (per Employer Past Practice)  
End Loader (under  $\frac{3}{4}$  yard capacity)  
Farm Tractor-incl. farm tractor with all attachments except backhoe and incl. highlift end loaders of 1 cu. Yard capacity or less  
Fireman (on boiler)  
Fork Lift – under 10 ton  
Form Grader (if motorized)  
Georgia Buggy – Power wheel barrel  $\frac{3}{4}$  yard with a seat  
Generator (15 kw or greater)  
Greaser Helper  
Guard Post Driver (power driven)

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$60.73       | \$76.05         | \$91.36     |

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$76.05 |
| 10th hour       | \$76.05 |
| Beyond 10 hours | \$76.05 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$76.05 |
| 9th hour        | \$76.05 |
| 10th hour       | \$76.05 |
| Beyond 10 hours | \$76.05 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$91.36</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name         | Category                  | Last Updated      |
|-----------------------------|---------------------------|-------------------|
| <b>Journeyman - Class V</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Journeyman - Class V

Concrete/Asphalt Saw - Power Driven (Less than 3 yrs. experience)

Density/Soil Engineer

Directional Boring Utility Man

Discharge Pumps 4" or less (1-4 units)

Dumper (Wagon, Truck, Etc.)-1/2 yard or less

Fence Erector/Power Driven

Light Plants (1 to 5 units)

Paving Batch Truck Dumper

Roto Mill Utility Grade Control

Sign Installer/Sign Installer with Remote Control Operated Equipment

Top Man, And Railroad Track and Trestle Engineer

Utility Engineer

Water Blasting Utility Engineer

1 to 4 pcs. of minor equip.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$42.35       | \$55.33         | \$68.31     |

### Overtime Provisions

#### Over 8-hour day/40-hour

#### week

|                 |         |
|-----------------|---------|
| 9th hour        | \$55.33 |
| 10th hour       | \$55.33 |
| Beyond 10 hours | \$55.33 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$55.33 |
| 9th hour        | \$55.33 |
| 10th hour       | \$55.33 |
| Beyond 10 hours | \$55.33 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$68.31</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                  | Last Updated      |
|--------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - 324 A140</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane with boom & jib or leads 140' or longer

Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.59       | \$100.24        | \$122.89    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$100.24 |
| 10th hour       | \$100.24 |
| Beyond 10 hours | \$100.24 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$100.24 |
| 9th hour        | \$100.24 |
| 10th hour       | \$100.24 |
| Beyond 10 hours | \$100.24 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$122.89</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 hours Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                  | Last Updated      |
|--------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - 324 A220</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane with boom & jib or leads 220' or longer

Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.86       | \$100.63        | \$123.40    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$100.63 |
| 10th hour       | \$100.63 |
| Beyond 10 hours | \$100.63 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$100.63 |
| 9th hour        | \$100.63 |
| 10th hour       | \$100.63 |
| Beyond 10 hours | \$100.63 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$123.40</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 hours Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                  | Last Updated      |
|--------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - 324 B120</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/120' of Boom or Longer w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.41       | \$99.99         | \$122.56    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$99.98 |
| 10th hour       | \$99.98 |
| Beyond 10 hours | \$99.98 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$99.98 |
| 9th hour        | \$99.98 |
| 10th hour       | \$99.98 |
| Beyond 10 hours | \$99.98 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$122.56</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                | Category                  | Last Updated      |
|------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - 324 GM</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Ground Man/Light Plants/Welder/Pumps Under 6"

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$43.83       | \$57.87         | \$71.91     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$57.87 |
| 10th hour       | \$57.87 |
| Beyond 10 hours | \$57.87 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$57.87 |
| 9th hour        | \$57.87 |
| 10th hour       | \$57.87 |
| Beyond 10 hours | \$57.87 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$71.91</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                | Category                  | Last Updated      |
|----------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - Below 5,000lb Capacity</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Ind. forklift/forktruck under 5,000lb capacity  
power jacks/power packs, composite crew only

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$67.10       | \$85.19         | \$103.28    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$85.19 |
| 10th hour       | \$85.19 |
| Beyond 10 hours | \$85.19 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$85.19 |
| 9th hour        | \$85.19 |
| 10th hour       | \$85.19 |
| Beyond 10 hours | \$85.19 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$103.28</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                | Category                  | Last Updated      |
|----------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - Crane Operator w/Oiler</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.05       | \$99.47         | \$121.89    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$99.47 |
| 10th hour       | \$99.47 |
| Beyond 10 hours | \$99.47 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$99.47 |
| 9th hour        | \$99.47 |
| 10th hour       | \$99.47 |
| Beyond 10 hours | \$99.47 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$121.89</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                               | Category                  | Last Updated      |
|---------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - Crane, TDH, Excavator</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator, Job Mechanic, Three Drum Hoist and Excavator

| Wage Rates                                   | Straight Time | Time and a Half | Double Time |
|----------------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                            | \$76.05       | \$98.04         | \$120.02    |
| Apprentice: Apprentice Engineer 0-6 months   | \$60.84       | \$78.54         | \$96.24     |
| Apprentice: Apprentice Engineer 13-18 months | \$65.90       | \$86.13         | \$106.36    |
| Apprentice: Apprentice Engineer 19-24 months | \$68.42       | \$89.92         | \$111.40    |
| Apprentice: Apprentice Engineer 25-30 months | \$70.95       | \$93.71         | \$116.46    |
| Apprentice: Apprentice Engineer 31-36 months | \$73.48       | \$97.50         | \$121.52    |
| Apprentice: Apprentice Engineer 7-12 months  | \$63.40       | \$82.38         | \$101.36    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$98.03 |
| 10th hour       | \$98.03 |
| Beyond 10 hours | \$98.03 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$98.03 |
| 9th hour        | \$98.03 |
| 10th hour       | \$98.03 |
| Beyond 10 hours | \$98.03 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$120.02</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category                  | Last Updated      |
|--------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - CW</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Compressor or welding machine  
Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$54.86       | \$69.72         | \$84.58     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$67.78 |
| 10th hour       | \$67.78 |
| Beyond 10 hours | \$67.78 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$67.78 |
| 9th hour        | \$80.70 |
| 10th hour       | \$80.70 |
| Beyond 10 hours | \$80.70 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$80.70</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name           | Category                  | Last Updated      |
|-------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - F</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Forklift, lull, extend-a-boom forklift

Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$63.36       | \$79.81         | \$96.25     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$79.81 |
| 10th hour       | \$79.81 |
| Beyond 10 hours | \$79.81 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$79.81 |
| 9th hour        | \$96.25 |
| 10th hour       | \$96.25 |
| Beyond 10 hours | \$96.25 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$96.25</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category                  | Last Updated      |
|--------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - FO</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Fireman or oiler

Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$53.83       | \$68.18         | \$82.52     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$66.31 |
| 10th hour       | \$66.31 |
| Beyond 10 hours | \$66.31 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$66.31 |
| 9th hour        | \$78.78 |
| 10th hour       | \$78.78 |
| Beyond 10 hours | \$78.78 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$78.78</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name      | Category           | Last Updated |
|--------------------------|--------------------|--------------|
| Operating Engineer - FSM | Operating Engineer | 04/04/2025   |

**Classification Description:** Forklift or Straight Mast

Four 10 hour days may be scheduled M-Th or T-F. Work not performed due to weather on M-Th may be scheduled on Friday

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$57.50       | \$71.40         | \$85.29     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$71.40 |
| 10th hour       | \$71.40 |
| Beyond 10 hours | \$71.40 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$71.40 |
| 9th hour        | \$85.29 |
| 10th hour       | \$85.29 |
| Beyond 10 hours | \$85.29 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$85.29 |
|-----------------------|---------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Friday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name           | Category                  | Last Updated      |
|-------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - I</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Lull or Extend-a-Boom Forklift

Four 10 hour days may be scheduled M-Th or T-F. Work not performed due to weather on M-Th may be scheduled on Friday

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$59.73       | \$77.09         | \$94.45     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$74.83 |
| 10th hour       | \$74.83 |
| Beyond 10 hours | \$74.83 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$74.83 |
| 9th hour        | \$89.92 |
| 10th hour       | \$89.92 |
| Beyond 10 hours | \$89.92 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$89.92</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

Friday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                     | Category                  | Last Updated      |
|-----------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - OE 324 A120</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane with boom & jib or leads 120' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$68.55       | \$87.30         | \$106.04    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$87.30 |
| 10th hour       | \$87.30 |
| Beyond 10 hours | \$87.30 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$87.30 |
| 9th hour        | \$87.30 |
| 10th hour       | \$87.30 |
| Beyond 10 hours | \$87.30 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$106.04</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time over 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category                  | Last Updated      |
|--------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - RC</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Regular crane, job mechanic, concrete pump with boom

Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$64.85       | \$84.71         | \$104.56    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$82.12 |
| 10th hour       | \$82.12 |
| Beyond 10 hours | \$82.12 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$82.12 |
| 9th hour        | \$99.38 |
| 10th hour       | \$99.38 |
| Beyond 10 hours | \$99.38 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$99.38</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                            | Category                  | Last Updated      |
|------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer - Skidsteer Operator</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Skidsteer forklift when working with fence and Door companies

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$65.69       | \$83.17         | \$100.65    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$83.17 |
| 10th hour       | \$83.17 |
| Beyond 10 hours | \$83.17 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$83.17 |
| 9th hour        | \$83.17 |
| 10th hour       | \$83.17 |
| Beyond 10 hours | \$83.17 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$100.65</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name               | Category           | Last Updated |
|-----------------------------------|--------------------|--------------|
| Operating Engineer - TDH, Backhoe | Operating Engineer | 04/04/2025   |

**Classification Description:** Hoisting Operator, Two Drum Hoist, Rubber Tire Backhoe

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$75.41       | \$97.11         | \$118.82    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$97.11 |
| 10th hour       | \$97.11 |
| Beyond 10 hours | \$97.11 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$97.11 |
| 9th hour        | \$97.11 |
| 10th hour       | \$97.11 |
| Beyond 10 hours | \$97.11 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$118.82</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                  | Last Updated      |
|----------------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Boom and Jib or Leads 120' or longer</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer when operating Crane with Boom and Jib or Leads 120' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions          |
|-------------------|---------------|-----------------|-------------|------------------------------|
|                   |               |                 |             | Over 8-hour day/40-hour week |
| Total Hourly Wage |               |                 |             | 9th hour \$70.96             |
|                   |               |                 |             | 10th hour \$70.96            |
|                   |               |                 |             | Beyond 10 hours \$90.70      |
|                   |               |                 |             | Saturday                     |
|                   |               |                 |             | First 8 hours \$90.70        |
|                   |               |                 |             | 9th hour \$110.45            |
|                   |               |                 |             | 10th hour \$110.45           |
|                   |               |                 |             | Beyond 10 hours \$110.45     |
|                   |               |                 |             | Sunday/Holiday               |
|                   |               |                 |             | \$110.45                     |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                  | Last Updated      |
|----------------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Boom and Jib or Leads 140' or longer</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer when operating Crane with Boom and Jib or Leads 140' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-------------------|---------------|-----------------|-------------|-------------------------------------|
| Total Hourly Wage | \$71.78       | \$94.91         | \$118.02    | <b>Over 8-hour day/40-hour week</b> |
|                   |               |                 |             | 9th hour \$71.78                    |
|                   |               |                 |             | 10th hour \$71.78                   |
|                   |               |                 |             | Beyond 10 hours \$91.89             |
|                   |               |                 |             | <b>Saturday</b>                     |
|                   |               |                 |             | First 8 hours \$71.78               |
|                   |               |                 |             | 9th hour \$111.99                   |
|                   |               |                 |             | 10th hour \$111.99                  |
|                   |               |                 |             | Beyond 10 hours \$111.99            |
|                   |               |                 |             | <b>Sunday/Holiday</b> \$111.99      |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                  | Last Updated      |
|----------------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Boom and Jib or Leads 220' or longer</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer when operating Crane with Boom and Jib or Leads 220' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions          |
|-------------------|---------------|-----------------|-------------|------------------------------|
|                   |               |                 |             | Over 8-hour day/40-hour week |
| Total Hourly Wage |               |                 |             | 9th hour \$92.31             |
|                   |               |                 |             | 10th hour \$92.31            |
|                   |               |                 |             | Beyond 10 hours \$92.31      |
|                   |               |                 |             | Saturday                     |
|                   |               |                 |             | First 8 hours \$72.08        |
|                   |               |                 |             | 9th hour \$112.55            |
|                   |               |                 |             | 10th hour \$112.55           |
|                   |               |                 |             | Beyond 10 hours \$112.55     |
|                   |               |                 |             | Sunday/Holiday               |
|                   |               |                 |             | \$112.55                     |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                  | Last Updated      |
|----------------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Boom and Jib or Leads 300' or longer</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer when operating Crane with Boom and Jib or Leads 300' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$73.58       | \$97.60         | \$121.62    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$73.58 |
| 10th hour       | \$73.58 |
| Beyond 10 hours | \$73.58 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$73.58  |
| 9th hour        | \$115.35 |
| 10th hour       | \$115.35 |
| Beyond 10 hours | \$115.35 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$115.35</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Mon-Fri-Double time after 12 hrs/day  
Sat-time and a half first 8 hours unless over 40, then double time

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                  | Last Updated      |
|----------------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Boom and Jib or Leads 400' or longer</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer when operating Crane with Boom and Jib or Leads 400' or longer

| Wage Rates                                          | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-----------------------------------------------------|---------------|-----------------|-------------|-------------------------------------|
| Total Hourly Wage                                   | \$75.08       | \$96.62         | \$118.16    | <b>Over 8-hour day/40-hour week</b> |
| Apprentice: Apprentice Engineer 1 - 999 Hours       | \$56.05       | \$71.31         | \$86.56     | 9th hour \$75.08                    |
| Apprentice: Apprentice Engineer 1,000 - 1,999 Hours | \$58.22       | \$74.56         | \$90.90     | 10th hour \$75.08                   |
| Apprentice: Apprentice Engineer 2,000 - 2,999 Hours | \$60.56       | \$78.07         | \$95.58     | Beyond 10 hours \$96.62             |
| Apprentice: Apprentice Engineer 3,000 - 3,999 hours | \$62.58       | \$81.11         | \$99.62     | <b>Saturday</b>                     |
| Apprentice: Apprentice Engineer 4,000 - 4,999 hours | \$64.77       | \$84.39         | \$104.00    | First 8 hours \$75.08               |
| Apprentice: Apprentice Engineer 4,999 - 5,999 hours | \$68.03       | \$89.28         | \$110.52    | 9th hour \$118.16                   |
|                                                     |               |                 |             | 10th hour \$118.16                  |
|                                                     |               |                 |             | Beyond 10 hours \$118.16            |
|                                                     |               |                 |             | <b>Sunday/Holiday</b> \$118.16      |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                     | Category                  | Last Updated      |
|---------------------------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Compressor or Welding Machine</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Engineer operating Compressor or Welding Machine

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$60.11       | \$77.40         | \$94.68     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$60.11 |
| 10th hour       | \$60.11 |
| Beyond 10 hours | \$90.17 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$60.11 |
| 9th hour        | \$90.17 |
| 10th hour       | \$90.17 |
| Beyond 10 hours | \$90.17 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$90.17</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                | Category                  | Last Updated      |
|------------------------------------|---------------------------|-------------------|
| <b>Operating Engineer-Forklift</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Lull or Extend-A-Boom Forklift

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$67.42       | \$88.36         | \$109.30    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$67.42  |
| 10th hour       | \$67.42  |
| Beyond 10 hours | \$103.84 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$67.42  |
| 9th hour        | \$103.84 |
| 10th hour       | \$103.84 |
| Beyond 10 hours | \$103.84 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$103.84</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name    | Category           | Last Updated |
|------------------------|--------------------|--------------|
| Regular Crane Operator | Operating Engineer | 04/04/2025   |

**Classification Description:** Job Mechanic, Concrete Pump with Boom, and High/Long Reach Shear

| Wage Rates        | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|-------------------|---------------|-----------------|-------------|-------------------------------------|
| Total Hourly Wage | \$70.10       | \$92.38         | \$114.66    | <b>Over 8-hour day/40-hour week</b> |
|                   |               |                 |             | 9th hour \$70.10                    |
|                   |               |                 |             | 10th hour \$70.10                   |
|                   |               |                 |             | Beyond 10 hours \$89.47             |
|                   |               |                 |             | <b>Saturday</b>                     |
|                   |               |                 |             | First 8 hours \$89.47               |
|                   |               |                 |             | 9th hour \$108.85                   |
|                   |               |                 |             | 10th hour \$108.85                  |
|                   |               |                 |             | Beyond 10 hours \$108.85            |
|                   |               |                 |             | <b>Sunday/Holiday</b> \$108.85      |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category           | Last Updated |
|---------------------|--------------------|--------------|
| Regular Engineer    | Operating Engineer | 04/04/2025   |

**Classification Description:** Hydro Excavator, Remote Controlled Concrete Breaker, and Concrete Saw operator

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$69.13       | \$90.93         | \$112.72    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$69.13 |
| 10th hour       | \$69.13 |
| Beyond 10 hours | \$88.08 |

##### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$69.13  |
| 9th hour        | \$107.03 |
| 10th hour       | \$107.03 |
| Beyond 10 hours | \$107.03 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$107.03</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Monday-Friday-Double time after 12hrs/day  
Saturday-Double time starts after 40 hrs otherwise first 8 are time and a half

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                       | Category                  | Last Updated      |
|-------------------------------------------|---------------------------|-------------------|
| <b>Sewer Relining Operator - Class II</b> | <b>Operating Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Class II-Operator of hot water heaters and circulation system; water jetters; and vacuum and mechanical debris removal systems and those assisting.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$50.80       | \$68.49         | \$86.18     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$66.30 |
| 10th hour       | \$66.30 |
| Beyond 10 hours | \$66.30 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$66.30 |
| 9th hour        | \$66.30 |
| 10th hour       | \$66.30 |
| Beyond 10 hours | \$66.30 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$81.79</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                         | Category                                                 | Last Updated      |
|-------------------------------------------------------------|----------------------------------------------------------|-------------------|
| <b>Marine Construction and Dredging<br/>Class I - OE324</b> | <b>Operating Engineer, Dredge<br/>or Marine Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Craft Foreman, Diver/Wet Tender, Engineer, Engineer (hydraulic dredge), Blaster

| Wage Rates        | Straight<br>Time | Time and a<br>Half | Double<br>Time | Overtime Provisions             |
|-------------------|------------------|--------------------|----------------|---------------------------------|
|                   |                  |                    |                | Over 8-hour day/40-hour<br>week |
| Total Hourly Wage |                  |                    |                | 9th hour \$110.05               |
|                   |                  |                    |                | 10th hour \$110.05              |
|                   |                  |                    |                | Beyond 10 hours \$110.05        |
|                   |                  |                    |                | Saturday                        |
|                   |                  |                    |                | First 8 hours \$110.05          |
|                   |                  |                    |                | 9th hour \$110.05               |
|                   |                  |                    |                | 10th hour \$110.05              |
|                   |                  |                    |                | Beyond 10 hours \$110.05        |
|                   |                  |                    |                | Sunday/Holiday                  |
|                   |                  |                    |                | \$135.80                        |

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                                                 | Last Updated      |
|----------------------------------------------------------------|----------------------------------------------------------|-------------------|
| <b>Marine Construction and Dredging<br/>Class II A - OE324</b> | <b>Operating Engineer, Dredge<br/>or Marine Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Crane, Backhoe, Material Handler, All Self-Propelled Drill Rigs, Mechanic/Welder, Asst. Engineer (hydraulic dredge), Leverman (hydraulic dredge), Diver Tender.

| Wage Rates        | Straight<br>Time | Time and a<br>Half | Double<br>Time |
|-------------------|------------------|--------------------|----------------|
| Total Hourly Wage | \$82.80          | \$107.80           | \$132.80       |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$107.80 |
| 10th hour       | \$107.80 |
| Beyond 10 hours | \$107.80 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$107.80 |
| 9th hour        | \$107.80 |
| 10th hour       | \$107.80 |
| Beyond 10 hours | \$107.80 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$132.80</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category                                                 | Last Updated      |
|----------------------------------------------------------------|----------------------------------------------------------|-------------------|
| <b>Marine Construction and Dredging<br/>Class II B - OE324</b> | <b>Operating Engineer, Dredge<br/>or Marine Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Friction, Lattice Boom, or Crane License Cert., Endorse Tug or Tow Boat Operator

| Wage Rates        | Straight<br>Time | Time and a<br>Half | Double<br>Time | Overtime Provisions             |
|-------------------|------------------|--------------------|----------------|---------------------------------|
|                   |                  |                    |                | Over 8-hour day/40-hour<br>week |
| Total Hourly Wage |                  |                    |                | 9th hour \$112.30               |
|                   |                  |                    |                | 10th hour \$112.30              |
|                   |                  |                    |                | Beyond 10 hours \$112.30        |
|                   |                  |                    |                | Saturday                        |
|                   |                  |                    |                | First 8 hours \$112.30          |
|                   |                  |                    |                | 9th hour \$112.30               |
|                   |                  |                    |                | 10th hour \$112.30              |
|                   |                  |                    |                | Beyond 10 hours \$112.30        |
|                   |                  |                    |                | Sunday/Holiday                  |
|                   |                  |                    |                | \$138.80                        |

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                           | Category                                                 | Last Updated      |
|---------------------------------------------------------------|----------------------------------------------------------|-------------------|
| <b>Marine Construction and Dredging<br/>Class III - OE324</b> | <b>Operating Engineer, Dredge<br/>or Marine Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Deck Equipment Operator, (Machineryman), Maintenance of Crane, Tug/Launch Operator, Loader/Dozer on Barge, Deck Machinery, etc.

| Wage Rates        | Straight<br>Time | Time and a<br>Half | Double<br>Time |
|-------------------|------------------|--------------------|----------------|
| Total Hourly Wage | \$78.30          | \$101.05           | \$123.80       |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$101.05 |
| 10th hour       | \$101.05 |
| Beyond 10 hours | \$101.05 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$101.05 |
| 9th hour        | \$101.05 |
| 10th hour       | \$101.05 |
| Beyond 10 hours | \$101.05 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$123.80</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                          | Category                                                 | Last Updated      |
|--------------------------------------------------------------|----------------------------------------------------------|-------------------|
| <b>Marine Construction and Dredging<br/>Class IV - OE324</b> | <b>Operating Engineer, Dredge<br/>or Marine Engineer</b> | <b>04/04/2025</b> |

**Classification Description:** Deck Equipment Operator, Machineryman/Fireman, (4 equipment units or more), Off Road Trucks, Deck Hand, Tug/Engineer, Crane Maint. (50 ton and under/Backhoe 115,000 lbs. or less), Asst. Tug Operator, Blaster Helper.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$73.35       | \$93.85         | \$114.35    |

#### Overtime Provisions

##### Over 8-hour day/40-hour

##### week

|                 |         |
|-----------------|---------|
| 9th hour        | \$93.85 |
| 10th hour       | \$93.85 |
| Beyond 10 hours | \$93.85 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$93.85 |
| 9th hour        | \$93.85 |
| 10th hour       | \$93.85 |
| Beyond 10 hours | \$93.85 |

##### Sunday/Holiday

\$114.35

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                    | Category                                                              | Last Updated      |
|--------------------------------------------------------|-----------------------------------------------------------------------|-------------------|
| <b>Operating Engineer Underground-324-<br/>Class I</b> | <b>Operating Engineer, General<br/>Construction &amp; Underground</b> | <b>04/04/2025</b> |

**Classification Description:** Class I Equipment-Air Compressors in Manifold with throttle valve Auto Grade or similar type machine

Backfill Tamper Backhoe

Backhoe on Farm Type Tractor 45 H.P. & over. Ballast Regulator (R.R.)

Batch Plant (concrete - central mix) Batch Plant Operator (concrete) Blade Grader Operator

Bulldozer

Caisson Drilling Machine Cherry Picker--15 ton or over Clamshell

Concrete/Asphalt Saw Operator - Power Driven (3yrs experience or more) Concrete Belt Placer (Formless)

Concrete Cure/Finish Machine Operator

Concrete Mixer 21 cu. ft. or over Concrete Paver [two (2) drums or larger] Concrete Pump (Truck Mount)

Concrete Pump (3 inch and over) Concrete Pump with Boom Operator Conveyor Loader Operator (Euclid type) Core Drilling Machine

Crane (Crawler, truck type or pile driving)

Crane or De1Tick with any attachment incl. clamshell, dragline, shovel, backhoe, etc. Directional Drill/Boring Machine Operator

Dozer Dragline

Dredge Engineer Dredge Operator

Drilling Machine on which the drill is an integral part

Earth Mover--rubber tired--(paddle wheel, 619, 631, TS-24 or similar type) Earth Mover rubber tired--tandem (\$.50 cents per hr. added for each bowl) Elevating

Grader Operator

End Loader

End Loader Operator (1½ yard capacity and over)

Excavator

Farm type tractor with attached pan

Finishing Machine Operator (Asphalt or Concrete) Foreman/Operating Engineer

Forklift (10 ton or over)

GPS or Electronic Grade on motorized equipment Gradall and similar type machine

Grader

Gravel Processing plant (portable) Operator of Guard Rail Post Driver Haul Units (off-highway) Helicopter crew

Highlift Shovel--1-1 /2 cu. yd. or over Hoisting Engineer

Horizontal Directional Drill Hydraulic Boom Truck

Hydro demolition equipment (water blaster) Hydro Excavator

Loader--Self-propelled (Belt-Chain- Wheel) (Holland or similar type) Locomotive and/or Dinkey Engine

Mechanic Milling Machine

Mucking Machine

Operator of Guard Rail Post Driver Paver Operator - Concrete

Pile Driver--Skid or Crawler Power Shovel

Rock Breaking Plant

Rock Crushing Plant (Portable)

Root Rake, Tractor Mounted Sand Blaster Vacuum Roto Mill

Scraper Self-Propelled or Tractor Drawn

Self-propelled Widener or Gravel distributing shoulder machine Shovel Operator  
Side Boom Tractor (type D-4 or equivalent or larger) Slope Paver  
Stump Remover Tractor Mounted Surface Heater & Planer  
Surface Roller with Dozer Blade  
Swinging Boom Truck (over 12-ton capacity) Tilling Machine or (Roto Grader)  
Tractor Operator  
Tractor--Boom, Winch or Hoe Head Tractor--Push  
Tractor with Scoop Tractor Mounted Spreader Tree Mover  
Trench Machine (ladder or wheel type) Trencher (over 8ft. digging capacity) Tugboat Operator  
Tunnel Boring Machine Tunnel Shield  
Vacuum Machine/Truck Operator Well Drilling Machine  
Well Drilling Rig  
Winch Truck with A Frame

| Wage Rates                                        | Straight Time | Time and a Half | Double Time |
|---------------------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                                 | \$68.12       | \$87.01         | \$105.89    |
| Apprentice: Apprentice Engineer 0-999 hours       | \$54.36       | \$69.57         | \$84.77     |
| Apprentice: Apprentice Engineer 1,000-1,999 hours | \$56.53       | \$72.83         | \$89.11     |
| Apprentice: Apprentice Engineer 2,000-2,999 hours | \$58.69       | \$76.06         | \$93.43     |
| Apprentice: Apprentice Engineer 3,000-3,999 hours | \$60.87       | \$79.33         | \$97.79     |
| Apprentice: Apprentice Engineer 4,000-4,999 hours | \$64.22       | \$84.36         | \$104.49    |
| Apprentice: Apprentice Engineer 5,000-5,999 hours | \$65.06       | \$85.62         | \$106.17    |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather Monday through Thursday, then Friday work may be scheduled for the ten (10) hours, at straight-time.

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$87.00 |
| 10th hour       | \$87.00 |
| Beyond 10 hours | \$87.00 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$87.00 |
| 9th hour        | \$87.00 |
| 10th hour       | \$87.00 |
| Beyond 10 hours | \$87.00 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$105.89</b> |
|-----------------------|-----------------|

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                     | Category                                                              | Last Updated      |
|---------------------------------------------------------|-----------------------------------------------------------------------|-------------------|
| <b>Operating Engineer Underground-324-<br/>Class II</b> | <b>Operating Engineer, General<br/>Construction &amp; Underground</b> | <b>04/04/2025</b> |

**Classification Description:** Class II Equipment

Air Compressor with Throttle Valve or Clever Brooks type comb. Backhoe (with 3/8-yard bucket or less)

Backhoe on Farm Type Tractor under 45 H.P.

Batch Plant (concrete-dry batch)

Boom Truck (power swing type boom)

Cherry Picker under 15 ton

Crusher

Crusher Operator

Concrete Pump

Concrete Mesh Depressor--independently operated Concrete Spreader--Power Driven

End Dumps when operated by an Operating Engineer End Loader under 1-1/2 cu yd.

Guniting Machine

Head Greaser

Hoist

Lowboy Operator

Mesh or Steel Placer (motorized)

Multiple Tamping Machine (R.R.)

Power Curing Spraying Machine (Formless)

P.C.C. Concrete Belt Placer (form type)

Pull Grader--Power Control

Pump Operator (6" discharge or over, gas diesel, powered or generator of 300 amp or larger)

Refrigerating Machine--Freezing operation Ross Carrier

Self-propelled convey transfer devise. Sheepfoot Roller (self-propelled)

Side Boom Tractor (smaller than D-4 type or equivalent)

Sweeper (Wayne type and similar equipment)

Telescoping laser finish machine (laser screed)

Tractor (pneu-tired, other than backhoe or front-end loader)

Trencher (8ft. digging capacity and smaller)

Trench Machine 24" and under

Tube Float (motorized)

Vac Truck

Washing Plant Operator Welder

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$64.00       | \$83.38         | \$102.75    |

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$80.82 |
| 10th hour       | \$80.82 |
| Beyond 10 hours | \$80.82 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$80.82 |
| 9th hour        | \$80.82 |
| 10th hour       | \$80.82 |
| Beyond 10 hours | \$80.82 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$97.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather Monday through Thursday, then Friday work may be scheduled for the ten (10) hours, at straight-time.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                      | Category                                                              | Last Updated      |
|----------------------------------------------------------|-----------------------------------------------------------------------|-------------------|
| <b>Operating Engineer Underground-324-<br/>Class III</b> | <b>Operating Engineer, General<br/>Construction &amp; Underground</b> | <b>04/04/2025</b> |

**Classification Description:** Class III Equipment

Air Compressor (600 CFM or larger)

Air Compressor [two (2) or more - less than 600 CFM] Base Paver (Jersey or similar type machine)

Boom Truck (Non swinging, Non powered type boom) Concrete Breaker

Concrete Finishing Machine

Concrete Paver (1 drum - ½ yard or larger) Curb Machine

Elevator (other than passenger) Hoist (one drum)

Jacks - Hydraulic Power-driven multiple jack system Maintenance Man

Mechanics Helper Paving Breaker

Power Broom Self-propelled

Pump [ two (2) or more 4 inch up to 6-inch discharge gas or diesel powered-excluding submersible pumps)

Pumpcrete Machine and similar equipment Roller (Earth & Sub-base material) Screening Plant Operator

Spike Machine (R.R.)

Tamper-Multiple Vibrating-Earth and Sub-base material Tractor with Drill--50 H.P. or over Well Point System Wagon Drill (multiple)

Welding Machine or Generator [two (2) or more 300 amp. Or larger -gas or diesel powered]

Well Point System

Widener (Apsco or similar type)

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$63.27       | \$82.28         | \$101.29    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$79.78 |
| 10th hour       | \$79.78 |
| Beyond 10 hours | \$79.78 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$79.78 |
| 9th hour        | \$79.78 |
| 10th hour       | \$79.78 |
| Beyond 10 hours | \$79.78 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$96.29</b> |
|-----------------------|----------------|

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather Monday through Thursday, then Friday work may be scheduled for the ten (10) hours, at straight-time.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                     | Category                                                              | Last Updated      |
|---------------------------------------------------------|-----------------------------------------------------------------------|-------------------|
| <b>Operating Engineer Underground-324-<br/>Class IV</b> | <b>Operating Engineer, General<br/>Construction &amp; Underground</b> | <b>04/04/2025</b> |

**Classification Description:** Class IV Equipment

Air Compressor Operator (over 250 CFM)

All Mulching Equipment

All Walk Behind or Remote-Control Powered Equipment (autonomous equipment)

Assistant to Engineer Automatic Dry Batch Plant

Belt Spreader (motorized including transfer device by remote, wireless or cable) Boiler

Boom or Winch truck operator

Broom & Belt Machine

Chair Cart (Self-propelled) Concrete Pumps (under 3")

Curing Equipment Operator (self-propelled)

Deck Hand

Digger Post Hole (Power-driven)

End loader Operator (under 3/4-yard capacity)

Extend A Boom Forklift--under 10 Ton

Farm Tractor with attachments Finishing Machine (concrete)

Forklift under 10 ton

Form Grader (if motorized)

Georgia Buggy -Power wheel barrel 1 3/4 yard with a seat Generator (15 kw or greater)

Greaser Helper

Hydraulic pipe pushing machine Mechanical Heater

Mechanics Helper

Outboard or Inboard Motorboat Power Bin Operator

Pug Mill

Pumps - [two (2) or more up to 4 in. discharge if used three (3) hours or more a day - gas or diesel powered- excluding submersible pumps]

Roller (other than asphalt)

Seaman Tiller

Skid Steer

Stump Remover (Grinder)

Sweeper (Wayne type and similar equipment) Tamper

Trencher (service)

Vibratory Compaction Equipment Operator (6 ft. wide or over)

Walk Behind Forklift

Water Wagon

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$62.70       | \$81.43         | \$100.15    |

## Overtime Provisions

### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$78.96 |
| 10th hour       | \$78.96 |
| Beyond 10 hours | \$78.96 |

### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$78.96 |
| 9th hour        | \$78.96 |
| 10th hour       | \$78.96 |
| Beyond 10 hours | \$78.96 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$95.22</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather Monday through Thursday, then Friday work may be scheduled for the ten (10) hours, at straight-time.



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                    | Category                                                              | Last Updated      |
|--------------------------------------------------------|-----------------------------------------------------------------------|-------------------|
| <b>Operating Engineer Underground-324-<br/>Class V</b> | <b>Operating Engineer, General<br/>Construction &amp; Underground</b> | <b>04/04/2025</b> |

**Classification Description:** Class V Equipment

Concrete/Asphalt Saw Operator- Power Driven (Less than 3 yrs. experience) Density/Soil Engineer  
Directional Boring Utility Man  
Discharge Pumps 4" or less (1 - 4 units) Dump Truck Operator  
Dumper (Wagon, Truck, Etc.) - or trade Fence Erector /Power Driven  
Guard Post Driver Operator (power driven) Hydra Seeder  
Light Plants (1 to 5 units) Oiler Fireman  
Operator of minor equip.  
Roto Mill Utility Grade Control Operator  
Scissor lifts and basket lifts where used for material hoisting  
Sign Installer/Sign Installer with Remote Control Operated Equipment  
Straw Blower or Brush Mulcher  
Top Man, And Railroad Track and Trestle Engineer Utility Engineer  
Water Blasting Utility Engineer

| Wage Rates        | Straight<br>Time | Time and a<br>Half | Double<br>Time |
|-------------------|------------------|--------------------|----------------|
| Total Hourly Wage | \$39.95          | \$53.88            | \$67.80        |

### Overtime Provisions

**Over 8-hour day/40-hour  
week**

|                 |         |
|-----------------|---------|
| 9th hour        | \$52.06 |
| 10th hour       | \$52.06 |
| Beyond 10 hours | \$52.06 |

**Saturday**

|                 |         |
|-----------------|---------|
| First 8 hours   | \$52.06 |
| 9th hour        | \$52.06 |
| 10th hour       | \$52.06 |
| Beyond 10 hours | \$52.06 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$64.17</b> |
|-----------------------|----------------|

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

In the event work is unable to be performed on account of weather Monday through Thursday, then Friday work may be scheduled for the ten (10) hours, at straight-time.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name              | Category                              | Last Updated      |
|----------------------------------|---------------------------------------|-------------------|
| <b>Crane Operator - 324 B400</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/400' Boom or Longer w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$81.86       | \$106.37        | \$130.88    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$106.37 |
| 10th hour       | \$106.37 |
| Beyond 10 hours | \$106.37 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$106.37 |
| 9th hour        | \$106.37 |
| 10th hour       | \$106.37 |
| Beyond 10 hours | \$106.37 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$130.88</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time over 12 hours Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                              | Last Updated      |
|--------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 A300</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane with boom & jib or leads 300' or longer  
Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$79.36       | \$102.78        | \$126.20    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$102.78 |
| 10th hour       | \$102.78 |
| Beyond 10 hours | \$102.78 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$102.78 |
| 9th hour        | \$102.78 |
| 10th hour       | \$102.78 |
| Beyond 10 hours | \$102.78 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$126.20</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time over 12 hours Mon-Sat.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                              | Last Updated      |
|--------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 A400</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane with boom & jib or leads 400' or longer  
Work in excess of 12 per day M-F shall be paid at double time.

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$80.86       | \$104.94        | \$129.01    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$104.93 |
| 10th hour       | \$104.93 |
| Beyond 10 hours | \$104.93 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$104.93 |
| 9th hour        | \$104.93 |
| 10th hour       | \$104.93 |
| Beyond 10 hours | \$104.93 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$129.01</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time over 12 hours/day Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                 | Category                              | Last Updated      |
|-------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 A50</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Tower Crane & Derrick Operator 50' or More

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.14       | \$99.59         | \$122.05    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$99.59 |
| 10th hour       | \$99.59 |
| Beyond 10 hours | \$99.59 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$99.59 |
| 9th hour        | \$99.59 |
| 10th hour       | \$99.59 |
| Beyond 10 hours | \$99.59 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$122.05</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                              | Last Updated      |
|--------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 B140</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/140' of /Boom or Longer w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$78.59       | \$101.68        | \$124.76    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$101.67 |
| 10th hour       | \$101.67 |
| Beyond 10 hours | \$101.67 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$101.67 |
| 9th hour        | \$101.67 |
| 10th hour       | \$101.67 |
| Beyond 10 hours | \$101.67 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$124.76</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                              | Last Updated      |
|--------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 B220</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/220' of Boom or Longer w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$78.86       | \$100.76        | \$123.97    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$102.06 |
| 10th hour       | \$102.06 |
| Beyond 10 hours | \$102.06 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$102.06 |
| 9th hour        | \$102.06 |
| 10th hour       | \$102.06 |
| Beyond 10 hours | \$102.06 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$125.27</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 hours Mon-Sat



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                              | Last Updated      |
|--------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 B300</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/300' of Boom or Longer w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$80.36       | \$104.22        | \$128.07    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$104.22 |
| 10th hour       | \$104.22 |
| Beyond 10 hours | \$104.22 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$104.22 |
| 9th hour        | \$104.22 |
| 10th hour       | \$104.22 |
| Beyond 10 hours | \$104.22 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$128.07</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time over 12 hours Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                 | Category                              | Last Updated      |
|-------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 B50</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Tower Crane & Derrick Operator 50' or more w/Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$78.14       | \$101.03        | \$123.92    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$101.03 |
| 10th hour       | \$101.03 |
| Beyond 10 hours | \$101.03 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$101.03 |
| 9th hour        | \$101.03 |
| 10th hour       | \$101.03 |
| Beyond 10 hours | \$101.03 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$123.92</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                      | Category                              | Last Updated      |
|------------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - 324 PRE60118</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Oiler/pumps over 6" \*\*Applies to Operators who have previously worked under this classification PRIOR to 6/1/18\*\*

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$61.22       | \$76.76         | \$92.29     |

### Overtime Provisions

#### Over 8-hour day/40-hour

##### week

|                 |         |
|-----------------|---------|
| 9th hour        | \$76.75 |
| 10th hour       | \$76.75 |
| Beyond 10 hours | \$76.75 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$76.75 |
| 9th hour        | \$76.75 |
| 10th hour       | \$76.75 |
| Beyond 10 hours | \$76.75 |

#### Sunday/Holiday

\$92.29

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

**Overtime Rate Comment:** Double time after 12 Mon-Sat

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name            | Category                              | Last Updated      |
|--------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer - EF</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Extended boom forklift over 5,000 lb capacity, 1 Drum Hoist

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$72.21       | \$92.53         | \$112.84    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$92.53  |
| 10th hour       | \$92.53  |
| Beyond 10 hours | \$112.84 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$92.53  |
| 9th hour        | \$92.53  |
| 10th hour       | \$92.53  |
| Beyond 10 hours | \$112.84 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$112.84</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW120 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 120' boom or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$74.14       | \$95.24         | \$116.33    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$95.24  |
| 10th hour       | \$95.24  |
| Beyond 10 hours | \$116.33 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$95.24  |
| 9th hour        | \$95.24  |
| 10th hour       | \$95.24  |
| Beyond 10 hours | \$116.33 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$116.33 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                    | Category                       | Last Updated |
|----------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW1200 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 120' boom or longer w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$75.01       | \$96.54         | \$118.07    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.54  |
| 10th hour       | \$96.54  |
| Beyond 10 hours | \$118.07 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.54  |
| 9th hour        | \$96.54  |
| 10th hour       | \$96.54  |
| Beyond 10 hours | \$118.07 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$118.07</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW140 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 140' boom or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$75.19       | \$96.80         | \$118.41    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.80  |
| 10th hour       | \$96.80  |
| Beyond 10 hours | \$118.41 |

##### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.80  |
| 9th hour        | \$96.80  |
| 10th hour       | \$96.80  |
| Beyond 10 hours | \$118.41 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$118.41 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                    | Category                       | Last Updated |
|----------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW1400 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 140' boom or longer W/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$76.19       | \$98.24         | \$120.28    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$98.24  |
| 10th hour       | \$98.24  |
| Beyond 10 hours | \$120.28 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$98.24  |
| 9th hour        | \$98.24  |
| 10th hour       | \$98.24  |
| Beyond 10 hours | \$120.28 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$120.28 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW220 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Boom & Jib 220' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$76.46       | \$98.62         | \$120.78    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$98.62  |
| 10th hour       | \$98.62  |
| Beyond 10 hours | \$120.78 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$98.62  |
| 9th hour        | \$98.62  |
| 10th hour       | \$98.62  |
| Beyond 10 hours | \$120.78 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$120.78 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                    | Category                       | Last Updated |
|----------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW2200 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 220' boom or longer w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$74.01       | \$95.11         | \$116.20    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$95.11  |
| 10th hour       | \$95.11  |
| Beyond 10 hours | \$116.20 |

##### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$95.11  |
| 9th hour        | \$95.11  |
| 10th hour       | \$95.11  |
| Beyond 10 hours | \$116.20 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$116.20 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW300 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Boom & Jib 300' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$76.96       | \$99.34         | \$121.72    |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$99.34  |
| 10th hour       | \$99.34  |
| Beyond 10 hours | \$121.72 |

##### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$99.34  |
| 9th hour        | \$99.34  |
| 10th hour       | \$99.34  |
| Beyond 10 hours | \$121.72 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$121.72 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                    | Category                       | Last Updated |
|----------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW3000 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 300' boom or longer w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$77.96       | \$100.78        | \$123.59    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$100.78 |
| 10th hour       | \$100.78 |
| Beyond 10 hours | \$123.59 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$100.78 |
| 9th hour        | \$100.78 |
| 10th hour       | \$100.78 |
| Beyond 10 hours | \$123.59 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$123.59 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW400 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Boom & Jib 400' or longer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$78.46       | \$101.49        | \$124.52    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$101.49 |
| 10th hour       | \$101.49 |
| Beyond 10 hours | \$124.52 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$101.49 |
| 9th hour        | \$101.49 |
| 10th hour       | \$101.49 |
| Beyond 10 hours | \$124.52 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$124.52 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                   | Category                       | Last Updated |
|---------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SW400 | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Crane w/ 400' boom or longer w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$79.46       | \$102.93        | \$126.39    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$102.93 |
| 10th hour       | \$102.93 |
| Beyond 10 hours | \$126.39 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$102.93 |
| 9th hour        | \$102.93 |
| 10th hour       | \$102.93 |
| Beyond 10 hours | \$126.39 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$126.39 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                         | Category                              | Last Updated      |
|---------------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer Steel Work - SWCO</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator, Job Mechanic, 3 Drum Hoist & Excavator

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$73.65       | \$94.59         | \$115.53    |
| Apprentice: 0-999 hours       | \$59.16       | \$76.02         | \$92.88     |
| Apprentice: 1,000-1,999 hours | \$61.56       | \$79.63         | \$97.68     |
| Apprentice: 2,000-2,999 hours | \$63.96       | \$83.22         | \$102.48    |
| Apprentice: 3,000-3,999 hours | \$66.38       | \$84.18         | \$101.98    |
| Apprentice: 4,000-4,999 hours | \$68.78       | \$90.46         | \$112.12    |
| Apprentice: 5,000 hours       | \$71.20       | \$91.09         | \$110.99    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$94.59  |
| 10th hour       | \$94.59  |
| Beyond 10 hours | \$115.53 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$94.59  |
| 9th hour        | \$94.59  |
| 10th hour       | \$94.59  |
| Beyond 10 hours | \$115.53 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$115.53</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                           | Category                              | Last Updated      |
|-----------------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer Steel Work - SWCO-O</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Crane Operator w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$74.65       | \$96.03         | \$117.40    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.03  |
| 10th hour       | \$96.03  |
| Beyond 10 hours | \$117.40 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.03  |
| 9th hour        | \$96.03  |
| 10th hour       | \$96.03  |
| Beyond 10 hours | \$117.40 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$117.40</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                       | Last Updated |
|--------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SWCW | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Compressor or Welder Operator

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$37.03       | \$49.48         | \$61.92     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$47.85 |
| 10th hour       | \$47.85 |
| Beyond 10 hours | \$58.67 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$47.85 |
| 9th hour        | \$47.85 |
| 10th hour       | \$47.85 |
| Beyond 10 hours | \$58.67 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$58.67</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                  | Category                       | Last Updated |
|--------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SWHO | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Hoisting Operator, 2 Drum Hoist, & Rubber Tire Backhoe

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$73.01       | \$93.67         | \$114.33    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$93.67  |
| 10th hour       | \$93.67  |
| Beyond 10 hours | \$114.33 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$93.67  |
| 9th hour        | \$93.67  |
| 10th hour       | \$93.67  |
| Beyond 10 hours | \$114.33 |

|                       |          |
|-----------------------|----------|
| <b>Sunday/Holiday</b> | \$114.33 |
|-----------------------|----------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                 | Category                       | Last Updated |
|-------------------------------------|--------------------------------|--------------|
| Operating Engineer Steel Work - SWO | Operating Engineer, Steel Work | 04/04/2025   |

**Classification Description:** Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$53.42       | \$67.61         | \$81.80     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$65.74 |
| 10th hour       | \$65.74 |
| Beyond 10 hours | \$78.06 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$65.74 |
| 9th hour        | \$65.74 |
| 10th hour       | \$65.74 |
| Beyond 10 hours | \$78.06 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$78.06</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                           | Category                              | Last Updated      |
|-----------------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer Steel Work - SWTD50</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Tower Crane & Derrick where work is 50' or more

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$74.74       | \$96.16         | \$117.57    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$96.16  |
| 10th hour       | \$96.16  |
| Beyond 10 hours | \$117.57 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$96.16  |
| 9th hour        | \$96.16  |
| 10th hour       | \$96.16  |
| Beyond 10 hours | \$117.57 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$117.57</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                             | Category                              | Last Updated      |
|-------------------------------------------------|---------------------------------------|-------------------|
| <b>Operating Engineer Steel Work - SWTD50 O</b> | <b>Operating Engineer, Steel Work</b> | <b>04/04/2025</b> |

**Classification Description:** Tower Crane & Derrick 50' or more w/ Oiler

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$75.84       | \$97.69         | \$119.54    |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$97.69  |
| 10th hour       | \$97.69  |
| Beyond 10 hours | \$119.54 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$97.69  |
| 9th hour        | \$97.69  |
| 10th hour       | \$97.69  |
| Beyond 10 hours | \$119.54 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$119.54</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

4 10s allowed M-Th with Friday makeup day because of bad weather

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category | Last Updated |
|---------------------|----------|--------------|
| Painter HR01        | Painter  | 07/01/2025   |

**Classification Description:** All work of a falling height of 31-44 feet

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$41.25       | \$54.45         | \$67.65     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$54.45 |
| 10th hour       | \$54.45 |
| Beyond 10 hours | \$54.45 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$54.45 |
| 9th hour        | \$54.45 |
| 10th hour       | \$54.45 |
| Beyond 10 hours | \$54.45 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$67.65</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

A make-up day may be scheduled for work missed due to holiday or inclement weather.

**Base Rate Comment:** The regular weekly work schedule may consist of 4 10s on consecutive days, Monday thru Saturday

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category | Last Updated |
|---------------------|----------|--------------|
| Painter HR02        | Painter  | 07/01/2025   |

**Classification Description:** All work of a falling height of 45-59 feet

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$41.35       | \$54.60         | \$67.85     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$54.60 |
| 10th hour       | \$54.60 |
| Beyond 10 hours | \$54.60 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$54.60 |
| 9th hour        | \$54.60 |
| 10th hour       | \$54.60 |
| Beyond 10 hours | \$54.60 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$67.85</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

A makeup day may be scheduled for work missed due to holiday or inclement weather.

**Base Rate Comment:** The regular weekly work schedule may consist of 4 10s on consecutive days, Monday thru Saturday.

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category       | Last Updated      |
|---------------------|----------------|-------------------|
| <b>Pipefitter</b>   | <b>Plumber</b> | <b>04/04/2025</b> |

**Classification Description:** Pipefitter, Steamfitter, HVAC-R mechanic

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$77.06       | \$100.47        | \$118.67    |
| Apprentice: 10th period       | \$42.91       | \$57.34         | \$70.42     |
| Apprentice: 1st & 2nd periods | \$34.00       | \$43.98         | \$52.60     |
| Apprentice: 3rd period        | \$35.25       | \$45.85         | \$55.10     |
| Apprentice: 4th period        | \$36.25       | \$47.35         | \$57.10     |
| Apprentice: 5th period        | \$36.98       | \$48.44         | \$58.56     |
| Apprentice: 6th period        | \$38.23       | \$50.32         | \$61.06     |
| Apprentice: 7th period        | \$39.48       | \$52.20         | \$63.56     |
| Apprentice: 8th period        | \$40.48       | \$53.70         | \$65.56     |
| Apprentice: 9th period        | \$41.48       | \$55.20         | \$67.56     |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$95.27  |
| 10th hour       | \$95.27  |
| Beyond 10 hours | \$113.47 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$95.27  |
| 9th hour        | \$95.27  |
| 10th hour       | \$113.47 |
| Beyond 10 hours | \$113.47 |

#### Sunday/Holiday

\$113.47



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category       | Last Updated      |
|---------------------|----------------|-------------------|
| <b>Plumber</b>      | <b>Plumber</b> | <b>04/04/2025</b> |

**Classification Description:** Plumber

| Wage Rates           | Straight Time | Time and a Half | Double Time |
|----------------------|---------------|-----------------|-------------|
| Total Hourly Wage    | \$79.32       | \$97.22         | \$115.11    |
| Apprentice: 1st Year | \$29.48       | \$38.33         | \$47.18     |
| Apprentice: 2nd Year | \$33.10       | \$42.83         | \$52.55     |
| Apprentice: 3rd Year | \$34.75       | \$45.23         | \$55.70     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$97.22  |
| 10th hour       | \$97.22  |
| Beyond 10 hours | \$115.11 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$97.22  |
| 9th hour        | \$115.11 |
| 10th hour       | \$115.11 |
| Beyond 10 hours | \$115.11 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$115.11</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category                   | Last Updated      |
|---------------------|----------------------------|-------------------|
| <b>Roofer - WOM</b> | <b>Roofer/Waterproofer</b> | <b>04/04/2025</b> |

**Classification Description:** Commercial Roofer

| Wage Rates                 | Straight Time | Time and a Half | Double Time |
|----------------------------|---------------|-----------------|-------------|
| Total Hourly Wage          | \$62.82       | \$79.68         | \$96.53     |
| Apprentice: Apprentice 1   | \$48.74       | \$58.55         | \$68.37     |
| Apprentice: Apprentice 2   | \$49.25       | \$59.32         | \$69.39     |
| Apprentice: Apprentice 3   | \$50.76       | \$61.59         | \$72.41     |
| Apprentice: Apprentice 4   | \$52.26       | \$63.83         | \$75.41     |
| Apprentice: Apprentice 5   | \$53.77       | \$66.10         | \$78.43     |
| Apprentice: Apprentice 6   | \$55.18       | \$68.21         | \$81.25     |
| Apprentice: Apprentice 7   | \$56.79       | \$70.63         | \$84.47     |
| Apprentice: Apprentice 8   | \$58.27       | \$72.85         | \$87.43     |
| Apprentice: new apprentice | \$48.68       | \$58.47         | \$68.25     |

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$79.68 |
| 10th hour       | \$79.68 |
| Beyond 10 hours | \$79.68 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$79.68 |
| 9th hour        | \$79.68 |
| 10th hour       | \$79.68 |
| Beyond 10 hours | \$79.68 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$96.53</b> |
|-----------------------|----------------|

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category           | Last Updated |
|---------------------|--------------------|--------------|
| Sheet Metal Worker  | Sheet Metal Worker | 04/04/2025   |

**Classification Description:** Journeyman -

A 4 10 schedule may be worked, 4 consecutive days Monday thru Friday.

| Wage Rates                    | Straight Time | Time and a Half | Double Time |
|-------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage             | \$74.96       | \$95.01         | \$115.06    |
| Apprentice: 1st & 2nd Periods | \$48.51       | \$59.65         | \$70.77     |
| Apprentice: 3rd & 4th Periods | \$50.74       | \$62.99         | \$75.23     |
| Apprentice: 5th & 6th Periods | \$52.96       | \$66.32         | \$79.67     |
| Apprentice: 7th & 8th Periods | \$55.19       | \$69.67         | \$84.13     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$95.01  |
| 10th hour       | \$95.01  |
| Beyond 10 hours | \$115.06 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$95.01  |
| 9th hour        | \$115.06 |
| 10th hour       | \$115.06 |
| Beyond 10 hours | \$115.06 |

|                       |                 |
|-----------------------|-----------------|
| <b>Sunday/Holiday</b> | <b>\$115.06</b> |
|-----------------------|-----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                | Category                | Last Updated      |
|------------------------------------|-------------------------|-------------------|
| <b>Sprinkler Fitter Journeyman</b> | <b>Sprinkler Fitter</b> | <b>04/04/2025</b> |

**Classification Description:** Sprinkler Fitter Journeyman -

4 ten hour days allowed Monday-Friday

Double time pay due after 12 hours worked M-F

| Wage Rates              | Straight Time | Time and a Half | Double Time |
|-------------------------|---------------|-----------------|-------------|
| Total Hourly Wage       | \$78.57       | \$102.66        | \$126.74    |
| Apprentice: 10th Period | \$69.91       | \$87.12         | \$104.33    |
| Apprentice: 1st Period  | \$31.91       | \$40.00         | \$48.09     |
| Apprentice: 2nd Period  | \$51.25       | \$60.36         | \$69.47     |
| Apprentice: 3rd Period  | \$53.58       | \$63.71         | \$73.83     |
| Apprentice: 4th Period  | \$55.91       | \$67.04         | \$78.17     |
| Apprentice: 5th Period  | \$58.25       | \$70.40         | \$82.55     |
| Apprentice: 6th Period  | \$60.58       | \$73.73         | \$86.89     |
| Apprentice: 7th Period  | \$62.91       | \$77.08         | \$91.24     |
| Apprentice: 8th Period  | \$65.25       | \$80.44         | \$95.62     |
| Apprentice: 9th Period  | \$67.58       | \$83.78         | \$99.98     |

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |          |
|-----------------|----------|
| 9th hour        | \$102.66 |
| 10th hour       | \$102.66 |
| Beyond 10 hours | \$126.74 |

#### Saturday

|                 |          |
|-----------------|----------|
| First 8 hours   | \$102.66 |
| 9th hour        | \$126.74 |
| 10th hour       | \$126.74 |
| Beyond 10 hours | \$126.74 |

**Sunday/Holiday** \$126.74

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                            | Category           | Last Updated      |
|----------------------------------------------------------------|--------------------|-------------------|
| <b>Tile, Marble &amp; Terrazzo Finisher-BAC2-Metro Detroit</b> | <b>Tile Setter</b> | <b>04/04/2025</b> |

**Classification Description:** Work: Assisting mechanics (e.g., tile, marble, terrazzo workers) with tasks necessary for completing installations.

Materials: Supporting materials used for tile, marble, or terrazzo work, such as cement and adhesives.

| Wage Rates                                    | Straight Time | Time and a Half | Double Time |
|-----------------------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                             | \$54.19       | \$68.23         | \$82.26     |
| Apprentice: TMT Finisher Apprentice Level 4   | \$40.89       | \$52.12         | \$63.35     |
| Apprentice: TMT Finisher Apprentice 1st Level | \$36.68       | \$45.81         | \$54.93     |
| Apprentice: TMT Finisher Apprentice 2nd Level | \$38.08       | \$47.91         | \$57.73     |
| Apprentice: TMT Finisher Apprentice 3rd Level | \$39.48       | \$50.01         | \$60.53     |
| Apprentice: TMT Finisher Apprentice Level 5   | \$42.29       | \$54.22         | \$66.15     |
| Apprentice: TMT Finisher Apprentice Level 6   | \$43.69       | \$56.32         | \$68.95     |
| Apprentice: TMT Setter Apprentice 7thLevel    | \$35.64       | \$48.98         | \$62.31     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$68.22 |
| 10th hour       | \$68.22 |
| Beyond 10 hours | \$68.22 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$68.22 |
| 9th hour        | \$68.22 |
| 10th hour       | \$68.22 |
| Beyond 10 hours | \$68.22 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$82.26</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                                                     | Category           | Last Updated      |
|-------------------------------------------------------------------------|--------------------|-------------------|
| <b>Tile, Marble &amp; Terrazzo Mechanic - BAC<br/>2 - Metro Detroit</b> | <b>Tile Setter</b> | <b>04/04/2025</b> |

**Classification Description:** Work: Installing and finishing mosaic and terrazzo materials, including precision tasks like grinding and polishing. Adding aggregate to the top of the finished base and troweled or rolled into the finish.  
Materials: Marble, mosaic, Venetian enamel, terrazzo, granules of marble, granite, bluestone, enamel, mother of pearl, quartz, ceramic-colored quartz, rubber, neoprene, vinyl, magnesium chloride, and resinous or chemical substances.

| Wage Rates                                  | Straight Time | Time and a Half | Double Time | Overtime Provisions                 |
|---------------------------------------------|---------------|-----------------|-------------|-------------------------------------|
| Total Hourly Wage                           | \$60.99       | \$87.01         | \$113.01    | <b>Over 8-hour day/40-hour week</b> |
| Apprentice: TMT Setter Apprentice 1st Level | \$41.07       | \$51.50         | \$61.93     | 9th hour \$60.99                    |
| Apprentice: TMT Setter Apprentice 2nd Level | \$42.81       | \$54.11         | \$65.41     | 10th hour \$60.99                   |
| Apprentice: TMT Setter Apprentice 3rd Level | \$44.55       | \$56.72         | \$68.89     | Beyond 10 hours \$60.99             |
| Apprentice: TMT Setter Apprentice 4thLevel  | \$46.29       | \$59.33         | \$72.37     | <b>Saturday</b>                     |
| Apprentice: TMT Setter Apprentice 5th Level | \$48.03       | \$61.94         | \$75.85     | First 8 hours \$60.99               |
| Apprentice: TMT Setter Apprentice 6th Level | \$49.76       | \$64.55         | \$79.33     | 9th hour \$60.99                    |
| Apprentice: TMT Setter Apprentice 7thLevel  | \$51.50       | \$67.15         | \$82.79     | 10th hour \$60.99                   |
| Apprentice: TMT Setter Apprentice 8th Level | \$53.24       | \$69.76         | \$86.27     | Beyond 10 hours \$60.99             |
|                                             |               |                 |             | <b>Sunday/Holiday</b> \$95.76       |

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated |
|---------------------|--------------|--------------|
| Truck Driver - RB1  | Truck Driver | 04/04/2025   |

**Classification Description:** on all trucks of 8 cubic yard capacity or less (except dump trucks of 8 cubic yard capacity or over, tandem axle trucks, transit mix and semis, euclid type equipment, double bottoms and low boys)

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$53.95       | \$70.30         | \$86.64     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$69.32 |
| 10th hour       | \$69.32 |
| Beyond 10 hours | \$69.32 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$69.32 |
| 9th hour        | \$69.32 |
| 10th hour       | \$69.32 |
| Beyond 10 hours | \$69.32 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$84.69</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category            | Last Updated      |
|----------------------------|---------------------|-------------------|
| <b>Truck Driver - RB1A</b> | <b>Truck Driver</b> | <b>04/04/2025</b> |

**Classification Description:** of all trucks of 8 cubic yard capacity or over semi, tractor trailer

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$54.10       | \$70.52         | \$86.94     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$69.55 |
| 10th hour       | \$69.55 |
| Beyond 10 hours | \$69.55 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$69.55 |
| 9th hour        | \$69.55 |
| 10th hour       | \$69.55 |
| Beyond 10 hours | \$69.55 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$84.99</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category            | Last Updated      |
|----------------------------|---------------------|-------------------|
| <b>Truck Driver - RB1B</b> | <b>Truck Driver</b> | <b>04/04/2025</b> |

**Classification Description:** on euclid type equipment, Pole drier, lowboy, doubles, fuel, bus, water

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$54.20       | \$69.70         | \$85.19     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$69.70 |
| 10th hour       | \$69.70 |
| Beyond 10 hours | \$69.70 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$69.70 |
| 9th hour        | \$69.70 |
| 10th hour       | \$69.70 |
| Beyond 10 hours | \$69.70 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$85.19</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - Yes

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated |
|---------------------|--------------|--------------|
| Truck Driver - RB2  | Truck Driver | 04/04/2025   |

**Classification Description:** of all trucks of 8 cubic yd capacity or over

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$44.10       | \$48.81         | \$49.80     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$56.55 |
| 10th hour       | \$56.55 |
| Beyond 10 hours | \$56.55 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$56.55 |
| 9th hour        | \$56.55 |
| 10th hour       | \$56.55 |
| Beyond 10 hours | \$56.55 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$56.55 |
|-----------------------|---------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated |
|---------------------|--------------|--------------|
| Truck Driver - RB2A | Truck Driver | 04/04/2025   |

**Classification Description:** of all trucks of 8 cubic yard capacity or less (except dump trucks of 8 cubic yard capacity or over, tandem axle trucks, transit mix and semis, euclid type equipment, double bottoms and low boys)

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$44.00       | \$48.66         | \$49.60     |

#### Overtime Provisions

##### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$56.40 |
| 10th hour       | \$56.40 |
| Beyond 10 hours | \$56.40 |

##### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$56.40 |
| 9th hour        | \$56.40 |
| 10th hour       | \$56.40 |
| Beyond 10 hours | \$56.40 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$56.40</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name | Category     | Last Updated |
|---------------------|--------------|--------------|
| Truck Driver - RB2B | Truck Driver | 04/04/2025   |

**Classification Description:** on euclid type equipment

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$44.25       | \$49.04         | \$0.00      |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$56.78 |
| 10th hour       | \$56.78 |
| Beyond 10 hours | \$56.78 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$56.78 |
| 9th hour        | \$56.78 |
| 10th hour       | \$56.78 |
| Beyond 10 hours | \$56.78 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$56.78 |
|-----------------------|---------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category                                                                | Last Updated |
|----------------------------|-------------------------------------------------------------------------|--------------|
| Pipe and Manhole Rehab - 2 | Wiring System Installer;<br>Technology Circuits or<br>Systems Installer | 04/04/2025   |

**Classification Description:** Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$32.70       | \$44.95         | \$57.19     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$44.95 |
| 10th hour       | \$44.95 |
| Beyond 10 hours | \$44.95 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$44.95 |
| 9th hour        | \$44.95 |
| 10th hour       | \$44.95 |
| Beyond 10 hours | \$44.95 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$44.95 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name        | Category                                                                | Last Updated |
|----------------------------|-------------------------------------------------------------------------|--------------|
| Pipe and Manhole Rehab - 3 | Wiring System Installer;<br>Technology Circuits or<br>Systems Installer | 04/04/2025   |

**Classification Description:** CCTV Technician/Combo Unit Operator: unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work

| Wage Rates        | Straight Time | Time and a Half | Double Time |
|-------------------|---------------|-----------------|-------------|
| Total Hourly Wage | \$31.45       | \$43.07         | \$54.69     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$43.07 |
| 10th hour       | \$43.07 |
| Beyond 10 hours | \$43.07 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$43.07 |
| 9th hour        | \$43.07 |
| 10th hour       | \$43.07 |
| Beyond 10 hours | \$43.07 |

|                       |         |
|-----------------------|---------|
| <b>Sunday/Holiday</b> | \$43.07 |
|-----------------------|---------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                      | Category                                                                         | Last Updated      |
|------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| <b>Sewer Relining Operator - Class I</b> | <b>Wiring System Installer;<br/>Technology Circuits or<br/>Systems Installer</b> | <b>04/04/2025</b> |

**Classification Description:** Class I-Operator of audio visual CCTV system including remote in-ground cutter and other equipment used in conjunction with CCTV system.

| Wage Rates              | Straight Time | Time and a Half | Double Time |
|-------------------------|---------------|-----------------|-------------|
| Total Hourly Wage       | \$52.84       | \$69.23         | \$85.62     |
| Apprentice: 0-6 months  | \$41.58       | \$54.66         | \$67.74     |
| Apprentice: 6-12 months | \$45.31       | \$60.26         | \$75.20     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$69.23 |
| 10th hour       | \$69.23 |
| Beyond 10 hours | \$69.23 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$69.23 |
| 9th hour        | \$69.23 |
| 10th hour       | \$69.23 |
| Beyond 10 hours | \$69.23 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$85.62</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - No

**Make Up Day Allowed?** - No

# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name               | Category                                                                | Last Updated |
|-----------------------------------|-------------------------------------------------------------------------|--------------|
| Sound and Communication Installer | Wiring System Installer;<br>Technology Circuits or<br>Systems Installer | 04/04/2025   |

**Classification Description:** Sound and Communication Installer

| Wage Rates                        | Straight Time | Time and a Half | Double Time |
|-----------------------------------|---------------|-----------------|-------------|
| Total Hourly Wage                 | \$48.26       | \$64.55         | \$80.85     |
| Apprentice: Apprentice 1st Period | \$34.69       | \$43.65         | \$52.61     |
| Apprentice: Apprentice 2nd Period | \$36.32       | \$46.09         | \$55.87     |
| Apprentice: Apprentice 3rd Period | \$37.96       | \$48.56         | \$59.14     |
| Apprentice: Apprentice 4th Period | \$39.58       | \$51.00         | \$62.40     |
| Apprentice: Apprentice 5th Period | \$41.21       | \$53.44         | \$65.65     |
| Apprentice: Apprentice 6th Period | \$42.84       | \$55.88         | \$68.91     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$64.08 |
| 10th hour       | \$64.08 |
| Beyond 10 hours | \$64.08 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$64.08 |
| 9th hour        | \$64.08 |
| 10th hour       | \$64.08 |
| Beyond 10 hours | \$64.08 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$79.90</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



# Prevailing Wage Rates for State Funded Projects

## Official Rate Schedule

### Wayne

| Classification Name                | Category                                                                  | Last Updated |
|------------------------------------|---------------------------------------------------------------------------|--------------|
| Sound and Communication Technician | Wiring System Technician;<br>Technology Circuits or<br>Systems Technician | 04/04/2025   |

**Classification Description:** Sound and Communication Technician

| Wage Rates           | Straight Time | Time and a Half | Double Time |
|----------------------|---------------|-----------------|-------------|
| Total Hourly Wage    | \$56.80       | \$77.37         | \$97.93     |
| Apprentice: Period 1 | \$34.18       | \$14.45         | \$14.67     |
| Apprentice: Period 2 | \$36.23       | \$15.13         | \$15.58     |
| Apprentice: Period 3 | \$38.27       | \$14.58         | \$14.85     |
| Apprentice: Period 4 | \$40.31       | \$14.66         | \$14.95     |
| Apprentice: Period 5 | \$42.35       | \$14.71         | \$15.03     |
| Apprentice: Period 6 | \$44.40       | \$14.79         | \$15.13     |

### Overtime Provisions

#### Over 8-hour day/40-hour week

|                 |         |
|-----------------|---------|
| 9th hour        | \$76.77 |
| 10th hour       | \$76.77 |
| Beyond 10 hours | \$76.77 |

#### Saturday

|                 |         |
|-----------------|---------|
| First 8 hours   | \$76.77 |
| 9th hour        | \$76.77 |
| 10th hour       | \$76.77 |
| Beyond 10 hours | \$76.77 |

|                       |                |
|-----------------------|----------------|
| <b>Sunday/Holiday</b> | <b>\$96.73</b> |
|-----------------------|----------------|

**Four 10-hour days allowed?** - Yes

**Make Up Day Allowed?** - No



**STATE OF MICHIGAN**  
**Informational Sheet: Prevailing Wages on State Projects**

**General Information Regarding Fringe Benefits**

**Certain** fringe benefits **may** be credited toward the payment of the Prevailing Wage Rate:

- If a fringe benefit is paid directly to a construction mechanic
- If a fringe benefit contribution or payment is made on behalf of a construction mechanic
- If a fringe benefit, which may be provided to a construction mechanic, is pursuant to a written contract or policy
- If a fringe benefit is paid into a fund, for a construction mechanic

When a fringe benefit is not paid by an hourly rate, the hourly credit will be calculated based on the annual value of the fringe benefit divided by 2080 hours per year (52 weeks @ 40 hours per week).

The following is an example of the types of fringe benefits allowed and how an hourly credit is calculated:

|                            |                                                        |                |
|----------------------------|--------------------------------------------------------|----------------|
| Vacation                   | 40 hours X \$14.00 per hour = \$560/2080 =             | \$3.27         |
| Dental insurance           | \$31.07 monthly premium X 12 mos. = \$372.84 /2080 =   | \$1.80         |
| Vision insurance           | \$5.38 monthly premium X 12 mos. = \$64.56/2080 =      | \$0.31         |
| Health insurance           | \$230.00 monthly premium X 12 mos. = \$2,760.00/2080 = | \$1.33         |
| Life insurance             | \$27.04 monthly premium X 12 mos. = \$324.48/2080 =    | \$1.56         |
| Tuition                    | \$500.00 annual cost/2080 =                            | \$2.40         |
| Bonus                      | 4 quarterly bonus/year x \$250 = \$1000.00/2080 =      | \$4.81         |
| 401k Employer Contribution | \$2000.00 total annual contribution/2080 =             | \$9.62         |
| <b>Total Hourly Credit</b> |                                                        | <b>\$32.09</b> |

Other examples of the types of fringe benefits allowed:

- Sick pay
- Holiday pay
- Accidental Death & Dismemberment insurance premiums

The following are examples of items that **will not** be credited toward the payment of the Prevailing Wage Rate

- Legally required payments, such as:
  - Unemployment Insurance payments
  - Workers' Compensation Insurance payments
  - FICA (Social Security contributions, Medicare contributions)
- Reimbursable expenses, such as:
  - Clothing allowance or reimbursement
  - Uniform allowance or reimbursement
  - Gas allowance or reimbursement
  - Travel time or payment
  - Meals or lodging allowance or reimbursement
  - Per diem allowance or payment
- Other payments to or on behalf of a construction mechanic that are not wages or fringe benefits, such as:
  - Industry advancement funds
  - Financial or material loans



## STATE OF MICHIGAN

### Informational Sheet: Prevailing Wages on State Projects

#### OVERTIME PROVISIONS for MICHIGAN PREVAILING WAGE RATE COMMERCIAL SCHEDULE

- Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

|               | Monday thru Friday | Saturday | Sunday & Holidays | Four 10s |
|---------------|--------------------|----------|-------------------|----------|
| First 8 Hours |                    | 4        | 8                 | 9        |
| 9th Hour      | 1                  | 5        |                   |          |
| 10th Hour     | 2                  | 6        |                   |          |
| Over 10 hours | 3                  | 7        |                   |          |

##### Overtime for Monday thru Friday after 8 hours:

the 1st character is for time worked in the 9th hour (8.1 - 9 hours)

the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)

the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

##### Overtime on Saturday:

the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)

the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)

the 6th character is for time worked in the 10th hour (9.1 - 10 hours)

the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

##### Overtime on Sundays & Holidays

The 8th character is for time worked on Sunday or on a holiday

##### Four Ten Hour Days

The 9th character indicates if an optional 4-day 10-hour per day workweek can be worked **between Monday and Friday without paying overtime after 8 hours worked, unless otherwise noted in the rate schedule. To utilize a 4 ten workweek, notice is required from the employer to employee prior to the start of work on the project.**

- Overtime Indicators Used in the Overtime Provision:

H - means TIME AND ONE-HALF due

X - means TIME AND ONE-HALF due after 40 HOURS worked

D - means DOUBLE PAY due

Y - means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked

N - means NO an optional 4-day 10-hour per day workweek *cannot* be worked without paying overtime after 8 hours worked

- EXAMPLES:

HHHHHHHDN - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (*characters 1 - 3*); for all hours worked on Saturday, 1½ rate is due (*characters 4 - 7*). Work done on Sundays or holidays must be paid double time (*character 8*). The N (*character 9*) indicates that 4 ten-hour days is not an acceptable workweek at regular pay.

XXXHHHHDY - This example shows that the 1½ rate must be used for time worked after 40 hours are worked Monday thru Friday (*characters 1-3*); for hours worked on Saturday, 1½ rate is due (*characters 4 – 7*). Work done on Sundays or holidays must be paid double time (*character 8*). The Y (*character 9*) indicates that 4 ten-hour days is an acceptable alternative workweek.



**STATE OF MICHIGAN**  
**Informational Sheet: Prevailing Wages on State Projects**

**ENGINEERS - CLASSES OF EQUIPMENT LIST**

**UNDERGROUND ENGINEERS**

**CLASS I**

Backfiller Tamper, Backhoe, Batch Plant Operator, Clam-Shell, Concrete Paver (2 drums or larger), Conveyor Loader (Euclid type), Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, End Loader, Gradall (and similar type machine), Grader, Power Shovel, Roller (asphalt), Scraper (self propelled or tractor drawn), Side Broom Tractor (type D-4 or larger), Slope Paver, Trencher (over 8' digging capacity), Well Drilling Rig, Mechanic, Slip Form Paver, Hydro Excavator.

**CLASS II**

Boom Truck (power swing type boom), Crusher, Hoist, Pump (1 or more 6" discharge or larger gas or diesel powered by generator of 300 amps or more, inclusive of generator), Side Boom Tractor (smaller than type D-4 or equivalent), Tractor (pneu-tired, other than backhoe or front end loader), Trencher (8' digging capacity and smaller), Vac Truck.

**CLASS III**

Air Compressors (600 cfm or larger), Air Compressors (2 or more less than 600 cfm), Boom Truck (non-swinging, non-powered type boom), Concrete Breaker (self-propelled or truck mounted, includes compressor), Concrete Paver (1 drum, ½ yard or larger), Elevator (other than passenger), Maintenance Man, Mechanic Helper, Pump (2 or more 4" up to 6" discharge, gas or diesel powered, excluding submersible pump), Pumpcrete Machine (and similar equipment), Wagon Drill Machine, Welding Machine or Generator (2 or more 300 amp or larger, gas or diesel powered).

**CLASS IV**

Boiler, Concrete Saw (40HP or over), Curing Machine (self-propelled), Farm Tractor (w/attachment), Finishing Machine (concrete), Firemen, Hydraulic Pipe Pushing Machine, Mulching Equipment, Oiler (2 or more up to 4", exclude submersible), Pumps (2 or more up to 4" discharge if used 3 hrs or more a day-gas or diesel powered, excluding submersible pumps), Roller (other than asphalt), Stump Remover, Vibrating Compaction Equipment (6' wide or over), Trencher (service) Sweeper (Wayne type and similar equipment), Water Wagon, Extend-a-Boom Forklift.

**HAZARDOUS WASTE ABATEMENT ENGINEERS**

**CLASS I**

Backhoe, Batch Plant Operator, Clamshell, Concrete Breaker when attached to hoe, Concrete Cleaning Decontamination Machine Operator, Concrete Pump, Concrete Paver, Crusher, Dozer, Elevating Grader, Endloader, Farm Tractor (90 h.p. and higher), Gradall, Grader, Heavy Equipment Robotics Operator, Hydro Excavator, Loader, Pug Mill, Pumpcrete Machines, Pump Trucks, Roller, Scraper (self-propelled or tractor drawn), Side Boom Tractor, Slip Form Paver, Slope Paver, Trencher, Ultra High Pressure Waterjet Cutting Tool System Operator, Vactors, Vacuum Blasting Machine Operator, Vertical Lifting Hoist, Vibrating Compaction Equipment (self-propelled), and Well Drilling Rig.

**CLASS II**

Air Compressor, Concrete Breaker when not attached to hoe, Elevator, End Dumps, Equipment Decontamination Operator, Farm Tractor (less than 90 h.p.), Forklift, Generator, Heater, Mulcher, Pigs (Portable Reagent Storage Tanks), Power Screens, Pumps (water), Stationary Compressed Air Plant, Sweeper, Water Wagon and Welding Machine.



## STATE OF MICHIGAN

### *Informational Sheet: Prevailing Wages on State Projects*

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#### **CARPENTER CRAFT JURISDICTION**

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Michigan recognizes the Carpenters for any and all work related to weatherization that has historically been the work of the Carpenter. This work shall include, but not be limited to: all work defined under the Federal Weatherization Assistance Program.

The jurisdiction of Carpenters, as to all work that has historically and traditionally been performed consisting of the milling, fashioning, joining, assembling, erecting, fastening or dismantling of all materials of wood, plastic, metal, fiber, cork, or composition and all other substitute materials, as well as the handling, cleaning, erecting, installing and dismantling of all machinery, equipment and all materials used by Carpenters.

The jurisdiction, therefore, extends over the following divisions and subdivisions of the trade: Carpenters and Joiners, Millwrights, Pile Drivers, Bridge, Dock and Wharf Carpenters, Underpinners, Timbermen, and Core-drillers, Shipwrights, Boat Builders, Ship-hand, Stair-Builders, Millmen, Wood and Resilient Floor Decorators, Floor Finishers, Carpet-layers, Shinglers, Siders, Insulators, Acoustic and Drywall Applicators, Sharers and House Movers, Loggers, Lumber and Sawmill Workers, Reed and Rattan Workers, Shingle Weavers, Casket and Coffin Makers, Railroad Carpenters and Car Builders, regardless of material used and all those engaged in the operation of woodworking or other machinery required in fashioning, milling or manufacturing of products used in the trade, and the handling, erecting and installing materials on any of the above divisions or sub-divisions, burning, welding and rigging incidental to the trade. When the term "Carpenter and Joiner" is used, it shall mean all the subdivisions of the trade. The trade autonomy of Carpenters therefore extends over the divisions and subdivisions of the trade, which are set forth as follows:

- (a) The framing, erecting and prefabrication of roofs, partitions, floors and other parts of buildings of wood, metal, plastic or other substitutes; application of all metal flashing used for hips, valleys and chimneys; the erection of Stran Steel section or its equal. The building and setting of all forms and centers for brick and masonry. The fabrication and erection of all forms for concrete and decking, the dismantling of same (as per International Agreement) when they are to be re-used on the job or stored for re-use. The cutting and handling of all falsework for fireproofing and slabs. Where power is used in the setting or dismantling of forms, all signaling and handling shall be done by carpenters. The setting of templates for anchor bolts for structural members and for machinery, and the placing, leveling and bracing of these bolts. All framing in connection with the setting or metal columns. The setting of all bulkheads, footing forms and the setting of and fabrication of, screeds and stakes for concrete and mastic floors where the screed is notched or fitted, or made up of more than one member. The making of forms for concrete block, bulkheads, figures, posts, rails, balusters and ornaments, etc.
- (b) The handling and erecting of rough material and drywall, the handling, assembly, setting and leveling of all fixtures, display cases, all furniture such as tables, chairs, desks, coat racks, etc., all de-mountable or moveable partitions such as Von wall, E Wall, Steel Case, Herman Miller, Haworth, American Seating, Westinghouse, Lazy Boy, rosewood, etc. All rebuilding, remodeling and setting up of all kinds of partitions, finished lumber, metal and plastic trim to be erected by Carpenters shall be handled from the truck or vehicle delivering same to the job by Carpenters.



## STATE OF MICHIGAN

### *Informational Sheet: Prevailing Wages on State Projects*

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#### **CARPENTER CRAFT JURISDICTION**

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- (c) The building and moving of all scaffolding runways and staging where carpenters' tools are used, the building from the ground up of all scaffolds over fourteen (14) feet in height including metal and specially designed scaffolding. The building and construction of all hoists and derricks made of wood; the making of mortar boards, boxes, trestles, all shoring, razing and moving of buildings. Lift type trucks are to be considered a tool of the trade. Metal siding and metal roofing fall within the scope of jurisdiction for the carpenters.
- (d) The cutting or framing and fireproofing of the openings for pipes, conduits, ducts, etc., where they pass through floors, partitions, walls, roofs or fixtures composed in whole or in part of wood. The laying out of making and installation of all inserts and sleeves for pipes, ducts, etc., where carpenters' tools and knowledge are required. The making and installing of all wooden meter boards, crippling and backing for fixtures. The welding of studs and other fastenings to receive material being applied by carpenters.
- (e) The installation of all grounds, furring or stripping, ceilings and sidewalks, application of all types of shingling and siding, etc.
- (f) The installation of all interior and exterior trim or finish of wood, aluminum, kalamein, hollow or extruded metal, plastic, doors, transoms, thresholds, mullions and windows. The setting of jambs, bucks, window frames of wood or metal where braces or wedges are used. The installation of all wood, metal or other substitutes of casing, molding, chair rail, wainscoting, china closets, base of mop boards, wardrobes, metal partitions as per National Decisions or specific agreements, etc. The complete laying out, fabrication and erection of stairs. The making and erecting of all fixtures, cabinets, shelving, racks, louvers, etc. The mortising and application of all hardware in connection with our work. The sanding and refinishing of all wood, cork or composition floors to be sanded or scraped, filled, sized and buffed, either by hand or power machines. The assembling and setting of all seats in theaters, halls, churches, schools, auditorium, grandstands and other buildings. All bowling alley work.
- (g) The manufacture, fabrication and installation of all screens, storm sash, storm doors and garage doors; the installation of wood, canvas, plastic or metal awnings or eye shades, door shelters, jalousies, etc. The laying of wood, wood block and wood composition in floors.
- (h) The installation of all materials used in drywall construction, such as plasterboard, all types of asbestos boards, transite and other composition board. The application of all material which serves as base for acoustic tile, except plaster. All acoustical applications as per National Agreement or specific agreement.
- (i) The building and dismantling of all barricades, hand rails, guard rails, partitions and temporary partitions. The erection and dismantling of all temporary housing on construction projects.
- (j) The installation of rock wool, cork and other insulation material used for sound or weatherproofing. The removal of caulking and placing of staff bead and brick mold and all Oakum caulking, substitutes, etc., and all caulking in connection with carpentry work.
- (k) The installation of all chalk boards/marker boards.



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**CARPENTER CRAFT JURISDICTION**

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- (l) The operation of all hand operated winches used to raise wooden structures.
- (m) The erection of porcelain enameled panels and siding.
- (n) The unloading and distribution of all furnished, prefabricated and built-up sections such as door bucks, window frames, cupboards, cabinets, store fixtures, counters and show cases or comparably finished or prefabricated materials, to the job sites or points of installation as used in the construction, alteration and remodeling industry.
- (o) The handling of doors, metal, wood or composite, partitions and other finished bulk materials used for trim from the point of delivery.
- (p) All processing of these materials and handling after processing.
- (q) The making up of panels and fitting them into walls, all bracing and securing, all removal of panels from the casting including all braces, walers, hairpins, etc.
- (r) The handling and setting of all metal pans and sections from the stock piles of reasonable distance as required by job needs shall be performed by carpenters. The stripping of such metal pans, panels or sections is to be performed by carpenters.
- (s) The sharpening of all carpenter hand or power tools, or those used by carpenters.
- (t) The layout, fabrication, assembling of and erection and dismantling of all displays made of wood, metal, plastic, composition board or any substitute material; the covering of same with any type of material, the crating and un-crating, the handling from the point of unloading and back to the point of loading of all displays and other materials or components.
- (u) The same shall apply to all other necessary component parts used for display purposes such as turntables, platforms, identification towers and fixtures, regardless of how constructed, assembled or erected or dismantled.
- (v) The make-up, handling, cutting and sewing of all materials used in buntings, flags, banners, decorative paper, fabrics and similar materials used in the display decorative industry for draperies and back drops. The decorative framing of trucks, trailers and autos used as floats or moving displays. The slatting of walls to hand fabrics and other decorative materials, drilling of all holes to accommodate such installations. Setting up and removal of booths constructed of steel or aluminum tubing as stanchions, railings, etc., handling and placing of furniture, appliances, etc., which are being used to complete the booth at the request of the exhibitor. Fabricating and application of leather, plastic and other like materials used for covering of booths. The handling of all materials, fabricating of same. The loading and unloading, erecting and assembling at the exhibit of show area, also in or out of storage when used in booth decorations.



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**CARPENTER CRAFT JURISDICTION**

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- (w) A display shall be construed as any exhibit or medium of advertising, open to private or public showing, which is constructed of wood, metal, plastic or any other substitute to accomplish the objectives of advertising or displaying.
- (x) Handling, fitting, draping, measuring and installation of fixtures and other hardwares for draperies, all manner of making, measuring, repairing, sizing, hanging and installation of necessary fixtures and hardware for shades and Venetian blinds.
- (y) Work consisting of cutting and/or forming of all materials in preparation for installing of floors, walls and ceilings; the installation of all resilient floor and base; wall and ceiling materials to include cork, linoleum, prefabricated, laminated, rubber, asphalt, vinyl, metal, plastic, seamless floors and all other similar materials in sheet, interlocking liquid or tile form; the installation of all artificial turf, the installation, cutting and/or fitting of carpets; installation of padding, matting, linen crash and all preformed resilient floor coverings; the fitting of all devices for the attachment of carpet and other floor, wall and ceiling coverings; track sewing of carpets, drilling of holes for sockets and pins, putting in dowels and slats; and all metal trimmings used; the installation of all underlayments, sealants in preparation of floors, walls and ceilings, the unloading and handling of all materials to be installed and the removal of all materials in preparing floors when contracted for by the employer, shall be done only by employees covered under this Agreement.
- (z) The installation of all sink-tops and cabinets, to include all metal trim and covering for same. All cork, linoleum, congo-wall, linewall, veos tile, plexiglass, vinawall tile, composition tile, plastic tile, aluminum tile and rubber in sheets or tile form and the application thereof. All bolta-wall and bolta-wall tile and similar products.
- (aa) The handling and placing of all pictures and frames and the assembly of bed frames and accessories. The hanging and placing of all signage.
- (bb) The installation of all framework partitions and trim materials for toilets and bathrooms made of wood, metal, plastics or composition materials; fastening of all wooden, plastic or composition cleats to iron or any other material for accessories.
- (cc) The erection of cooling towers and tanks.
- (dd) The setting, lining, leveling and bracing of all embedded plates, rails and angles. The setting of all stay in place forms.
- (ee) Environmental: Clean room, any type of environmental chamber, walk in refrigerated coolers and all refrigerated rooms or buildings.





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**CARPENTER CRAFT JURISDICTION**

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**PILE DRIVING AND CAISSON DRILLING**

(ff) All unloading, handling, signaling and driving of piles, whether wood, steel, pipe, beam pile, composite, concrete or molded in place, wood and steel sheeting, cofferdam work, trestle work, dock work, floating derricks, caisson work, foundation work, bridge work, whether old or new, crib work, pipe line work and submarine work. Cutting of all wood, steel or concrete pile, whether by machine or hand; welding and cutting, peeling, and heading of all wood pile, steel sheeting and wood sheeting. The erecting and dismantling of all pile driving rigs, also derricks whether on land or water; also the moving, shoring and underpinning of all buildings. The loading and unloading of all derricks, cranes and pile driving materials. The tending, maintenance and operation of all valves pertaining to the operation of driving of pile. All diving and tending essential to the completion of jurisdictional claims.

All work done in the established yards of the Company and all work not enumerated above, shall be handled and manned as the Employer decides.

The pile driver will unload all material shipped in by rail from the point that the rail car is spotted.

All cleaning and preparation of all piling prior to driving.

The welding and attachment of all boot plates, pile points, splice plates, connectors, rock crosses, driving crosses, driving rigs, point reinforcements and overboots.

The construction, reconstruction, repair, alteration, demolition and partial or complete removal of all marine work including, but not limited to, docks, piers, wharves, quays, jetties, cribs, causeways, breakwaters, lighthouses and permanent buoys, etc. (mixing and placing of concrete excepted).

The driving and pulling of all wood, steel and concrete foundation piles and sheet piling.

The heading, pointing, splicing, cutting and welding of all piles.

The placing of all wales, bolts, studs, lagging, rods and washers including the cutting, drilling, boring or breaking of all holes or openings thereof.

The removal of all materials and/or obstructions of any nature (rip-rap included) that retard or interfere with the driving of piles or with the placing of wales, bolts and rods.



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### *Informational Sheet: Prevailing Wages on State Projects*

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#### **CARPENTER CRAFT JURISDICTION**

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This is to be subject to the discretion of the contractor who may choose to use blasting specialists or other demolition specialists.

The handling on the job of all materials used in the work.

The manning of all floating equipment (towing equipment excepted) engaged in the work enumerated, including deck engines, except machinery manned by Operating Engineers.

The placing of all rip-rap, fill stone, bedding stone, cover stone and concrete blocks in connection with marine construction. Work normally performed by Employers, such as soil tests, shoring, underpinning of buildings, cribbing, driving of sheet piling, marine divers, tenders, underwater construction workers and similar operations shall continue to be included in the jurisdiction of this Agreement.

All burning, cutting, welding and fabrication of pipe, H-beams, sheet pile (metal or wood), done on the job site or in the yard of the Employer shall be done by pile drivers. The driving of bearing piles, sheet piling with heavy equipment, caissons, pile caps, auger drilling and boring, the setting up for load testing for any type of piling, all layout and spotting for piling, caisson and boring work, all earth retention, ditch boarding, installing tiebacks.

#### **ASBESTOS ABATEMENT CARPENTERS**

(gg) All erection and maintenance of barriers and partitions used in the removing of asbestos or any abatement work. The abatement of any materials previously installed by the carpenter such as transite, ceiling and floor tiles. All operating and maintaining of current equipment used in any abatement work.



**STATE OF MICHIGAN**  
***Informational Sheet: Prevailing Wages on State Projects***

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**ELECTRICIAN – SOUND AND COMMUNICATION / DATA/ VOICE JURISDICTION**

The installation, testing, service and maintenance, of systems which utilize the transmission and/or transference of voice, sound, vision or digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, CATV and CCTV, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, radio page, school intercom and sound, burglar alarms, low voltage fire alarm systems, low voltage master clock systems, distributed antenna systems (DAS), IP data networks, and all surface-mounted (non-power) telecommunications wiremold. Shall additionally include the installation of all raceway systems of unlimited length in telecommunications rooms, entrance facilities, equipment rooms, and similar areas. Energy management systems. Security systems; perimeter, vibration, card access, access control and sonar/infrared monitoring equipment. Communications systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; SCADA (Supervisory Control and Data Acquisition), PCM (Pulse Code Modulation), Digital Data Systems, Broadband and Baseband and Carriers, POS (Point of Sale systems), VSAT Data Systems, RF and Remote Control Systems, Fiber Optic Data Systems and Voice and Data Infrastructure and Backbone.



## STATE OF MICHIGAN

Wage and Hour Division

PO Box 30476

Lansing, MI 48909

517-284-7800

### ***Informational Sheet: Prevailing Wages on State Funded Projects***

#### **REQUIREMENTS**

**Effective February 13, 2024**

The purpose of establishing prevailing rates is to provide minimum rates of pay that must be paid to workers on construction projects that are financed or financially supported by the state. Prevailing rates compiled from the rates contained in collectively bargained agreements which cover the locations of the state projects. While the prevailing wage rates are compiled through surveys of collectively bargained agreements, a collective bargaining agreement is not required for contractors to be on or be awarded state projects. The prevailing rate schedule provides an hourly rate which includes wage and fringe benefit totals for designated construction mechanic classifications. The overtime rates also include wage and fringe benefit totals. Please pay special attention to the overtime and premium pay requirements. The prevailing wage is satisfied when wages plus fringe benefits are equal to or greater than the required rate.

#### **State of Michigan responsibilities:**

- The department establishes the prevailing rate for each classification of construction mechanic requested by the contracting agents prior to contracts being let out for bid on a state project.

#### **DTMB responsibilities**

- If a contract is not awarded or construction does not start within 90 days of the date of the issuance of rates, a re-determination of rates must be requested by the contracting agents.
- Rates for classifications needed but not provided on the Prevailing Rate Schedule, ***must*** be obtained ***prior*** to contracts being let out for bid on a state project.

#### **Contractor responsibilities:**

- Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing rates prescribed in a contract.
- Every contractor and subcontractor shall keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each construction mechanic. This record shall be available for reasonable inspection by DTMB or the department.
- Each contractor or subcontractor is liable for the payment of the prevailing rate to its employees.
- The prime contractor is responsible for advising all subcontractors of the requirement to pay the prevailing rate prior to commencement of work.
- A construction mechanic ***shall only*** be paid the apprentice rate if registered with the United States Department of Labor, Bureau of Apprenticeship and Training and the rate is included in the contract.

#### **Enforcement:**

A person who has information of an alleged prevailing wage violation on a prevailing wage project may file a complaint with the State of Michigan. The department will investigate and attempt to resolve the complaint informally. During the course of an investigation, if the requested records and posting certification are not made available in compliance with contractual requirements, the Contracting Agent may consider the Contractor to be in material breach of the contract and may terminate the contract for cause at the sole discretion. There are also civil penalties for failure to be in compliance with Act 10. View the entire text of Act 10 of 2023 at [michigan.gov/wagehour](https://michigan.gov/wagehour).

## SECTION 01 10 00 – SUMMARY

### PART 1 - GENERAL

#### 1.1.1 PROJECT INFORMATION

A. PROJECT NAME AND LOCATION

Belle Isle Athletic Shelter  
Vista Drive  
Belle Isle  
Detroit, MI 48207

B. PROJECT SUMMARY DESCRIPTION

Project scope includes the replacement of existing furnace and hot water heater. Provide a new complete Fire Alarm and Fire Suppression system throughout the First and Second Floor.

Constructed in 1898, the Athletic Shelter is listed on the National Register of Historic Places. The Athletic Shelter is currently rented to a tenant and the main use is Assembly A-3 on the first and second floor. Construction type is IIIB with masonry and steel structure, concrete floor slabs and steel and wood framed attic and roof construction.

C. ARCHITECT

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D. MEP ENGINEERS

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Troy, MI 48098

E. FIRE PROTECTION ENGINEER

Jensen Hughes  
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Schaumburg, IL 60173

F. ENVIRONMENTAL CONSULTANT

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Ferndale, MI 48220

G. PROJECT MANAGER

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General Office Building 3B  
Dimondale MI 48821  
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## **1.2 WORK BY OTHER CONTRACTORS**

- A. The Prime Contractor shall fully cooperate with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

## **1.3 PHASED CONSTRUCTION**

- A. The work shall be completed in a single phase. Coordination will be required to maintain building operations.

## **1.4 COORDINATION WITH OCCUPANTS**

- A. Owner will occupy site and adjacent building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits.

## **1.5 WORK RESTRICTIONS**

- A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Architect and Owner not less than 7 calendar days in advance of proposed utility interruptions.
  - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- B. Noise, Vibration, Dust and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors or other disruption to Owner occupancy with Owner.
  - 1. Notify Architect and Owner not less than 2 business days in advance of proposed utility interruptions.
  - 2. Obtain Owner's written permission before proceeding with utility interruptions.

## **1.6 MISCELLANEOUS PROVISIONS**

- B. Work in existing facilities shall correspond in all respects with the existing conditions to which it connects, or to similar existing conditions, in materials, workmanship and finish.
- C. Alterations to Existing Conditions: Existing conditions shall be cut, drilled, removed, temporarily removed, or removed and replaced, as necessary for performance of Work under the Contract. Work out of alignment where exposed by removal of existing work shall be called to the attention of the Architect. Necessary corrective work shall be as directed.

- D. Replacements of existing conditions that are removed shall match similar existing conditions.
- E. Unless otherwise indicated, existing structural members shall not be cut or altered without authorization by the Architect.
- F. Conditions remaining in place, which are damaged or defaced during the Work, shall be restored to the condition existing at time of award of Contract.
- G. Discolored or unfinished surfaces exposed by removal of existing conditions, that are indicated to be final exposed surfaces, shall be refinished or replaced as necessary to produce uniform and harmonious contiguous surfaces.
- H. Existing structures will remain in place, unless noted otherwise.
- I. Existing utility services with related meters and equipment will remain in place, unless noted otherwise.

**END OF SECTION 01 10 00**

## **SECTION 01 35 10 - HISTORIC BUILDING TREATMENT PROCEDURES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Treatment procedures shall comply with the Department of the Interior's Standards for Rehabilitation. This section includes special procedures for historic treatment on Project including, but not limited to, the following:
  - 1. Storage and Protection of existing historic materials.
  - 2. Temporary protection of historic materials during construction.
  - 3. Protection during application of chemicals.
  - 4. Protection during use of heat-generating equipment.
  - 5. Historic treatment procedures.
  - 6. Construction waste management.

#### **1.2 DEFINITIONS**

- A. "Preservation": To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.
- B. "Rehabilitation": To make possible a compatible use for a property through repair, alterations, or additions while preserving those portions or features that convey its historical or cultural values.
- C. "Restoration": To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.
- D. "Reconstruction": To reproduce and match in the exact form and detail a building, structure, or artifact as it appeared at a specific period.
- E. "Stabilize": To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.
- F. "Protect and Maintain": To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.



- G. "Repair": To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Repair includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.
- H. "Replace": To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:
  - 1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
  - 2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
  - 3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.
- I. "Remove": To detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- J. "Remove and Salvage" or "Dismantle": To detach items from existing construction and deliver them to DZS ready for reuse. Items of interest or value to DZS that may be encountered during removal and dismantling work remain DZS's property. Carefully dismantle and salvage each item or object, and store in a manner that the items do not deteriorate.
- K. "Remove and Reinstall": To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.
- L. "Existing to Remain" or "Retain": Existing items that are not to be removed.
- M. "Match": This means to blend with adjacent building fabric to appear identical to the original in terms of size, color, material, texture, finish, and if applicable method of attachment.
- N. "Material in Kind": Material that matches existing materials, as much as possible, in species, cut, color, grain, finish and composition.
- O. "Consolidate": To strengthen loose or deteriorated materials in place.
- P. "Stabilize": To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- Q. "Strip": To remove existing finish strip down to base material unless otherwise indicated.

### **1.3 SUBMITTALS**

- A. Material Samples: For mockups and in kind repair or replication of historic materials. Submit material samples showing accurate replication of historic material color, finish, form, detailing, texture, and other visual qualities.
- B. Historic Treatment Program: Submit a written plan for each phase or process including storage of restoration materials and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Provide sequencing of work, and how the contractor will work with DNR to assure continuity of operations and services during the work. Describe how the Contractor's Preservation Construction Manager and other supervisory personnel will minimize the risks of adverse effects on historic materials and project delays resulting from unforeseen conditions or execution challenges. Historic Treatment Program must be approved by the Architect in conjunction with the DNR Preservation and Project staff prior to construction commencement in historic areas.
- C. Alternative Methods and Materials: Alternative methods and materials to those indicated must be approved by the Architect and State. For any phase of work, provide a written description including evidence of successful use on other, comparable projects, and a program of testing to demonstrate effectiveness for use on this Project.

#### **1.4 QUALITY ASSURANCE**

- A. Historic Treatment Preconstruction Conference: Conduct conference at Project site.
  - 1. Review manufacturer's written instructions for precautions and effects of products and procedures on building materials, components, and vegetation.
- a) Record procedures established as a result of the review and distributed to affected parties.
  - 2. Both field supervisor(s) and workers who will conduct the work will be present, and provide credentials to certify their qualifications to conduct the work
- B. Mockups. Prepare mockups to demonstrate historic treatment methods and/or cleaning procedures with respect to the compatibility of new work and quality standards of materials and execution. Prepare mockups so they are inconspicuous or reversible. Locate mockups on the building as identified by locations that enable viewing under the same conditions as the completed Work.

#### **1.5 STORAGE AND PROTECTION OF HISTORIC MATERIALS**

- A. Removed and Salvaged Historic Materials:
  - 1. Clean salvaged historic items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items where directed by State.

- B. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by State, items may be removed to a suitable, protected storage location during historic treatment [and cleaned] and reinstalled in their original locations after historic treatment operations are complete.

#### 1.6 PROJECT-SITE CONDITIONS

A. Exterior Cleaning and Repairing:

1. Proceed with the work only when forecasted weather conditions are favorable.

- a) Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when the relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.
- b) Do not perform exterior wet work when the air temperature is below 40 deg F.
- c) Do not begin cleaning, patching, or repairing when there is any likelihood of frost or freezing.
- d) Do not begin cleaning when either the air or the surface temperature is below 45 deg F unless approved means are provided for maintaining a 45 deg F temperature of the air and materials during, and for 48 hours subsequent to, cleaning. Commence cleaning only during a rising thermometer.

2. Perform cleaning and rinsing of the exterior only during daylight hours.

- B. The State may occupy portions of the building adjacent to the historic treatment area. Conduct historic treatment so operations will not be disrupted. Provide not less than 72 hours' notice of activities that will affect operations.

#### PART 2 PRODUCTS (*not used*)

#### PART 3 EXECUTION

**3.1 PROTECTION, GENERAL**

- A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Temporary Protection of Historic Materials during Construction:
  - 1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
  - 2. Attachments of temporary protection to existing construction shall be approved by the Architect prior to installation.
- D. Protect landscape work adjacent to or within work areas by creating tree protection zones, installing fencing and avoiding construction activities within the protection zones.
- E. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify the Architect immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.
  - 1. Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.
  - 2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

**3.2 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT**

- A. Comply with the Building Hot Work procedures. Before work with heat-generating equipment commences in historic work areas, furnish qualified personnel to serve as fire watch (or watches) for location(s) where work is to be performed.

**3.3 HISTORIC TREATMENT PROCEDURES**

- A. Historic Treatment Program: Prepare a written plan for approval by the Architect of historic treatment throughout the performance of the Work, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
  2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- B. Examination
1. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine conditions of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
  2. Verify that affected utilities have been disconnected and capped.
  3. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
  4. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make a permanent record of measurements, materials, and construction details required to make exact reproduction.
- C. Mock-ups: Prepare mock-ups of specific historic treatment procedures specified in this Section to demonstrate the resulting appearance of treated areas and set quality standards for materials and execution.
1. Mock-ups shall include removal and dismantling work, bird excrement removal, and any of the restoration, preservation, reconstruction, and replacement efforts to be conducted for the project.
  2. Ensure adequate curing time is provided to show the true finish condition prior to review. Comply with manufacturer's recommendations.
- D. The principal aim of preservation work is to halt the process of deterioration and stabilize the item's condition. Repair is required where specifically indicated. The following procedures shall be followed:
1. Retain as much existing material as possible; repair and consolidate rather than replace.
  2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.

3. Use reversible processes wherever possible. This means that the preservation treatment can be undone to return to the condition before treatment commenced.
  4. Use traditional replacement materials and techniques.
  5. Record the work before the procedure with preconstruction photos and during the work with periodic construction photos.
- E. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.
- F. Prohibit smoking by personnel performing work on or near historic building fabric.
- G. Notify the Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
1. Do not proceed with the work in question until directed by the State.
- H. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of the State.
- I. Where Work requires existing features to be removed, cleaned, and reused, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
- J. Identify new or replacement materials and features with inconspicuous, permanent marks to distinguish them from original materials. Record the legend of identification marks and the locations of these marks on Record Drawings.
- K. When cleaning, match samples of existing materials that have been cleaned and identified for acceptable cleaning levels. Avoid over-cleaning to prevent damage to existing materials.
- L. Rinse thoroughly to prevent formation of subsurface salts or surface residue. Test damp surface with pH strip before and after cleaning to confirm that rinsing is complete.

#### **3.4 PROTECTION DURING APPLICATION OF CHEMICALS**

- A. Protect surrounding surfaces of the building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof, UV-resistant, and will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to the manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials staining.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize and collect alkaline and acid wastes and legally dispose of off premises.
- E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

**END OF SECTION 01 35 10**

## **SECTION 02 41 19 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

**A. Section Includes:**

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

#### **1.2 MATERIALS OWNERSHIP**

- A.** Unless otherwise indicated, demolition waste becomes property of Contractor.
- B.** Historic items, relics, antiques, and similar objects and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### **1.3 PREINSTALLATION MEETINGS**

- A.** Predemolition Conference: Conduct conference at Project site.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A.** Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.
- B.** Schedule of selective demolition activities with starting and ending dates for each activity.
- C.** Predemolition photographs or video.
- D.** Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

#### **1.5 CLOSEOUT SUBMITTALS**

- A.** Inventory of items that have been removed and salvaged.



**1.6 QUALITY ASSURANCE**

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

**1.7 FIELD CONDITIONS**

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is expected that hazardous materials will be encountered in the Work. Refer to Specification Section 02 81 00 Transportation and Disposal of Hazardous Materials.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- F. Arrange selective demolition schedule so as not to interfere with Owner's operations.

**1.8 WARRANTY**

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- C. Inventory and record the condition of items to be removed and salvaged.

### **3.2 PREPARATION**

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

### **3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Arrange to shut off utilities with utility companies.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

### **3.4 PROTECTION**

- A. Temporary Protection: Provided temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

### **3.5 SELECTIVE DEMOLITION**

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
  - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 6. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area on-sites as designated by Owner.
  - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### **3.6 CLEANING**

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 02 41 19**

## **SECTION 02 8000 - HAZARDOUS MATERIALS REMEDIATION**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY OF WORK**

- A. Provide all labor, materials, equipment, transportation, packaging, sampling and testing, and incidentals required to remove and dispose of hazardous materials in accordance with all Federal, State and local laws and regulations. Hazardous materials found in the Belle Isle Athletic Shelter that may be disturbed during the HVAC & Fire Protection Improvements project include, but are not limited to:
  - 1. Fire suppression system shall be evacuated of its contents prior to demolition;
  - 2. Mercury-containing devices/equipment (thermostats and fluorescent lamps);
  - 3. Polychlorinated-biphenyl (PCB) light ballasts;
  - 4. Smoke detectors (containing batteries); and
  - 5. Fire extinguishers
  - 6. Refrigerator
- B. The location of such materials are shown on the demolition drawings prepared by G. H. Forbes Associates Architects. Verify all information.

#### **1.02 RELATED SECTIONS**

- A. Section 02 8200 - Asbestos Remediation
- B. Section 02 8300 – Lead Remediation

#### **1.03 GENERAL REQUIREMENTS**

- A. Contractor Responsibility: Assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the Site, and persons occupying areas adjacent to the Site. Provide medical examinations and maintain medical records of personnel as required by the applicable Federal, State, and local regulations. Hold the Owner and Owner's Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of Contractor, Contractor's employees, or subcontractors.
- B. Decontamination area location, dumpster location, and entrances that may be used for the movement of supplies and personnel are subject to Owner or Owner's Representative approval.

**1.04 REFERENCES**

- A. General Applicability of Codes, Regulations, and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The references in this Article may apply to the work under this Section. This list shall not be considered complete, and it is the Contractor's responsibility to perform all work in accordance with all Federal, State and local laws and regulations.
- C. Verification Survey of Hazardous Materials prepared by Willem Environmental Consulting, LLC (WEC Project No. 24-029-00), dated June 25, 2025. Attached to this verification survey is the Hazardous and Regulated Materials Survey Report for Belle Isle Athletic Shelter prepared by Beam, Longest, and Neff (BLN Project No. 23022), dated September 8, 2023. The report is included with this specification package. It is the Contractor's responsibility to verify all information and to interpret all data and reports for removal purposes.

**D. CODE OF FEDERAL REGULATIONS (CFR)**

|                  |                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 29 CFR Part 1910 | Occupational Safety and Health Standards                                                                                         |
| 29 CFR Part 1926 | Safety and Health Regulations for Construction                                                                                   |
| 40 CFR Part 61   | Subpart M National Emission Standard for Hazardous Air Pollutants (NESHAP)                                                       |
| 40 CFR Part 261  | Identification and Listing of Hazardous Waste                                                                                    |
| 40 CFR Part 262  | Standards Applicable to Generators of Hazardous Waste                                                                            |
| 40 CFR Part 263  | Standards Applicable to Transporters of Hazardous Waste                                                                          |
| 40 CFR Part 264  | Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities                                |
| 40 CFR Part 265  | Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities                 |
| 40 CFR Part 171  | Department of Transportation Regulations to Stipulate Requirements for Containers and Procedures for Shipment of Hazardous Waste |

|                 |                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------|
| 40 CFR Part 761 | Polychlorinated Biphenyls (PCB) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions |
|-----------------|----------------------------------------------------------------------------------------------------------|

**E. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

|         |                                        |
|---------|----------------------------------------|
| NFPA 30 | Flammable and Combustible Liquids Code |
|---------|----------------------------------------|

|           |                                                           |
|-----------|-----------------------------------------------------------|
| NFPA 70 B | Recommended Practice for Electrical Equipment Maintenance |
|-----------|-----------------------------------------------------------|

|          |                                              |
|----------|----------------------------------------------|
| NFPA HAZ | Fire Protection Guide to Hazardous Materials |
|----------|----------------------------------------------|

**F. STATE OF MICHIGAN**

|                  |                                                             |
|------------------|-------------------------------------------------------------|
| PA 451, PART 201 | Michigan Natural Resources and Environmental Protection Act |
|------------------|-------------------------------------------------------------|

|                  |                                                |
|------------------|------------------------------------------------|
| PA 451, PART 111 | Michigan, NREPA Hazardous Waste Management Act |
|------------------|------------------------------------------------|

|                  |                                            |
|------------------|--------------------------------------------|
| PA 451, PART 115 | Michigan, NREPA Solid Waste Management Act |
|------------------|--------------------------------------------|

|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| PA 451, PART 121 | Michigan Liquid Industrial By-Product Act (effective March 2016) |
|------------------|------------------------------------------------------------------|

|          |                                                                  |
|----------|------------------------------------------------------------------|
| PART 309 | Michigan Occupational Safety and Health Administration – Cadmium |
|----------|------------------------------------------------------------------|

|          |                                                                                        |
|----------|----------------------------------------------------------------------------------------|
| PART 603 | Michigan Occupational Safety and Health Administration – Lead Exposure in Construction |
|----------|----------------------------------------------------------------------------------------|

**1.05 SUBMITTALS**

At least **10 business days prior to the start of the work**, submit the following items. Do not begin work until they are acknowledged as received.

**A. Work Plan**

1. Prior to proceeding with any removal and disposal work, submit a work plan for the removal and disposal of hazardous materials. Provide a detailed description of the methods and equipment to be used for each operation, and sequence of operations.

**B. For all disposal or recycling facilities:**

1. Submit the name, location, 24-hour telephone number, and Federal, State and local license or permit numbers.
2. Submit the name and address, and federal, state and local permit or identification numbers of the proposed transportation contractor.

3. Submit for Owner's Representative to review prior to Owner's signature, the disposal facility's approval application (waste profile) filled out in its entirety, inclusive of required laboratory data. Within 5 days, the Owner's Representative will either return the Owner signed waste profile to the Contractor or reject the application. Contractor is responsible for the contents of the waste profile, and disposal facility rejection of an Owner signed waste profile shall not be cause for additional compensation.
  4. Submit the approved waste profile after receiving disposal facility approval prior to removing hazardous material from the Site. The approval shall contain the facility's waste approval number.
- C. Submit the name and address of any environmental testing laboratory to be utilized.

#### **1.06 SAMPLING AND ANALYTICAL TESTING**

- A. Retain a laboratory, which routinely provides analysis acceptable to the Michigan Department of Environmental Quality (MDEQ), to perform required analytical testing and sampling. Costs of sample collection, shipping, and testing shall be borne by Contractor and are incidental to the Contract. Sampling as required or as specified by the Owner Representative or Consultant shall be performed by the Contractor or Contractor's personnel. The sampling and testing requirements for hazardous material disposal shall be the Contractor's responsibility.

#### **1.07 QUALITY ASSURANCE**

- A. Contractor will be experienced in the removal, packaging, handling, transportation, and proper disposal of hazardous material and have all necessary local permits and/or approvals.
- B. Contractor shall be responsible for the proper handling of material being disposed from the time the Contractor moves the material until the material is disposed off-site at the licensed disposal facility. The Contractor shall be responsible to clean up all spills that occur during loading, hauling and final disposal at no cost to the Owner. Contractor shall immediately notify the Owner's Representative of any spills and appropriately clean up and dispose of all material and impacted media required for cleanup.
- C. Do all work required by and in accordance with all applicable federal, state and local government regulatory agencies and arrange for all permits and licenses for the packaging, loading, hauling, and final disposal operations.
- D. If additional data is required to obtain disposal facility approval, collect and analyze appropriate samples. Notify the Owner's Consultant in writing at least one week in advance of sampling with an explanation for the additional testing and the date and time of the sampling so that the Owner's Consultant will have the opportunity to collect co-located samples.



## **PART 2 – PRODUCTS**

NOT USED

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

#### **A. Preparation**

1. Obtain all required permits, including confined space entry permits (if necessary). Provide approved containers, vehicles, equipment, labor, labels, and manifests and other documents necessary for accomplishment of the work.

#### **B. Safety Guidelines**

1. Perform work associated with hazardous materials using appropriate Personal Protection Equipment, as defined by MIOSHA or more stringent if required.
2. Ensure that personnel conducting work under this Section are trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this work.

### **3.02 REMOVAL**

#### **A. General Packaging and Handling Requirements**

1. Prior to the start of removal operations, determine which waste materials may be hazardous. Keep hazardous waste segregated from solid waste, so that proper disposal of the waste material can be achieved.
2. Inspect containers to determine if they are broken, leaking or deformed. In the case of over-packed, leaking, or broken containers of hazardous materials, remove hazardous contents, and place in new drums.
3. Categorize and containerize materials by contents and disposal compatibility. Perform compatibility tests, so wastes can be segregated in the interim storage area without risk of fire or explosion.
4. Package small containers of waste to meet all applicable U.S. Department of Transportation (DOT) and/or Michigan Department of Transportation (MDOT) requirements. Collect liquid waste in drums (55-gallons or smaller).
5. Package mercury gauges in a 5-gallon bucket with sawdust or similar, so as to not break gauges during transport.
6. Properly evacuate refrigerants and fire suppression contents into appropriate containers for transportation and disposal.

7. Properly evacuate oils and/or other contaminants hydraulic equipment into appropriate containers for transportation and disposal.
8. Properly label all containers prior to shipment in accordance with all MDOT and other applicable regulations
9. Provide for the safe storage of waste on-site prior to disposal. For security reasons, restrict access to waste storage areas.
10. Provide covered dumpsters and storage containers with appropriate hazard labels.
11. Do not place waste on the unprotected ground. Adequately shield waste to prevent dispersion of the debris by wind or rainwater.
12. Evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.

**B. Hazardous Waste Packaging and Handling Requirements**

1. Store and handle the on-site hazardous waste debris in accordance with the requirements of 40 CFR 262 and 40 CFR 265, with special attention given to proper labeling, use of proper containers, and personnel training. Provide preparedness, prevention, and contingency plans (PPCP) in accordance with 40 CFR 265 Subpart C and Subpart D for the steps to be taken in the event of an unplanned release or emergency.
2. Do not exceed hazardous waste accumulation limits or storage time limits set forth in Federal and State regulations for the Owner's generator size status.
3. Inspect hazardous waste storage areas as required by Federal and State regulations.

**C. Additional Requirements**

1. Lead was detected in paint throughout the building; therefore, contractors shall comply with the requirements outlined in the following MIOSHA regulations:
  - a. MIOSHA Part 603: Lead Exposure in Construction

**3.03 DISPOSAL AT A LICENSED DISPOSAL OR RECYCLING FACILITY**

**A. General**

1. If required to obtain disposal approval, characterize the material to be disposed by collecting samples at a frequency required by the disposal facility and have the samples analyzed by the independent analytical laboratory for parameters required by the disposal facility. Provide results to Owner's

Representative. The Contractor shall be responsible for all costs and coordination for this testing.

2. Take special care when removing waste from the Site in order to avoid environmental contamination or injury to workers. Containers shall be moved and packed into the truck with care. When possible, use hand trucks, dollies, or pull carts, along with ramps or trucks with lift gates. These procedures will help minimize container breakage.
3. All vehicles hauling material shall comply with applicable DOT and MDOT regulations. Vehicles shall be properly licensed under and comply with all applicable federal, state, and local laws and regulations.
4. Trucks and trailers used for transporting material shall be in good repair, free from holes, have tailgates in good working order, and have tarps that cover the truck's box and trailers.
5. Vehicles found to be leaking vehicle fluids shall not be loaded until the source of the leak is located, contained, and repaired to the satisfaction of the Owner's Representative. Report all spills immediately to the Owner's Representative. Cleanup of vehicle fluids released to the ground is the Contractors' responsibility.
6. Prior to loading, provide Owner's Consultant with one manifest for each load of material. Each manifest will be pre-printed with the Site name and address, the Owner's name and address, the name of the disposal facility, the name of the transporter, and the disposal facility approval number.
7. During loading, the Owner's Consultant will provide a manifest signed on behalf of the Owner for each load.
8. Transport hazardous materials, universal waste and non-hazardous waste to a licensed treatment storage and disposal facility or recycling facility for disposal.
9. Within 24 hours of the load arriving at the disposal or recycling facility, provide to the Owner's Representative an original manifest and a corresponding disposal facility receipt ticket that have been signed by the disposal or recycling facility.

**B. Liquid and Hazardous Waste Disposal:**

1. Transport hazardous waste in accordance with the requirements of 40 CFR 263 and other applicable state and federal requirements, and disposed of properly. Use only licensed transporters. Transporters shall have an EPA ID Number and must meet DOT requirements for shipping containers.
2. Dispose of hazardous waste in accordance with 40 CFR 264 and 40 CFR 268 at a disposal facility licensed to accept the waste.

**END OF SECTION**

## SECTION 02 8200 - ASBESTOS REMEDIATION

### PART 1 – GENERAL

#### 1.01 SUMMARY OF WORK

- A. The type of work under this specification involves proper removal and disposal of suspect asbestos-containing pipe gaskets located in the Mechanical Room of the Belle Isle Athletic Shelter as part of the HVAC & Fire Protection Improvements project.
- B. The location of suspect asbestos-containing gaskets is in the Mechanical Room and are shown on the demolition drawings prepared by G.H. Forbes Associates Architects. Verify all information.

#### 1.02 RELATED SECTIONS

- A. Section 02 8000 – Hazardous Materials Remediation
- B. Section 02 8300 – Lead Remediation

#### 1.03 REFERENCES

- A. General Applicability of Codes, Regulations, and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The references in this Article may apply to the work under this Section. This list shall not be considered complete, and it is the Contractor's responsibility to perform all work in accordance with all Federal, State and local laws and regulations.
- C. Verification Survey of Hazardous Materials prepared by Willem Environmental Consulting, LLC (WEC Project No. 24-029-00), dated June 25, 2025. Attached to this verification survey is the Hazardous and Regulated Materials Survey Report for Belle Isle Athletic Shelter prepared by Beam, Longest, and Neff (BLN Project No. 23022), dated September 8, 2023. The report is included with this specification package. It is the Contractor's responsibility to verify all information and to interpret all data and reports for removal purposes.
- D. Federal Requirements: Requirements that govern asbestos-abatement work or hauling and disposal of asbestos waste materials include, but are not limited to, the following:
  - 1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

- a. Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations
  - b. Respiratory Protection Title 29, Part 1910, Section 134 of the Code of Federal Regulations
  - c. Construction Industry Title 29, Part 1926, of the Code of Federal Regulations
  - d. Access to Employee Exposure and Medical Records Title 29, Part 1910, Section 2 of the Code of Federal Regulations
  - e. Hazard Communication Title 29, Part 1910, Section 1200 of the Code of Federal Regulations
  - f. Specifications for Accident Prevention Signs and Tags Title 29, Part 1910, Section 145 of the Code of Federal Regulations
2. U.S. Environmental Protection Agency (EPA) including, but not limited to:
  - a. Worker Protection Rule 40 CFR Part 763, Subpart G of the Code of Federal Regulations
  - b. Regulation for Asbestos Title 40, Part 61, Sub-part A of the Code of Federal Regulations
  - c. National Emission Standard for Asbestos Title 40, Part 61, Sub-part M (Revised Sub-part B) of the Code of Federal Regulations
3. U.S. Department of Transportation (DOT) including but not limited to:
  - a. Hazardous Substances: Final Rule Regulation
  - b. 49 CFR, Parts 171 and 172
  - c. State and Local Requirements: Abide by all local requirements that govern asbestos abatement work or hauling and disposal of asbestos waste materials.
- E. Michigan Labor and Economic Opportunity (LEO) and Michigan Occupational Safety and Health Administration (MIOSHA) Safety Standards relating to asbestos include but are not limited to:
  1. Part 1 General Provision
  2. Part 451 Respiratory Protection

3. Part 42 Hazard Communication
4. Part 20 Demolition
5. Part 45 Fall Protection
6. Part 6 Personal Protective Equipment
7. Part 7 Welding & Cutting
8. Part 19 Tools
9. Part 12 Scaffolds & Scaffold Platforms
10. Part 602 Asbestos Standards in Construction

- F. National Institute of Occupation Safety and Health (NIOSH 7400) – Asbestos and Other Fibers by Phase Contrast Microscopy (PCM).

#### **1.04 SUBMITTALS**

At least two weeks prior to beginning work, submit the following items. Do not begin work until they are acknowledged as received by the Owner Representative.

- A. Notices: Submit notices required by federal, state and local regulations, together with proof of timely transmittal, to agency requiring the notice, including a copy of the Notification of Intent to Renovate/Demolish which is required to be submitted to Michigan Department of Environment, Great Lakes and Energy (EGLE) and LEO.
- B. Licenses: Submit copies of all state licenses necessary to carry out the work of this contract, including a copy of the Contractor's license under Michigan Public Act 135 of 1986.
- C. For the proposed disposal facility, submit the name, location, 24-hour telephone number, and Federal, State and local license or permit numbers. Also, provide copies of all licenses and approvals permitting the disposal of asbestos and provide satisfactory evidence that the facility complies with 40 CFR 61.154 and all other applicable laws and regulations for disposal of asbestos.

- D. Submit the name and address, and federal, state and local permit or identification numbers of the proposed transportation contractor.
- E. Asbestos Abatement Action Plan. Contractor shall prepare and submit an Asbestos Abatement Action Plan (Plan). The Plan shall be submitted to the Owner Representative for review and approval at least **10 business days prior to the start of the work**. No work shall be allowed until the Plan has been approved. The Plan shall include drawings and narratives, sufficient in detail to demonstrate and indicate the following:
  - 1. Description of materials scheduled for removal in the building.
  - 2. The specific areas of work in the building.
  - 3. Removal methods and work practices to be performed by Contractor.
  - 4. Locations of critical barriers.
  - 5. Delineation of the regulated area.
  - 6. Personal protection equipment and clothing to be worn by employees.
  - 7. Personal hygiene and equipment decontamination procedures.
- F. Other:
  - 1. Evidence of training of all workers as required by the State of Michigan.
  - 2. Copies of Contractor's written respiratory protection program, engineering controls, and work practices.
  - 3. Copies of all medical approvals for all applicable workers to use respiratory protective equipment.
  - 4. Records of respirator fit testing for all workers.
  - 5. Identification of designated competent person under 29 CFR 1926.1101 and phone numbers for 24-hour contact.
- G. Historic Airborne Fiber Data: Submit airborne asbestos fiber count data from an independent air monitoring firm to demonstrate the ability to perform work of this Section while maintaining an airborne fiber count below 0.1 fibers per cubic centimeter in the breathing zone of the individual performing the work. Include the following data for each procedure required by the work:
  - 1. Date of measurements; operations monitored; sampling and analytical methods used and evidence of their accuracy; and number, duration, and results of samples taken.
- H. Alternate Procedures and Variances: A Variance to the Work Practices may be requested by submitting a written proposal to the Owner and Owner's Representative 10 business days before the commencement of work. The written proposal shall include a detailed description of the procedure(s) to be used in lieu of the requirements described herein. The Owner or Owner's

Representative will notify the Contractor in writing of its decision to either grant or deny the variance.

#### **1.05 GENERAL REQUIREMENTS**

- A. Contractor Responsibility: Assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the Site, and persons occupying areas adjacent to the Site. Provide medical examinations and maintain medical records of personnel as required by the applicable Federal, State, and local regulations. Hold the Owner and Owner Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other regulations on the part of Contractor, Contractor's employees, or subcontractors.
- B. Decontamination area location, Contractor parking, dumpster location, and entrances that may be used for the movement of supplies and personnel are subject to the Owner Representative approval.
- C. Allow the Owner Representative to inspect and approve all equipment and materials used before the start of any work.
- D. Allow the Owner Representative to check or evaluate air monitoring methods, procedures and quality assurance.
- E. All personnel performing work under this specification from pre-clean/prep to and including tear down shall be State of Michigan-certified asbestos workers or contractor supervisors.
- F. Asbestos abatement procedures are outlined in this specification document. Contractors may submit alternate abatement procedures for compliance with State and Federal requirements. These procedures will require approval by the Owner Representative prior to commencing abatement activities.

#### **1.06 POTENTIAL ASBESTOS HAZARD**

- A. The disturbance or dislocation of ACM may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health hazard to workers. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the Site of the seriousness of the hazard and of proper work procedures, which must be followed.
- B. Take appropriate measures as necessary to protect workers from the potential hazard of exposure to airborne asbestos. Such measures include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.



**1.07 STOP WORK**

- A. If the Owner Representative presents a written stop work order, immediately stop all work. Do not recommence work until authorized by the Owner Representative.

**1.08 PROJECT COORDINATION**

- A. Project Superintendent - Provide a full-time Project Superintendent who is experienced in administration and supervision of asbestos abatement projects, including work practices, protective measures for building and personnel, disposal procedures, etc.
  - 1. The Project Superintendent is the Competent Person for the Contractor, as required by OSHA in 29 CFR 1926.1101, and is the Contractor's Representative responsible for compliance with all applicable federal, state and local regulations.
  - 2. This person must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures and have had a minimum of two (2) years on-the-job training. The Project Superintendent shall be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA Regulation 40 CFR, Part 763, Subpart E, Appendix C.
  - 3. Duties of Project Superintendent
    - a. Coordination: Coordinate the work of all subcontractors and material suppliers.
    - b. Supervision: Supervise the activities of every phase of the asbestos abatement work taking place on the project.
    - c. Communication: Establish lines of authority and communication at the Site.
    - d. Permits: Obtain building and special permits required for asbestos abatement.
    - e. Location: Be present on the Site at all times when work is being performed.
    - f. Regulations: Ensure compliance with all applicable federal, state, and local regulations with regard to ACM.

**1.09 NOTICES**

- A. U.S. Environmental Protection Agency / State and Local Agencies

1. If required, submit notices required by federal, state and local regulations, together with proof of timely transmittal, to agency requiring the notice. All associated fees are considered incidental to the project.

#### **1.10 AIR MONITORING**

- A. Personal air monitoring required by Michigan LEO is the work of the Contractor.
- B. The Owner Representative shall conduct air monitoring to verify that the building beyond the work area and the outside environment remain uncontaminated. The Owner Representative shall also perform clearance sampling, if required.
- C. Use Phase Contrast Microscopy (PCM) analysis for air sampling before and during abatement. Transmission Electron Microscopy (TEM) will be used at the discretion of the Owner Representative.
- D. PCM Clearance Criteria: All final air sampling results shall be at or below 0.01 fibers per cubic (f/cc) centimeter to achieve clearance.
- E. TEM Clearance Criteria: All final air sampling results shall be at or below 70 structures per square millimeter (s/mm<sup>2</sup>) to achieve clearance.
- F. The Clearance Criteria set forth in this Section also serve as airborne fiber concentrations indicative of a release from the work area.
- G. The following procedure will be used to resolve disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.
  1. "Airborne Fibers": "Includes all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission electron microscopy (TEM) demonstrates to the satisfaction of the Owner Representative that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by TEM shall be all asbestos fibers.
  2. Phase Contrast Microscopy (PCM): Performed using the NIOSH 7400 method at the Site.
  3. Transmission Electron Microscopy (TEM): Performed using the analysis method set forth in the AHERA Regulation 40 CFR, Part 763, Appendix A.
- H. Secure air samples before start of work to establish a baseline.

#### **1.11 WORKER TRAINING AND ACCREDITATION**

- A. AHERA Accreditation: All workers are to be accredited as Abatement Workers as required by the AHERA Regulation 40 CFR 763, Appendix C, Subpart E, April 30, 1987 and Michigan Public Act 440 of 1988.

- B. Train, in accordance with 29 CFR 1926, all workers in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures.
- C. All on-site personnel working under this specification shall, at a minimum, be State of Michigan Asbestos Workers. The work must be overseen by an on-site State of Michigan Asbestos Contractor Supervisor.

#### **1.12 QUALITY ASSURANCE**

- A. Contractor shall be experienced in the removal, packaging, handling, transportation, and proper disposal of asbestos containing material and have all necessary local permits and/or approvals.
- B. Contractor shall be responsible for the proper handling of material being disposed from the time the Contractor moves the material until the material is disposed off-site at the licensed disposal facility. The Contractor shall be responsible to clean up all spills that occur during loading, hauling and final disposal at no cost to the Owner. Contractor shall immediately notify the Owner Representative of any spills and appropriately clean up and dispose of all material and impacted media required for cleanup.
- C. Do all work required by and in accordance with all applicable federal, state and local government regulatory agencies and arrange for all notifications and licenses for the removal, packaging, loading, hauling, and final disposal operations.
- D. If additional data is required to obtain disposal facility approval, collect and analyze appropriate samples. Notify the Owner Representative in writing at least one week in advance of sampling with an explanation for the additional testing and the date and time of the sampling so that the Owner Representative will have the opportunity to collect co-located samples.
- E. The Owner Representative will observe abatement operations, inspect critical barriers and other enclosures, and conduct air monitoring. If the Owners Representative shuts down the project because the clearance level is exceeded outside of the work area, do not resume until corrections are made.

#### **1.13 PROJECT CLOSEOUT**

- A. Preliminary Procedures: When requesting inspection for Substantial Completion, list exceptions in the request.
- B. Inspection Procedures: On receipt of a request for inspection, the Owner Representative will either proceed with inspection or advise the Contractor of unfilled requirements.

- C. The Owner Representative will perform a visual inspection and verify that the work has been substantially completed.
- D. Results of the completed visual inspection and clearance sample results will form the basis of requirements for final acceptance.

#### 1.14 DEFINITIONS

- A. Adequately wet: To sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.
- B. Aerosol: A system consisting of particles, solid or liquid, suspended in air.
- C. Air Cell: Insulation, normally used on pipes and ductwork, which is comprised of corrugated cardboard that is frequently comprised of asbestos combined with cellulose or refractory binders.
- D. Air Erosion: The passage of air over friable ACM, which may result in the release of asbestos fibers.
- E. Air Monitoring: The process of measuring the fiber content of a specific volume of air.
- F. Amended Water: Water to which a surfactant has been added. Use a mixture of surfactant and water that results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided using one (1) ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with 5 gallons of water.
- G. Asbestos: The asbestos-form varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, and actinolite-tremolite. For purposes of determining respiratory and worker protection, both the asbestiform and non-asbestiform varieties of the above minerals, and any of these materials that have been chemically treated and/or altered, shall be considered as asbestos.
- H. Asbestos Abatement: Removal, encapsulation, enclosure, demolition and renovation activities related to asbestos and procedures to control fiber release from asbestos-containing materials during removal.
- I. Asbestos Abatement Contractor: Any person hired to conduct asbestos abatement.
- J. Asbestos-Containing Material (ACM): Surfacing asbestos-containing material, thermal system insulation asbestos-containing material, or miscellaneous

asbestos-containing material that is found in or on interior structural members or other parts of a building.

Any material containing more than 1% by weight of asbestos of any type or mixture of types.

- K. Asbestos-Containing Waste Material (ACWM): Any material that is or is suspected of being or any material contaminated with an asbestos-containing material, which shall be removed from a work area for disposal.
- L. Authorized Visitor: The Owner, Owner Representative, testing lab personnel, or a representative of any federal, state and local regulatory or other agency having authority over the project.
- M. Barrier: Any surface that seals off the work area to inhibit the movement of fibers.
- N. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- O. Ceiling Concentration: The concentration of an airborne substance that shall not be exceeded.
- P. Certified Industrial Hygienist (CIH): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.
- Q. Clean Room: An uncontaminated area or room that is a part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and clean protective equipment.
- R. Critical Barrier: A single layer of 6-mil or greater polyethylene sheeting or an equivalent airtight barrier installed initially over all doors, windows, ventilation openings, drains, wall penetrations, etc., as an additional measure to prevent contaminated air from escaping the work area.
- S. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.
- T. Cutting: To penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.
- U. Decontamination enclosure system: A series of three (minimum) connected rooms, separated from the work area and from each other by air locks or curtained doorways, for the decontamination of workers and equipment.
- V. Demolition: The wrecking or taking out of any load-supporting structural member of a facility together with related handling operations or the intentional burning of any facility.

- W. Disposal Bag: Six (6) mil thick leak-tight plastic bags used for transporting asbestos waste from work and to disposal site. Each is labeled as follows:

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD

and

CAUTION  
Contains Asbestos Fibers  
Avoid Opening or Breaking Container  
Breathing Asbestos is Hazardous to Your Health.

- X. Duct Tape: Provide duct tape in 2-inch or 3-inch widths as indicated, with an adhesive that is formulated to aggressively stick to sheet polyethylene.
- Y. Encapsulant: A material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent release of fibers.
1. Bridging encapsulant: An encapsulant that forms a discrete layer on the surface of an in-situ asbestos matrix.
  2. Penetrating encapsulant: An encapsulant that is absorbed by the in-situ asbestos matrix without leaving a discrete surface layer.
  3. Removal encapsulant: A penetrating encapsulant specifically designed for removal of asbestos-containing materials rather than for in-situ encapsulation.
- Z. Encapsulation: The application of a liquid material to asbestos-containing material to control the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
- AA. Enclosure: The construction of an airtight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.
- BB. Equipment room: A contaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.
- CC. Fiber release episode: Any uncontrolled or unintentional disturbance of ACM resulting in visible emissions.

- DD. Filter: A media component used in respirators to remove solid or liquid particles from the inspired air.
- EE. Final cleaning: The cleaning of all dust and debris from the work areas near the end of the active abatement phase, immediately prior to the final visual inspection.
- FF. Fixed object: A piece of equipment or furniture in the work area that cannot be readily removed from the work area.
- GG. Friable: Any material, when dry, that may be crumbled, pulverized, or reduced to powder by hand pressure, including previously non-friable material after such previously non-friable material becomes damaged to the extent that, when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.
- HH. Glove bag: A sack (typically constructed of 6-mil transparent polyethylene or polyvinyl chloride plastic) with two inward projecting long-sleeved gloves that are designed to enclose an object from which an asbestos-containing material is removed.
- II. Grinding: To reduce to powder or small fragments, including mechanical chipping or drilling.
- JJ. HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): High efficiency particulate air (absolute) filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.
- KK. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- LL. Negative Pressure Ventilation System: A local exhaust system, utilizing HEPA filtration, capable of maintaining a negative pressure inside the work area and a constant air flow from adjacent areas into the work area and exhausting that air outside the work area.
- MM. Negative Pressure: Air pressure lower than surrounding areas, generally caused by exhausting air from a sealed space (work area).
- NN. Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
- OO. Phase Contrast Microscopy: The analysis of testing asbestos airborne fiber concentration by performing a visual count using NIOSH method 7400.

- PP. Pre-cleaning: The cleaning of the work area of visible dust and debris prior to active abatement.
- QQ. Polarized Light Microscopy: The analysis of testing bulk building materials for asbestos by performing a visual estimation using the EPA Method 600/R-93/116.
- RR. Polyethylene Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, 4.0 or 6.0-mils thick as indicated, clear, frosted, or black as indicated.
1. Flame-resistant Polyethylene Sheet: Flame resistant polyethylene film conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films.
  2. Reinforced Polyethylene Sheet: Translucent, nylon reinforced or woven polyethylene, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films.
- SS. Project Design: The preparation of plans, specifications, project procedures, containment design/placement, descriptions of engineering controls, and shop drawings for an asbestos-abatement project or response action. It shall include an accurate and detailed scope of work, quantities of material to be removed, removal methods, and air exchange calculations. Drawings shall include locations of ACM to be abated, location of the decontamination unit, waste load out, negative air units, air intake and exhaust, and emergency exits when applicable.
- TT. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- UU. Regulated Area: Area established by the Contractor to demarcate areas where asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.
- VV. Regulated Asbestos-Containing Material (RACM): Any of the following: (a) Friable asbestos material, (b) Category I, non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by forces expected to act on the material during demolition or renovation operations.



1. Category I Non-friable Asbestos-Containing Materials (ACM): Asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than one percent asbestos as determined using Polarized Light Microscopy.
  2. Category II Non-friable ACM: Any material, excluding Category I nonfriable ACM, containing more than one percent asbestos as determined using Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- WW. Respirator: A device designed to protect the wearer from inhalation of harmful atmospheres.
- XX. Shower room: A room between the clean room and the equipment room in the worker decontamination enclosure suitably arranged for complete showering during decontamination.
- YY. Spray Cement: Spray adhesive in aerosol cans that is specifically formulated to stick to sheet polyethylene.
- ZZ. Staging area: The holding area or an area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.
- AAA. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- BBB. Transmission Electron Microscopy (TEM): The analysis of testing bulk building materials, air concentrations, or dust wipes for asbestos contamination. The most precise technique used for the definitive identification of asbestos.
- CCC. Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.
- DDD. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- EEE. Waste load-out area: A specially constructed airlock system utilized as a short-term storage area for bagged or barreled waste and as a port for transferring waste to the transport vehicle. This area is separate from the decontamination unit.
- FFF. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils that have been dampened with amended water or diluted removal encapsulant and afterwards, thoroughly decontaminated or disposed of as asbestos-contaminated waste.

- GGG. Wetting Materials: For wetting prior to disturbance of asbestos-containing material, use either amended water or a removal encapsulant.
- HHH. Work Area: The area where asbestos-related work or removal operations are performed and that is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by 29 CFR 1926.
- III. Workday: Means Monday through Friday, not including holidays that falls on any of the days Monday through Friday.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### A. Sheet Plastic:

1. Polyethylene Sheet: Sheeting for walls shall be a minimum of 4-mils. For floors and critical barriers, other objects in the regulated area and worker decontamination areas, poly shall be 6-mils.
2. Flame-resistant Polyethylene Sheet: Where needed, provide flame resistant polyethylene film. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.
3. Reinforced Polyethylene Sheet: Where plastic sheet constitutes the only barrier between the Work Area and the building exterior, provide reinforced polyethylene sheet. Provide largest size possible to minimize seams, 6.0 mil thick as indicated, frosted or black as indicated.\

#### B. Miscellaneous Materials

1. Duct Tape
2. Spray Cement
3. Wetting Materials:
  - a. Amended Water
  - b. Removal Encapsulant
  - c. Garden Sprayer: For glove bag use provide a hand pump type pressure-can garden sprayer fabricated out of either metal or plastic, equipped with a metal wand at the end of a hose that can deliver a stream or spray of liquid under pressure.

### 2.02 PERSONAL PROTECTIVE EQUIPMENT

- A. Additional Protective Equipment – Provide disposable coveralls, head covers, and footwear covers for use by the Owner Representative and other authorized representatives who may inspect the Site.

### **PART 3 - EXECUTION**

#### **3.01 GENERAL PROCEDURES**

- A. Remove asbestos containing material in strict accordance with the requirements of OSHA 29 CFR 1926.1101 and this Section.
- B. Provide asbestos banner tape and warning signs at each visual and physical barrier.
- C. Properly remove additional materials that may be suspected to contain asbestos. Perform all work necessary to remove ACM that is encountered during demolition.
- D. Comply with Article 3.07 – Worker Protection.
- E. All incoming electrical supplies shall be equipped with ground fault circuit interrupters.
- F. Pre-cleaning
  - 1. HEPA vacuum or wet wipe all surfaces in the asbestos abatement work area contaminated with visible dust or debris. Clean movable objects free of dust and debris by HEPA vacuum or wet wiping before removal from the work area.
  - 2. Dispose of all dust and debris, filters, mop heads and other contaminated waste as ACM.
  - 3. After pre-cleaning work area, begin prep of work area.
  - 4. Pick up and containerize ACM-debris in each work area prior to setting up the work area.
- G. Impermeable Drop Cloths
  - 1. Install an impermeable drop cloth (i.e., a clear 6-mil sheet plastic) in all areas where asbestos removal work is to be carried out. Completely cover work area around work activity.
  - 2. Remove drop cloth at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.
- H. Airborne Fiber Counts

1. Use work procedures that result in a fiber count outside the work area less than that indicated in Article 1.10 of this Specification.
  - a. If airborne fiber counts exceed the specified level, immediately mist the area with amended water to lower fiber counts and revise work procedures to maintain airborne fiber levels within the required limit.
2. Use respiratory protection based on fiber counts as indicated in Article 3.08 of this Specification.
- I. On a daily basis, stockpile and clean up all rubbish, trash, debris, etc., caused by work done under this project.

### **3.02 ACCETPABLE REMOVAL METHODS**

- A. Use wet removal techniques for all ACM removal
  1. Thoroughly wet, to satisfaction of Owner Representative, ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
  2. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
  3. Remove saturated ACM in small sections. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into asbestos disposal bags. Twist neck of bags, bend over and seal with minimum three (3) wraps of duct tape. Clean outside and move to wash down station adjacent to material decontamination unit. Waste shall be double bagged or bagged and placed in a second impermeable container (i.e., cardboard drum).
- B. Removal of pipe gaskets are classified as "Class II asbestos work" under OSHA's 29 CFR 1926.1101 Asbestos in Construction.
  1. Pipe gaskets: The area around the removal areas shall be cordoned with asbestos banner tape. An adjacent decontamination station with HEPA-

vacuum shall be set up adjacent to the regulated area for worker and equipment decontamination. Drop cloths shall be placed under removal areas. The gaskets shall be removed using wet methods and hand tools and waste shall be double bagged.

### **3.03 AIR MONITORING – TEST SERVICES**

- A. The purpose of air monitoring outside of the work area is to detect faults in the work area isolation such as:
  - 1. Contamination of the building outside of the work areas with airborne asbestos fibers.
  - 2. Failure of filtration or rupture in the negative pressure system.
- B. Background and Perimeter Area Air-Monitoring: The Owner Representative will monitor airborne fiber counts outside of the work area. Perimeter area monitoring must meet clearance criteria in Article 1.10 or not exceed background levels representing the same area before the asbestos work began. The results of such monitoring will be made known to the Owner no later than 48 hours from the end of the work shift represented by such monitoring.
- C. Sample Analysis
  - 1. Sample analysis will be performed using PCM before, during and after asbestos abatement. TEM analysis will be performed if deemed necessary by the Owner or Owner Representative.
  - 2. Provide a microscope and technician at the Site or send samples daily by overnight mail to a testing laboratory so that verbal reports on air samples can be obtained within 24 hours.
- D. Personal Monitoring
  - 1. Perform all monitoring to meet MIOSHA requirements (Part 602. Asbestos Standards is Construction) for maintenance of time-weighted average (TWA) fiber counts for types of respiratory protection provided. Submit results within 1 week of receipt of data.

### **3.04 WORK AREA ISOLATION**

- A. General
  - 1. When required by the acceptable removal method, completely isolate the work area from other parts of the building to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the work area(s) become contaminated with asbestos-containing dust or debris, determined through visible observations or perimeter air monitoring results, immediately notify the Owner Representative and

clean those areas in accordance with the proper procedures. Perform all such required cleaning or decontamination at no additional cost to Owner.

2. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated before erection of plastic sheeting temporary enclosure. Remove all uncontaminated removable furniture, equipment, and/or supplies from the work area before commencing work, or completely cover with two (2) layers of 6-mil polyethylene sheeting securely taped in place with duct tape. Such furniture and equipment shall be considered outside the work area unless covering plastic or seal is breached.
3. Disable Ventilating Systems and any other system that brings air into or out of the work area. Disable system by disconnecting wires, removing circuit breakers, by lockable switch or other positive means that will prevent accidental premature restarting of equipment.
4. The Owner Representative must visually observe and approve all work area set-up before commencing any removal activities.
5. Allow for work area clearance in accordance with Article 3.09 prior to dismantling the enclosure.

**B. Control of Access**

1. Permit access to the work area only through the Decontamination Area. Close off all other means of access and seal. Display warning signs on the clean side of the sealed access.
2. Provide asbestos banner tape and warning signs at each visual and physical barrier.

**C. Critical Barriers**

1. Completely separate the work area from other portions of the building and the outside by sheet plastic barriers at least 6-mil in thickness, or by sealing with duct tape.
2. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the work area with duct tape alone or with polyethylene sheeting at least 6-mil in thickness, taped securely in place with duct tape. Maintain seal until all work, including project decontamination, is completed. Take care in sealing off lighting fixtures to avoid melting or burning of sheeting. Use flame resistant or reinforced polyethylene sheet where required.

**3.05 NEGATIVE PRESSURE SYSTEM REQUIREMENTS FOR ENCLOSURES -  
RESERVED**

**3.06 WORKER ENTRY AND DECONTAMINATION/MATERIAL DECONTAMINATION**

- A. Entry to Regulated Area: Every time that a worker enters the Regulated Area, the workers shall remove all street clothes and don clean coveralls and respirator. A swimsuit or second disposable suit may be worn beneath outer coveralls.
- B. Worker Decontamination: Every time that a worker leaves the work area, require adherence to the following procedure:
  - 1. Maintain a bucket of clean potable water in the Regulated Area. Do not amend with a wetting agent.
  - 2. Remove contaminated suit inside the Regulated Area. Leave respirator in place.
  - 3. Wash hands, face, and surface of respirator with water and wet paper towels. Use caution to avoid breaking seal between respirator face piece and face.
  - 4. Proceed with respirator in place to Change Room/Area and remove respirator and don street clothes.
  - 5. At end of workday, decontaminate fully in accordance with Article 3.07 Worker Protection.
  - 6. For work in enclosures, workers must exit through the decontamination unit and shower prior to entering the clean room/area.
- C. Material Decontamination: Require that the following procedure be used in removing equipment and bagged debris from the Regulated Area.
  - 1. Remove equipment and bagged debris from the Regulated Area in separate operations.
  - 2. Worker in Regulated Area cleans equipment and bagged debris and hands one piece of equipment or one bag of debris at a time to worker outside the Regulated Area.
  - 3. Transport all bags to the dumpster in clean, sealed containers that have never been in an asbestos work area, Mini-Enclosure, or Decontamination Unit/Area.

**3.07 WORKER PROTECTION**

- A. General

1. Provide worker protection as required by the most stringent LARA, OSHA and/or EPA standards applicable to the work. The procedures listed in this item are to be adhered to regardless of fiber count in the work area. Before beginning work with any material, provide workers with the required protective equipment.
  2. Require that appropriate protective equipment be used at all times.
  3. Each time the work area is entered, remove all street clothes in the Changing Room of the Personnel Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed to equipment room and put on work boots.
- B. Decontamination Procedures - Require all workers to adhere to the following personal decontamination procedures whenever they leave the work area:
1. When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the Equipment Room.
  2. The following procedure is required as a minimum:
    - a. Thoroughly wash hair, hands and face (and other exposed skin).
    - b. Carefully wash face piece of respirator inside and out.
    - c. Proceed to outside work area.
- C. Within Work Area
1. Do not allow workers to eat, drink, smoke, or chew gum or tobacco in the work area. To eat, chew, drink, or smoke, the workers shall follow the decontamination procedure described above, and then dress in street clothes before entering the non-work areas of the building.

### **3.08 RESPIRATORY PROTECTION**

- A. General
1. Respiratory Protection Program: Comply with OSHA 29 CFR 1910 and 1926 (also MIOSHA Part 451), and MIOSHA Part 602 Asbestos.
  2. Require that respiratory protection be used at all times that there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental.
  3. Require that a respirator be worn by anyone in a work area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until the area has been cleared for re-occupancy in accordance with Article 3.09 – Work Area Clearance.



4. Regardless of airborne fiber, require that the minimum level of respiratory protection used be a half-face and air purifying respirators with high efficiency filters.
5. Do not allow the use of single use, disposable, or quarter face respirators for any purpose.

B. Fit Testing

1. Initial Fitting: Provide initial fitting of respiratory protection during a respiratory protection course of training. Fit types of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which he/she has been trained and fit.
2. Upon Each Wearing: Require that each time an air-purifying respirator is put on, it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions.

C. Type of Respiratory Protection Required

1. Provide Respiratory Protection as indicated in this Article. Using paragraph E of this Article, determine the proper level of protection by dividing the airborne fiber count in the work area by the "protection factors" given below. The level of respiratory protection that supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed.

D. Permissible Exposure Limits (PEL)

1. 8-Hour Time Weighted Average (TWA) of asbestos fibers to which any worker may be exposed shall not exceed 0.1-fibers/cubic centimeter.
2. 30-Minute Exposure Limit (EL): 1.0 fibers/cubic centimeter.
3. Fibers: For purposes of this Section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), NIOSH 7400 procedures, or asbestos fibers of any size as counted using a transmission electron microscope.

| <b><u>Airborne Fiber Concentration</u></b> | <b><u>Required Respiratory Protection</u></b> |
|--------------------------------------------|-----------------------------------------------|
|--------------------------------------------|-----------------------------------------------|

Not in excess of 1.0f/cc  
HEPA Cartridges; minimum  
requirement for all activities

Half-mask air purifying with

Not in excess of 5.0f/cc  
HEPA filters

Full facepiece respirator with

Not in excess of 10.0f/cc  
PAPR with HEPA filters

Any tight fitting, full facepiece

Not in excess of 100f/cc

Full facepiece supplied air  
operated in pressure demand  
mode

In excess of 100f/cc

Any supplied air respirator  
operated in the pressure-demand  
mode, equipped with auxiliary SCBA

**E. Air-Purifying Respirators**

1. Negative pressure - half or full-face mask: Supply a sufficient quantity of respirator filters approved for asbestos so that workers can change filters routinely. Require that respirators be wet-wiped each time a worker leaves the work area. Store respirators and filters at the Site in the Changing Room and protect totally from exposure to asbestos prior to their use.

**3.09 WORK AREA CLEARANCE**

**A. The following procedures shall be followed to open the area for re-occupancy after abatement:**

1. Air testing and other requirements that must be met for decontamination of the Work Area before release of Contractor and re-occupancy of the work area are specified in this Article.
2. Decontaminate air in the Work Area that has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to asbestos containing materials in the space.
3. Clean and decontaminate of all surfaces (ceiling, walls, floor, etc.) of the Work Area and all furniture or equipment in the Regulated Area by use of damp-cleaning and mopping, and/or a High Efficiency Particulate Air (HEPA) filtered vacuum. Do not perform dry dusting or dry sweeping.
4. Perform visual inspection and complete Certificate of Visual Inspection. The Owner's Representative shall look for debris from any sources, residue on surfaces, dust or other matter. If any such debris residue, dust or other matter is found, repeat final cleaning and continue decontamination procedure from that point.
5. Encapsulation: After a satisfactory visible inspection by the Owner's Representative, the abated surfaces shall be sealed with an encapsulant.

6. The Owner Representative will perform final clearance sampling.
  7. Clean, decontaminate, and remove temporary facilities installed prior to abatement work, including critical barriers erected by work of Article 3.04 – Work Area Isolation Enclosures.
- B. Final Air Sampling / Clearance Criteria – Reserved
- C. Completion of Abatement Work
1. Asbestos Abatement Work is complete upon meeting the work area clearance criteria and fulfilling the following:
    - a. Remove all equipment, materials, and debris from the Site.
    - b. Dispose of all asbestos-containing waste material as specified in Article 3.10.
    - c. Fulfill Project Closeout Requirements of Article 1.13 and Article 3.09.
- D. Certificate of Visual Inspection: Complete the appended “Certificate of Visual Inspection” with the Owner’s Representative for signature. Submit with air sampling results and keep on file for the length of the project.

### CERTIFICATE OF VISUAL INSPECTION

The Contractor hereby certifies that he has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) in accordance with Specification Section 02 8200, Article 3.09 and has found no dust, debris or residue.

By: \_\_\_\_\_  
(Signature)

Date: \_\_\_\_\_

(Print Name) \_\_\_\_\_

(Print Title) \_\_\_\_\_

### OWNER'S REPRESENTATIVE CERTIFICATION

The Owner's Representative hereby certifies that he/she has accompanied the Contractor on his visual inspection and verifies that this inspection has been thorough and to the best of his knowledge and belief, the Contractor's certification above is a true and honest one.

By: \_\_\_\_\_  
(Signature)

Date: \_\_\_\_\_

(Print Name) \_\_\_\_\_

(Print Title) \_\_\_\_\_

(Print Company) \_\_\_\_\_

**3.10 OFF-SITE TRANSPORTATION AND DISPOSAL**

- A. Load drums, bags, and wrapped components that have been removed from the work area into an enclosed or covered truck/trailer for transportation. If a rented vehicle is used, notify the owner of the vehicle of its intended use and give a copy of the notification shall be given to the Owner Representative.
- B. All vehicles hauling material to the disposal site shall comply with applicable MDOT regulations. Vehicles shall be properly licensed under and comply with all applicable federal, state, and local laws and regulations.
- C. Maintain the enclosed cargo area of the vehicle free of debris and line with two layers of 6-mil polyethylene sheeting to prevent contamination from leaking or damaged containers. Install floor sheeting first and extend up to the sidewalls. Lap the wall sheeting over the floor sheeting and tape into place.
- D. Provide proper tools/equipment to safely expedite container handling. Place drums on level surfaces in the cargo area and pack tightly together to prevent shifting and tipping. Secure large structural components to prevent shifting.
- E. Protect personnel handling asbestos-containing waste by disposable clothing, including head, body and foot protection, and at a minimum, half-face piece, air-purifying, dual cartridge respirators equipped with high efficiency filters.
- F. Prior to loading, provide Owner Representative with one manifest for each load of material. Each manifest will be pre-printed with the Site name and address, the Owner's name and address, the name of the landfill, the name of the transporter, and the landfill approval number.
- G. During loading, the Owner Representative will provide a manifest signed on behalf of the Owner for each load.
- H. Transport contaminated material and excavated fill soil to a Type II landfill disposal facility licensed to accept asbestos for disposal.
- I. Dispose of asbestos-containing waste material and debris that is packaged in accordance with the provision of this Specification at the approved landfill in accordance with the regulatory requirements of the NESHAP and any applicable state and local guidelines and regulations.
- J. Within 24 hours of the load leaving the Site, provide to the Owner Representative an original manifest and any other documentation indicating receipt signed by the landfill.
- K. Obtain and provide certification by and other satisfactory evidence from the owner(s) or operators(s) of the waste disposal facility(ies) attesting to the fact that all disposal activities were conducted and concluded in conformance with the requirements of 40 CFR 61 Subpart M and all other applicable laws and regulations.

**END OF SECTION**

## SECTION 02 8300 - LEAD PAINT REMEDIATION

### PART 1: GENERAL

#### 1.01 SUMMARY OF WORK

- A. The type of work under this specification involves work on surfaces and equipment painted with lead-based paint (LBP) or lead-containing paint (LCP). The Improvement activities include:
  - 1. Coring through walls;
  - 2. Demolition of wood plank ceiling in Lower Level Kitchen
  - 3. Demolition and cutting of plaster ceiling;
  - 4. Cutting of wood walls on the 2<sup>nd</sup> level; and
  - 5. Demolition of mechanical and electrical equipment in Mechanical Room.
- B. The location of such activities are shown on the demolition drawings prepared by G.H. Forbes Associates Architects. Verify all information.

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 80 00: Hazardous Materials Remediation
- B. Section 02 82 00: Asbestos Abatement

#### 1.03 REFERENCES

- A. General Applicability of Codes, Regulations, and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The references in this Article may apply to the work under this Section. This list shall not be considered complete, and it is the Contractor's responsibility to perform all work in accordance with all Federal, State and local laws and regulations.
- C. Verification Survey of Hazardous Materials prepared by Willem Environmental Consulting, LLC (WEC Project No. 24-029-00), dated June 25, 2025. Attached to this verification survey is the Hazardous and Regulated Materials Survey Report for Belle Isle Athletic Shelter prepared by Beam, Longest, and Neff (BLN Project No. 23022), dated September 8, 2023. The report is included with this specification

package. It is the Contractor's responsibility to verify all information and to interpret all data and reports for removal purposes.

- D. Michigan Labor and Economic Opportunity (LEO) and Michigan Occupational Safety and Health Administration (MIOSHA) Safety Standards relating to lead include but are not limited to:
1. Part 1 General Provision
  2. Part 451 Respiratory Protection
  3. Part 42 Hazard Communication
  4. Part 20 Demolition
  5. Part 45 Fall Protection
  6. Part 6 Personal Protective Equipment
  7. Part 7 Welding & Cutting
  8. Part 19 Tools
  9. Part 12 Scaffolds & Scaffold Platforms
  10. Part 451 Respiratory Protection
  11. Part 603 Lead Exposure in Construction
- E. Code of Federal Regulations:
1. 40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards"
  2. 40 CFR 117, "Determination of Reportable Quantities for Hazardous Substances"
  3. 40 CFR 122, "EPA Administered Permit Program: The National Pollutant Discharge Elimination System"
  4. 40 CFR 261, "Identification and Listing of Hazardous Waste"
  5. 40 CFR 262, "Standards Applicable to Generators of Hazardous Waste"
  6. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste"
  7. 40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities"



8. 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities"
  9. 40 CFR 268, "Land Disposal Restrictions"
  10. 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan."
  11. 40 CFR 302, "Designation, Reportable Quantities, and Notification."
- F. State of Michigan:
1. Michigan Codified Laws Annotated MCLA 299.9101 - 299.11107 "Michigan Hazardous Waste Management"
- G. National Institute for Occupational Health and Safety: NIOSH Method 7082, "Lead".
- H. American Society for Testing and Materials
1. ASTM D3335, "Test Method for Low Concentrations for Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy."
- I. EPA (Environmental Protection Agency) Publications:
1. SW-846, Test Methods for Evaluating Solid Waste - Physical/Chemical Methods.
  2. EPA Method 3050, "Acid Digestion of Sediments, Sludges, and Soils."
- J. SSPC (Steel Structures Painting Council): Guide 61 (CON) Guide for Containing Debris Generated During Paint Removal Operations.
- K. "Industrial Lead Paint Removal Handbook", 2nd Edition, Kenneth A. Trimmer.

#### **1.04 GENERAL REQUIREMENTS**

- A. Contractor Responsibility: Assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. Provide medical examinations and maintain medical records of personnel as required by the applicable Federal, State, and local regulations. Hold the Owner and Owner's Consultant harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of Contractor, Contractor's employees, or subcontractors.
- B. Training: Contractors performing abatement of lead-containing paint

demolition or renovation activities on buildings materials or equipment painted with LBP and/or LCP shall have at a minimum, lead awareness training. Lead awareness training is an annual requirement.

- C. Decontamination area location, dumpster location, and entrances that may be used for the movement of supplies and personnel are subject to the Owner and Owner's Consultant approval.
- C. Allow the Owner's Consultant to inspect and approve all equipment and materials used before the start of any work.
- D. Allow the Owner's Consultant to check or evaluate field/air monitoring methods, procedures and quality assurance

#### 1.05 DEFINITIONS

- A. Abatement: Any set of measures designed to permanently eliminate LBP or LCP, or to eliminate lead paint hazards for an expected design life of at least 20 years. Abatement includes the removal of LBP or LCP and associated dust hazards, demolition of components or fixtures painted with LBP or LCP, and all preparation, cleanup, disposal, and post abatement clearance inspection activities associated with such measures.
- B. Accredited laboratory: A laboratory that has been evaluated and given approval to perform a specified measurement or task (such as the American Industrial Hygiene Association or National Lead Laboratory Accreditation Program), usually for a specific property or analyze for a specified period of time.
- D. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches around the nose and mouth of the face.
- E. Competent Person: An agent of the Contractor who is a Competent Person as defined by OSHA in 29 CFR 1926.62. This person must be capable of identifying existing and predictable lead and cadmium hazards in the surroundings or working conditions and who has authorization by the Contractor to take prompt corrective measures to eliminate them.
- F. Lead-Containing Paint Surface: Paint containing any amount of lead by weight at or above the laboratory method detection limit.
- G. Lead-Based Paint Surface: Paint having a lead content of greater than or equal to 0.50% by weight.
- H. Engineering Controls: Measure which are put into place at the work site to implement containment and control and/or the reduction of lead and cadmium dust exposure.

- I. Encapsulation The application of a covering or coating that acts as a barrier between the LBP or LCP and the environment and that relies for its durability on adhesion between the encapsulant and the painted surface, and on the integrity of the existing bonds between paint layers and between the paint and the substrate.
- J. Enclosure: The use of rigid, durable construction materials that are mechanically fastened to the substrate in order to act as a barrier between LBP or LCP and the environment.
- K. FieldBlank: A non-exposed sample of the medium used for testing, such as a wipe or filter, which is analyzed like other samples to determine whether (1) samples are contaminated with lead or cadmium before samples are collected (e.g., at the factory, or at the testing site), (2) the samples are contaminated after sample collection (e.g., during transportation to the laboratory or in the laboratory).
- L. FinalClearanceInspection: An inspection by a qualified inspector to determine whether abatement and cleanup are complete and unit tests pass the final clearance standards as set forth herein.
- M. Generator: The facility owner or operator or person who first creates or produces the hazardous waste. Generator size statuses are:
1. Large Quantity Generator: Generates over 2,200 pounds (1,000 kilograms) of hazardous waste or 2.2 pounds of acutely hazardous waste per month or stores more than 13,200 (6,000 kilograms) pounds of waste or more than 2.2 pounds of acutely hazardous waste at the site at any one time.
  2. Small Quantity Generator: Generates more than 220 pounds (100 kilograms), but less than 2,200 pounds (1,000 kilograms) of hazardous waste per month and accumulates less than 13,200 pounds (6,000 kilograms) at any one time.
  3. Conditionally Exempt Small Quantity Generator: Generates less than 220 pounds (100 kilograms) of hazardous waste per month and accumulates no more than 1,000 kilograms (2,200 pounds) of hazardous waste at any time.
- N. HazardousWaste: Paint debris is classified as hazardous waste due to the characteristic of toxicity, if after testing by Toxicity Characteristic Leaching Procedures (TCLP), the leachate contains any of the elements in the concentrations listed below (or greater):

|          |         |         |         |
|----------|---------|---------|---------|
| Arsenic  | 5 ppm   | Lead    | 5 ppm   |
| Barium   | 100 ppm | Mercury | 0.2 ppm |
| Chromium | 5 ppm   | Silver  | 5 ppm   |

Note: Other characteristics can cause a material to be hazardous as defined in 40 CFR 261 and must be taken into consideration. The list above includes only those elements typically associated with paint solids. If chemical strippers are used, the debris may be hazardous waste, due to characteristics of the chemical(s), or if the pH is less than or equal to 2 or greater than or equal to 12.5.

- O. HEPA-High Efficiency Particulate Air: A filter capable of filtering out particles of 0.3 microns or greater from a body of air at 99.97% efficiency or greater.
- P. High-Phosphate Detergent: Detergent that contains at least 5% tri-sodium phosphate (TSP).
- Q. Lead Dust Contamination: Dust containing lead at levels above the clearance criteria, generated by the deterioration of lead-based paint, by environmental factors or by the abatement of leaded surfaces.
- R. Monitoring: A systematic means of inspection to assure compliance with the safety standards contained herein, which shall include, but not limited to, visual inspection, air sampling, and surface lead and cadmium dust sampling by the OWNER'S CONSULTANT.
- S. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- T. Personal Samples (for sampling lead and cadmium dust): Air samples collected from within the breathing zone of a worker, but outside the respirator. The samples are collected with a personal sampling pump, pulling 1 to 4 liters/minute of air.
- U. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- V. Regulated Area: Area established by the Contractor where the airborne concentrations exceeds or may reasonably be expected to exceed the MIOSHA Lead Action Level of  $30.0 \mu\text{g}/\text{m}^3$ . The regulated area is demarcated and/or isolated to prevent the spread of lead dust or debris, and entry by unauthorized personnel.
- W. TCLP (Toxicity Characteristic Leaching Procedure): A test defined in Appendix II of 40 CFR 261 that is designed to identify wastes likely to leach hazardous concentrations of particular toxic constituents into the ground water as a result of improper management.

- X. TimeWeightedAverage(TWA): The average concentration of a contaminant in air during a specific time period.
- Y. WetCleaning(WetDetergentWash): The process of eliminating lead and cadmium dust contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with a solution of water and trisodium phosphate (TSP) or appropriate substitute and afterwards thoroughly decontaminated or disposed of as lead and cadmium contaminated waste.
- Z. WorkArea: The area where LBP or LCP removal or related work is performed, where dust collection or abrasive recycling equipment is located, and locations where LBP or LCP debris is handled or transferred to storage containers. Work areas are defined and/or isolated to prevent the spread of lead or cadmium dust, or debris and entry by unauthorized personnel. Regulated areas are within work areas.
- AA. WorkPractice: A procedure followed by workers, which is intended to minimize exposure to the worker and the environment.

#### 1.06 SUBMITTALS

At least 2 weeks prior to beginning work, submit a written plan which includes the following items. Do not begin work until they are acknowledged as received.

- A. Abatement: The written plan shall include methods to be employed for surface preparation, LBP or LCP abatement, area set up, and collection of debris.
  - 1. Describe the proposed methods and locations for work disturbing LBP or LCP for each activity outlined in Item 1.01 Summary of Work.
  - 2. Include details for establishing regulated areas. When designing the system, thoroughly examine building components to verify their ability to support containment system; include wind loads (if applicable).
  - 3. If required, detail the methods and procedures for lead abatement of historically significant features.
- B. ProgramsfortheProtectionofAmbientAir,andWater: The written plan shall include information regarding testing and evaluation programs that will be used to confirm that the work does not violate Federal, State and local regulations. Refer to Article 1.07 for acceptance criteria.
  - 1. AirQuality: The following shall be addressed:

- a. Visible Emissions: Submit a written plan for the observations that will be made to verify that the visible emissions criteria of this Specification are not exceeded.
- b. Personal Monitoring and Negative Exposure Assessment: The Contractor shall submit a program that identifies the proposed activities for the use of personal monitors in accordance with Part 603 Lead Exposure in Construction Standard and NIOSH Method 7082. The duration of monitoring, provisions for background monitoring, laboratory qualifications, and evaluation procedures to be employed shall be included.

C. Handling, Disposal and Analysis of Debris:

1. Handling and Site Storage: The written plan shall address handling and site storage of LBP or LCP debris in accordance with the requirements of 40 CFR 262 and 40 CFR 265. The plan will at a minimum include container requirements, contingency plan, labeling and personnel training, storage area inspections, and emergency response.
2. Sampling and Testing of Debris: Written procedures that will be followed for the sampling and testing of debris to determine if it is a hazardous waste. The sampling procedure shall be in accordance with the requirements of SW 846, with the analysis accomplished by TCLP, as defined in Appendix II of 40 CFR 261. The plan shall include the name of the testing laboratory to be utilized. The testing laboratory shall hold certifications or accreditations relevant to the testing and documentation of such shall be included in the plan.
3. Transportation: The written plan shall how waste will be properly transported in accordance with the requirements of 40 CFR 263 and other state and federal regulations. The name of the transporter shall be included.
4. For the proposed disposal facility, submit the name, location, 24-hour telephone number, and Federal, State and local license or permit numbers.
5. Submit the name and address, and federal, state and local permit or identification numbers of the proposed transportation contractor.
6. Submit, for review Owner's Consultant prior to Owner's signature, the disposal facility's approval application (waste profile) filled out in its entirety, inclusive of landfill required laboratory data. Within 5 days, the Owner's Consultant will either return the Owner signed waste profile to the Contractor or reject the application. Contractor is responsible for the contents of the waste profile, and disposal facility rejection of an Owner signed waste profile shall not be cause for additional compensation.

7. Submit the approved waste profile after receiving disposal facility approval prior to beginning work. The approval shall contain the disposal facility's waste approval number.
8. Equipment Decontamination: A written plan for the decontamination of reusable items prior to removal from the project site, or for the proper testing and disposal of the materials if decontamination is not possible or desirable.

D. Worker Protection:

1. The written plan shall address worker protection consistent with MIOSHA, Part 603 - Lead Exposure in Construction including, but not limited to, exposure assessments and methods for selection of appropriate respiratory protection, personal protective equipment, hygiene facilities and practices, and medical surveillance.

1.07 CRITERIA FOR CONTROL OF LEAD DUST EMISSIONS

A. Ambient Air Quality - Particulate Matter and Visible Emissions: Monitor and control ambient air particulate matter and visible emissions in accordance with the following criteria:

1. Visible Emissions: Visible emissions shall be used as a criterion for project shut down until corrections to the containment, removal methods or the regulated area are made. The Owner's Consultant has the authority to shut down the project if any visible emissions are observed outside the containment, work, or regulated area.

B. Air Monitoring to Establish Regulated Areas:

1. Determine the extent of the regulated area surrounding activities where exposures may exceed the MIOSHA Lead Action Level of  $30.0 \mu\text{g}/\text{m}^3$ .
2. Emissions of in excess of MIOSHA's Lead Action Level over an eight-hour period shall be cause for shut down of the project until correction are made to comply with these levels.

C. Water Quality: Do not allow the release of lead into bodies of water or storm sewers. Stop work if spills or emissions are observed entering into bodies of water, or are found in areas where storm water run-off could carry the debris into bodies of water or storm sewers.

1. Provide protection at drains to prevent paint debris from entering the storm sewer system.

D. Clearance Criteria:

1. Clearance will be conducted using a visual inspection by the Owner's Consultant of the work area and surrounding areas to ensure that no dust or debris remains.
  - a. If criteria are met, the work area may be released for general use.
  - b. If the clearance criteria are not met, the work area(s) shall be re-cleaned by the contractor and the clearance inspection repeated at no cost to the project.

1.08 WORKER TRAINING AND CERTIFICATION

- A. LARA MIOSHA-Required Training: All workers are to be trained in the dangers inherent in handling, breathing or ingesting lead dust and in the proper work procedures and personal and area protective measures prior to the time of initial job assignment and at least annually thereafter in accordance with Part 603.

1.09 RELEASES

- A. Contractor shall be responsible for the proper handling of material being disposed from the time the Contractor removes the material until the material is disposed of site in a landfill. The Contractor shall be responsible to clean up all spills that occur during loading, hauling and final disposal at no cost to the Owner. Contractor shall immediately notify the Owner's Consultant of any spills and appropriately clean up and dispose of all material and impacted media required for cleanup.

1.10 RECORD KEEPING AND REMOVAL MANAGEMENT

- A. Document and maintain records of the removal process. Submit the records to the Owner, for their use upon completion of the removal and prior to final payment. The records shall clearly describe in non-technical language where the lead were found, and how it was removed.
- B. Records shall include a detailed written description of the abatement, including the abatement methods used, locations of room and/or components where abatement occurred, and reasons for selecting particular abatement methods for each component.

1.11 QUALITY ASSURANCE

- A. Contractor will be experienced in the removal, packaging, handling, transportation, and proper disposal of LBP or LCP and have all necessary local permits and/or approvals.



- B. Contractor shall be responsible for the proper handling of material being disposed from the time the Contractor moves the material until the material is disposed of site at the licensed disposal facility. The Contractor shall be responsible to clean up all spills that occur during loading, hauling and final disposal at no cost to the Owner. Contractor shall immediately notify the Owner's Consultant of any spills and appropriately clean up and dispose of all material and impacted media required for cleanup.
- C. Do all work required by and in accordance with all applicable federal, state and local government regulatory agencies and arrange for all permits and licenses for the packaging, loading, hauling, and final disposal operations.

#### **1.12 OWNER'S CONSULTANT'S ROLE**

- A. The Owner's Consultant, will perform the following activities:
  - 1. Review the Contractor's submittals for compliance with the specifications.
  - 2. Conduct air monitoring outside of the regulated area. Perform sampling in accordance with NIOSH 7082. Send samples to an accredited laboratory with a 24-hour turn-around-time. Shut down the project if the Action Level is exceeded and do not resume until corrections to the containment, removal methods or the regulated area are made.
  - 3. Perform clearance visual inspection.
  - 4. Periodically monitor for visible emissions from the work area and regulated area.
- B. The Owner or Owner's Consultant has the right to stop any work that does not comply with the intent of the specifications. If the Owner presents a written stop work order, immediately stop all work. Do not recommence work until authorized by the Owner.

### **PART 2: PRODUCTS**

#### **2.01 EQUIPMENT**

- A. HEPAvacuums: Utilize HEPA vacuums to clean surfaces during and after working involving disturbing LBP or LCP.
- B. Air-filtration devices (AFDs): Utilize AFDs in containments and work and regulated areas to filter air and keep dust levels down.
- C. Other equipment, including personal safety equipment, as necessary to comply with the requirements of this specification.

## 2.02 MATERIALS

- A. The following materials may be used to set up the work area:
  - 1. Polyethylene sheeting: 4-mil and 6-mil thickness.
  - 2. Polyethylene spray glue: Product MSDS shall be approved by the OWNER'S CONSULTANT.
  - 3. Heavy duty tape (e.g., duct tape) to fasten plastic sheets;
  - 4. Staple gun with heavy duty staples for fastening plastic sheets;
  - 5. Miscellaneous materials such as storage drums, framing lumber, masking, as necessary to meet the requirements of this specification.
- B. Non-flammable chemical paint strippers that do not contain methylene chloride.

## PART 3 - EXECUTION

### 3.01 GENERAL PROCEDURES

- A. Provide on-site, full time competent person (or persons) to ensure that the worker protection program is effective.
- B. Site Preparation: Prior to work start:
  - 1. Ensure the ventilation system in the vicinity of the work area is off.
  - 2. Demarcate work areas and regulated areas by use of ropes, tape, walls, or other similar means, and post appropriate warning signs; maintain egress. At a minimum, provide barrier warning tape at the perimeter of the work area and post warning signs with the following:

**"DANGER  
LEAD WORK AREA  
MAY DAMAGE FERTILITY OR THE UNBORN CHILD  
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM DO  
NOT EAT, DRINK OR SMOKE IN THIS AREA"**

- 3. When activities are used for removal which are likely to cause airborne concentrations to exceed the MIOSHA Lead Action Level, erect containment to protect surfaces and contain and control dust and debris as specified in Article 3.03.

4. When possible, remove components whole (i.e., radiators, pipe hangers, wood framing, doors, etc.), without disturbing the paint.
  5. Conduct an on-site safety meeting to discuss possible work place/work practice hazards.
- C. Prohibited on-site removal methods:
1. Open flame burning or torching (includes propane-fueled heat grids).
  2. Machine sanding or grinding without HEPA local vacuum exhaust tool.
  3. Uncontained hydro-blasting or high-pressure wash.
  4. Dry sanding or scraping (except in limited circumstances as permitted by Federal regulations).
  5. Abrasive blasting or sandblasting without HEPA local vacuum exhaust tool.
  6. Heat guns operating above 1,100 °F.
  7. Methylene chloride chemical paint removers.
  8. Other methods prohibited by Federal, State or local regulations.
- D. Approved Removal Methods: Mitigation of lead-bearing substances shall employ only the following methods:
1. Removal of component. Any component part of a building may be abated by removing the component whole and replacing it with a part free of lead -bearing substances.
  2. Removal of paint. Paint shall be removed from the substrate using the following techniques:
    - a. Offsite chemical stripping;
    - b. Heat gun (The temperature of the heat gun shall not exceed 1,100~ F.);
    - c. Nonflammable chemical strippers which do not contain methylene chloride;
    - d. Wet scraping or sanding;
    - e. Sander equipped with HEPA vacuum;

- f. Vacuum-blasting in exterior work areas only;
  - g. Mechanical paint removal systems equipped with a HEPA vacuum.
- E. Exercise caution to avoid the release of dust into the air. Contain dust and debris on polyethylene sheeting. Prevent emissions from the regulated area in excess of the MIOSHA Lead Action Limit. These activities include, but are not limited to: manual demolition, scraping, sanding, abrasive blasting, welding, cutting and torch cutting.
- F. HEPA vacuum and wet-wipe the exterior of the filled waste containers before removing from the work area to remove residual contamination. If plastic bags are used, bag again as they come out of the work area.
- G. Limit access to the work area to those persons properly trained and protected in accordance with Article 1.08 and the submitted worker protection program.
- H. Require persons entering a regulated area to wear appropriate respiratory protection in accordance with appropriate Federal and State laws and regulations, and with this Specification.
- I. Perform personal/exposure air monitoring on employees for compliance with MIOSHA's Part 603 Lead Exposure in Construction. The Owner's Consultant has the authority to shut down the project if the personal air monitoring results indicated that workers' respiratory protection is inadequate until workers wear respirator with appropriate protection factors and/or engineering controls are implemented to reduce exposures to lead dust.
- J. Do not allow unacceptable activities within the work area including, but not limited to, eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.
- K. Provide access to Owner's Consultant and allow them to utilize ladders, lifts or other equipment to access above-grade areas for inspections and tests.

### **3.02 CONTROLLING DISPERSAL**

- A. Limiting access: Prior to satisfactory clearance testing, limit access to the work areas to the following:
  - 1. Contractor and designated employees;
  - 2. State, county, or local enforcement officials, or their designees;
  - 3. Inspectors representing the Owner;
  - 4. Owner's Consultant

- B. Limiting Tracking of Dust and Debris:
  - 1. Require persons entering the work area to wear disposable coveralls, and shoe covers. The coveralls and shoe covers shall be removed upon leaving the work area and placed with removal waste.
  - 2. Remove waste from work areas at times when worker traffic is low. Select transit and hauling routes to minimize interaction with non-lead workers.
- C. Regularly clean all tools, equipment, and worker protection equipment to minimize worker exposure and the risk of transferring lead and cadmium outside of the work area.

### **3.03 EXTERIOR WORK PROCEDURES**

- A. Work Area Isolation and Preparation:
  - 1. Isolate the work area to prevent unauthorized access.
    - a. Post OSHA-compliant lead warning signs at each entrance to the work area.
    - b. Construct a physical barrier such as warning tape to delineate the regulated area with a perimeter of at least twenty (20) feet around the work area.
  - 2. Remove all movable belongings and items from below the work area.
  - 3. Completely cover all immovable items with protective sheeting. Seal seams and edges with tape.
  - 4. Cover the ground in the work area with 6-mil thick poly sheeting or equivalent impermeable material to ten (10) feet in each direction beyond the perimeter of surfaces undergoing renovation.
    - a. If renovations occur in warmer climate, use white plastic sheeting to avoid damage to vegetation.
    - b. Erect a vertical containment or use equivalent extra precautions if renovations occur within ten (10) feet of the property line.
    - c. Place disposable tack pads at the edge of protective ground covering where workers will leave the area.
  - 5. Close and seal all windows within twenty (20) feet of the work area with 6-mil thick poly sheeting or equivalent impermeable material sealed with tape.

6. Close and seal all doors in the work area with 6-mil thick poly sheeting or equivalent impermeable material sealed with tape.
  - a. Any doors that will be used for entry to the building shall be set-up with an overlapped poly flap doorway entrance.
7. Seal all other penetrations within twenty (20) feet of the work area with 6-mil thick poly sheeting or equivalent impermeable material sealed with tape.
8. Construct a decontamination area that consists of an equipment removal area, wash area (equipped at a minimum with hands and face wash station, running warm water, clean towels, and lead reducing soap), and clean area.

**3.04 CLEANING PROCEDURE:**

- A. Conduct prompt clean-up of dust and debris using a HEPA vacuum and wet methods using a lead specific cleaner on a continuous basis.
- B. Conduct cleaning of all tools and equipment using a HEPA vacuum and wet methods using a lead specific cleaner prior to leaving the containment area.
- C. At the end of each shift and upon completion, clean drop cloth and any dust or debris on the ground using a HEPA vacuum and wet methods using a lead specific cleaner.
- D. Upon completion, clean all surfaces (horizontal and vertical) in the work area using a HEPA vacuum and wet methods using a lead specific cleaner following a "top to bottom, back your way out" approach.
- E. Clean at least four (4) feet beyond the contained work area.

**3.05 DISPOSAL:**

- A. Dispose of any dust or paint debris in leak-tight 6-mil thick poly bags.
- B. Dispose of drop cloth by misting, folding inwards, securing with duct tape, and placing in leak-tight 6-mil thick poly bags.
- C. Dispose of all other work related items (e.g. PPE, mops, wipes, filters, etc.) in leak-tight 6-mil thick poly bags.
- D. If items are too large to fit into bags, wrap items in plastic and seal with tape prior to removal from the plastic containment area.
- E. Seal poly bags with duct tape in a gooseneck configuration.

- F. Use a HEPA vacuum and wet methods using a lead specific cleaner to clean the outside of the bags and larger wrapped items before removing them from the plastic containment area.
- G. Move bags out of the work area into a designated secure storage area.
- H. Dispose of wastewater in accordance with local, state, and Federal regulatory requirements.
- I. Submit a representative bag of waste prepared in accordance with laboratory requirements for testing to an EPA accredited lab for Toxicity Characteristic Leaching Procedure (TCLP) analysis.
  - 1. If the concentration of lead is equal to or greater than 5.0 mg/l as determined by the TCLP, the handling and disposal of hazardous waste must be conducted in accordance with applicable local, state, and the Resource Conservation and Recovery Act (RCRA) regulations applicable to the activity being conducted.
  - 2. Do not store hazardous waste on-site for greater than 90 days (or 180 days for a small-quantity generator; 270 days for a small-quantity generator that transports waste greater than 200 miles) without a RCRA permit.
  - 3. Label all waste bags and larger items with appropriate hazardous material disposal information.
  - 4. If the material is determined to be non-hazardous, it may be treated as a municipal solid waste, construction debris, or scrap metal as appropriate.
- J. Carefully place the containers into the truck or dumpster used for disposal. Ensure that all waste is transported in covered vehicles to an appropriate landfill based on the results of the waste determination.

**3.06 CLEARANCE:**

- A. Following the completion of final clean-up, coordinate with the Owner's Consultant for clearance inspection of the area.
- B. Clearance will be conducted using a visual inspection of the work area and surrounding areas to ensure that no dust or debris remains.
- C. If criteria are met, the work area may be released for general use.
- D. If the clearance criteria are not met, the work area(s) shall be re-cleaned by the contractor and the clearance inspection repeated at no cost to the project.

**END OF SECTION**

**SECTION 02 8400 - POLYCHLORINATED BIPHENYL (PCB) REMEDIATION**

**PART 1 – GENERAL**

**1.01 SUMMARY OF WORK**

- A. Provide all labor, materials, equipment, transportation, packaging, sampling and testing, and incidentals required to remove and dispose of polychlorinated biphenyl (PCB)-containing materials or items in accordance with all Federal, State and local laws and regulations. PCB-containing materials may include, but are not limited to fluorescent light ballasts, dielectric fluid in transformers and all other materials or items containing or suspected to contain PCBs.
- B. Consider fluorescent and mercury light ballasts to be PCB-containing unless clearly labeled as non-PCB.
- C. Sample and analyze oil in liquid-filled transformer to determine appropriate disposal methods. The transformer has labeling indicating it is owned by Detroit Power and Light (PLD P75) and has a "NON-PCB" sticker. The contractor will need analytical documentation of PCB-status in the transformer for the disposal facility; therefore, the oil shall be tested prior to disposal.
- D. The location of the transformer and lights requiring removal are shown on the drawings prepared by G. H. Forbes Associates Architects. Verify all information.

**1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 02 8000 - Hazardous Materials Remediation
- B. Section 02 8200 - Asbestos Remediation

**1.03 GENERAL REQUIREMENTS**

- A. Contractor Responsibility: Assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. Provide medical examinations and maintain medical records of personnel as required by the applicable Federal, State, and local regulations. Hold the Owner and Owner Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of Contractor, Contractor's employees, or subcontractors.



- B. Decontamination area location, dumpster location, and entrances that may be used for the movement of supplies and personnel are subject to the Owner Representative.

#### 1.04 REFERENCES

- A. General Applicability of Codes, Regulations, and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
- B. The references in this Article may apply to the work under this Section. This list shall not be considered complete, and it is the Contractor's responsibility to perform all work in accordance with all Federal, State and local laws and regulations.
- C. A Hazardous Materials Survey (HMS) for the Belle Isle Oakway Restroom and Snack Shop building has been conducted and the report is included in Attachment I.

It is the Contractor's responsibility to verify all information and to interpret all data and reports for removal purposes.

- D. CODE OF FEDERAL REGULATIONS (CFR)

29 CFR Part 1910 Occupational Safety and Health Standards

29 CFR Part 1926 Safety and Health Regulations for Construction

40 CFR Part 761 Polychlorinated Biphenyls (PCB) Manufacturing,  
Processing, Distribution in Commerce and Use  
Prohibitions

#### 1.05 SUBMITTALS

At least 1 week prior to beginning work, submit the following items. Do not begin work until they are acknowledged as received.

- A. Work Plan

1. Submit work plans describing the means, methods, and procedures proposed for removing, transporting and disposing of PCB-containing materials.
  2. The work plans shall address safety issues dealing with removal, handling, storing, and transporting the PC- containing materials and products used to remove PCB contamination, including methods of preventing cleanup materials from entering sewers.
  3. Submit health and safety plans in accordance with Michigan Occupational Safety and Health Act (MIOSHA) requirements.
- B. For all disposal facilities:
1. Submit the name, location, 24-hour telephone number, and Federal, State and local license or permit numbers.
  2. Submit the name and address, and federal, state and local permit or identification numbers of the proposed transportation contractor.
  3. Submit for Owner's Representative's review prior to Owner's signature, the disposal facility's approval application (waste profile) filled out in its entirety, inclusive of required laboratory data. Within 5 days, the Owner's Representative will either return the Owner signed waste profile to the Contractor or reject the application. Contractor is responsible for the contents of the waste profile, and disposal facility rejection of an Owner signed waste profile shall not be cause for additional compensation.
  4. Submit the approved waste profile after receiving disposal facility approval prior to removing hazardous material from the sites. The approval shall contain the facility's waste approval number.
  5. Submit a sample manifest filled out in accordance with the requirements of this Section.
- C. Submit the name and address of any environmental testing laboratory to be utilized.

#### **1.06 SAMPLING AND ANALYTICAL TESTING**

- A. Sample and analyze oil in liquid-filled transformer to determine appropriated disposal methods.

- B. Retain a laboratory which routinely provides analysis acceptable to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to perform required analytical testing and sampling. Costs of sample collection, shipping, and testing shall be borne by the Contractor and are incidental to the Contract. Sampling as required or as specified by the Owner Representative shall be performed by the Contractor. The sampling and testing requirements for hazardous material disposal shall be the Contractor's responsibility.
- C. Provide a copy of the laboratory results to the Owner's Representative.

#### **1.07 QUALITY ASSURANCE**

- A. Contractor will be experienced in the removal, packaging, handling, transportation, and proper disposal of PCBs and have all necessary local permits and/or approvals.
- B. Contractor shall be responsible for the proper handling of material being disposed from the time the Contractor moves the material until the material is disposed off-site at the licensed disposal facility. The Contractor shall be responsible to clean up all spills that occur during loading, hauling and final disposal at no cost to the Owner. Contractor shall immediately notify the Owner's Representative of any spills and appropriately clean up and dispose of all material and impacted media required for cleanup.
- C. Do all work required by and in accordance with all applicable federal, state and local government regulatory agencies and arrange for all permits and licenses for the packaging, loading, hauling, and final disposal operations.
- D. If additional data is required to obtain disposal facility approval, collect and analyze appropriate samples. Notify the Owner's Representative in writing at least one week in advance of sampling with an explanation for the additional testing and the date and time of the sampling so that the Owner's Representative will have the opportunity to collect co-located samples.

### **PART 2 – PRODUCTS**

#### **2.01 GENERAL**

- A. Use only products designed to remove PCBs from contaminated surfaces and allowed under TSCA.

### **PART 3 – EXECUTION**

#### **3.01 GENERAL**

**A. Preparation**

1. Obtain all required permits. Provide approved containers, vehicles, equipment, labor, labels, manifests and other documents necessary for accomplishment of the work.

**B. Safety Guidelines**

1. Perform all work associated with PCB cleanup using appropriate personal protective equipment as defined by MIOSHA or more stringent if required.
2. Personal protective equipment shall include respiratory protection and/or ventilation for vapors or particulates associated with contamination removal or other activities if appropriate.
3. Make the work areas safe for the Owner's Representative and other authorized agents of the Owner.
4. Ensure that personnel conducting work under this Section are trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this work.

**3.02 REMOVAL**

**A. General Packaging and Handling Requirements**

1. Prior to the start of removal operations, determine which waste materials may be hazardous. Keep hazardous waste segregated from solid waste, so that proper disposal of the waste material can be achieved.
2. Inspect containers to determine if they are broken, leaking or deformed. In the case of over-packed, leaking, or broken containers of hazardous materials, remove hazardous contents, and place in new drums.
3. Categorize and containerize materials by contents and disposal compatibility. Perform compatibility tests, so wastes can be segregated in the interim storage area without risk of fire or explosion.
4. Package small containers of waste to meet all applicable U.S. Department of Transportation (DOT) and/or Michigan Department of Transportation (MDOT) requirements. Collect liquid waste in drums (55-gallons or smaller).

5. Properly label all containers prior to shipment in accordance with all MDOT and other Federal and State regulations.
6. Provide for the safe storage of waste on-site, prior to disposal. For security reasons, restrict access to waste storage areas.
7. Provide storage containers with appropriate hazard labels.
8. Do not place waste on the unprotected ground. Adequately shield waste to prevent dispersion of the debris by wind or rainwater.
9. Evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.

**3.03 PCB CONTAINING AND SUSPECTED PCB MATERIALS AND ITEMS**

- A. Properly remove, segregate from other materials, and containerize PCB-containing ballasts, and transformers and other suspected PCB items and materials.

**3.04 FLUORESCENT LIGHT BALLASTS**

**A. General**

1. Properly remove, segregate from other materials, and containerize fluorescent light ballasts not clearly labeled as No-PCB.
2. Fluorescent light ballasts containing PCBs only in an intact and non-leaking PCB Small Capacitor are regulated for disposal under 40 CFR 761.60(b)(2)(ii).
3. Fluorescent light ballasts containing PCBs in the potting material are regulated for disposal as PCB bulk product waste under 40 CFR 761.62.
4. Leaking fluorescent light ballasts are regulated for disposal as PCB bulk product waste under 40 CFR 761.62(a) or (c).

**3.05 LIQUID-FILLED TRANSFORMERS**

**A. General**

1. Sample and analyze oil in liquid-filled transformers to determine appropriate disposal methods

**3.06 DISPOSAL AT A LICENSED DISPOSAL OR RECYCLING FACILITY**

**A. General**

1. If required to obtain disposal approval, characterize the material to be disposed by collecting samples at a frequency required by the disposal facility and have the samples analyzed by the independent analytical laboratory for parameters required by the disposal facility. Provide results to Owner Representative. The Contractor shall be responsible for all costs and coordination for this testing.
2. Take special care when removing waste from the site in order to avoid environmental contamination or injury to workers. Containers shall be moved and packed into the truck with care. When possible, use hand trucks, dollies, or pull carts, along with ramps or trucks with lift gates. These procedures will help minimize container breakage.
3. All vehicles hauling material shall comply with applicable Federal and MDOT regulations. Vehicles shall be properly licensed under and comply with all applicable federal, state, and local laws and regulations.
4. Trucks and trailers used for transporting material shall be in good repair, free from holes, have tailgates in good working order, and have tarps that cover the truck's box and trailers.
5. Vehicles found to be leaking vehicle fluids shall not be loaded until the source of the leak is located, contained, and repaired to the satisfaction of the Owner Representative. Report all spills immediately to the Owner Representative. Cleanup of vehicle fluids released to the ground is the Contractors' responsibility.
6. Prior to loading, provide Owner Representative with one manifest for each load of material. Each manifest will be pre-printed with the site name and address, the Owner's name and address, the name of the disposal facility, the name of the transporter, and the disposal facility approval number.
7. During loading, the Owner Representative will provide a manifest signed on behalf of the Owner for each load.
8. Transport hazardous materials, universal waste and non-hazardous waste to a licensed treatment storage and disposal facility or recycling facility for disposal.

9. Within 24 hours of the load arriving at the disposal or recycling facility the site, provide to the Owner Representative an original manifest and a corresponding disposal facility receipt ticket that have been signed by the disposal or recycling facility.
- B. Liquid, Hazardous and/or PCB Waste Disposal:
1. Transport waste in accordance with the requirements of 40 CFR 263 and other applicable state and federal requirements.
  2. Use only licensed transporters. Transporters shall have an EPA ID Number and must meet DOT requirements for shipping containers.
  3. Dispose of waste in accordance with 40 CFR Part 761, 40 CFR 264 and 40 CFR 268 at a disposal facility licensed to accept the waste.

**END OF SECTION**

**SECTION 03 30 00 - CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 SECTION REQUIREMENTS**

- A. Scope: New concrete housekeeping pads for mechanical equipment.
- B. Submittals: Product Data, concrete mix designs and submittals required by ACI 301.
- C. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- D. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

1.2 Cold weather and water protection is required for foundations and slabs-on-grade and is specified elsewhere herein.

1.3 Cast-in-place concrete shall be designed, detailed and constructed in accordance with the following ACI publications and specifications except as otherwise noted on plans and specifications.

- A. ACI-318 Building Code Requirements for Reinforced Concrete.
- B. ACI-315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- C. ACI-613 Recommended Practice for Selecting Proportions for Normal Weight Concrete.
- D. ACI-306 Recommended Practice for Cold Weather Concreting.
- E. ACI-605 Recommended Practice for Hot Weather Concreting.

1.4 All concrete shall be steel reinforced.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Reinforcing Bars: New billet steel ASTM A 615, Grade 60, deformed unless noted otherwise on the Drawings.
  - 1. Anchorage and laps shall conform to ACI Class B splices.
  - 2. Laps shall be minimum of 36 bar diameters.
  - 3. Hook top bars at discontinuous ends.
- B. Plain Steel Wire: ASTM A 82, as drawn.



- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, as drawn, flat sheet. Reinforcement bar into existing slab as indicated on drawings.
  - 1. 4" thick slabs: One layer of 6" x 6" by W1.4 x W1.4. to conform to ASTM A-185 unless otherwise noted.
  - 2. 8" thick slabs: Two layers of 6" x 6" by W2.9 x W2.9. to conform to ASTM A-185 unless otherwise noted.
- D. Portland Cement: ASTM C 150, Type I or high early strength cement, ASTM C-150, Type III.
- E. Air Entraining, Portland Cement: ASTM C-175, Type IA or III.
- F. Fly Ash: ASTM C 618, Type C or F.
- G. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- H. Silica Fume: ASTM C 1240, amorphous silica.
- I. Aggregates: ASTM C 33, uniformly graded.
  - 1. Aggregate: Washed gravel or crushed stone, well-graded from fine to coarse within limits specified in ASTM C-33 except that where exposed to weather less than 2% may be soft particles, 1% chert and 2% hard absorbent with the total, including hard absorbent, less than 4%.
  - 2. Aggregate for washed concrete platforms shall be pea gravel.
  - 3. Maximum aggregate size to be not larger than one-fifth the narrowest dimension between sides of forms nor larger than three-fourths (3/4) of the minimum clear spacing between individual reinforcing bar.
  - 4. Maximum size of aggregate for slabs on grade to be not larger than 1/3 depth of slab.
- J. Air-Entraining Admixture: ASTM C 260.
- K. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- L. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- M. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- N. Water: Clean and free of mineral and organic substances. Preferably obtained from a municipal water supply system.

## **2.2 MIXES**

- A. Comply with ACI 301 requirements for concrete mixtures.

- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
1. Minimum Compressive Strength:
    - a. 4000 psi (27.6 MPa) at 28 days unless otherwise noted.
  2. Maximum Water-Cementitious Materials Ratio: 0.45.
  3. Slump Limit: 5 inches (125 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
  4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
  5. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
  6. For exterior concrete, limit use of fly ash to 25 percent replacement of portland cement by weight and granulated blast-furnace slag to 40 percent of portland cement by weight; silica fume to 10 percent of portland cement by weight.
- C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M.
1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- D. AIR ENTRAINED CONCRETE
1. Concrete exposed to the weather shall have an air content of the following values:

| Maximum Size of Aggregate | Air Content     |
|---------------------------|-----------------|
| 1-1/2 to 2-1/2 inches     | 3-1/2 to 5-1/2% |
| 3/4 to 1-1/2 inches       | 4 to 6%         |
| 3/8 to 3/4 inches         | 5 to 7%         |
  2. Concrete not exposed to weather shall have 3% to 4% air content.

## **PART 3 - EXECUTION**

### **3.1 CONCRETING**

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch (3.2 mm) for concrete exposed to view and Class C, 1/2 inch (13 mm) for other concrete surfaces.
1. Form Materials: To be wood, metal or other material that will not adversely affect the surface of the concrete and that will produce or facilitate obtaining the specified surface finish of the concrete.
  2. Form work shall be taped and cone ties used.

3. Removal of Forms: Forms may be removed as soon as construction is strong enough to support its own and superimposed loads.
  4. Unless otherwise noted, supported slabs shall be formed on 1-1/2" metal deck capable of supporting the concrete dead load until ultimate strength is achieved.
- B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches (150 mm) and sealed.
  - C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - D. Concrete covering over reinforcement: To be as specified in ACI, Publication 318, unless noted otherwise on drawings.
  - E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.
  - F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
  - G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.
  - H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
    1. Scratch finish for surfaces to receive mortar setting beds.
    2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
    3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
    4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
    5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.
  - I. Cure formed surfaces by moist curing for at least seven days.
  - J. The Contractor will engage a testing agency to perform field tests and to submit test reports.
  - K. Protect concrete from damage. Repair surface defects in formed concrete and slabs.
- 3.2 EXTERIOR SLABS, CURBS & WALKS
- A. All flatwork shall be reinforced with welded wire fabric as specified in PRODUCTS.
  - B. Provide contraction joints for walks and platforms as shown on plans, or at 6'-0" maximum dimension in either direction. Joint shall be open, 3/8" wide by 3/4" deep.

Provide 1/2" thick expansion joint strip where slabs meet walls curbs or pavements and no more that 30' apart. Strips shall be for the full depth of the slab.

1. Platforms and walks adjacent to walls shall be placed on 6" of granular fill as specified in Division 2.
- C. Finish: Washed aggregate - uniform in depth and texture.
- D. Curbs: Provide two (2) #4 continuous bar reinforcement unless otherwise noted.
  1. Curb ramps shall have detectable warnings.

### **3.3 CURING**

- A. Curing to be accomplished by preventing loss of moisture, rapid temperature change, damage from rain, flowing water, freezing or any other cause for a minimum of seven (7) days after placing and finishing. Curing to be accomplished by one of following methods applicable to the type of work involved.
  1. Curing Compound: Apply two (2) coats of RIW "Toxkure" or other approved impervious curing compound as directed by manufacturer's written instructions. Compound to be clear and not impair adhesion of resilient flooring or the finish.
  2. Membrane Curing: Cover with kraft paper or other approved medium, in widest practicable widths with all edges lapped at least 13" and sealed continuously with waterproof cement.
- B. Concrete to be kept moist prior to covering.
- C. Curing of other concrete to be by approved method for not less than seven (7) days after placement. Form work left in place to be kept wet to prevent joints from opening.
- D. SEAL AND CURE
  1. Floor slabs to receive finish flooring: Seal and cure with "Kure-N-Seal" by Sonneborn Building Products or approved equal. Color: transparent.
  2. Uncovered floor slabs shall be cured with "Resi-Chem" by Simmons Corp or approved equal and sealed with "Diamond Seal" by Euclid Chemical Corp or approved equal. color: Transparent.

### **3.4 PROTECTION**

- A. Concrete slabs-on-grade shall be protected against freezing and rain water. Cover slabs with waterproof thermal blankets sufficient to insulate slabs against freezing in an ambient temperature of -5F for a 24 hour period.

**3.5 TESTING**

- A. The Contractor shall provide standard concrete test cylinders for all concrete work. A set of three (3) cylinders shall be made for each pour of 40 C.Y. or less. An additional set of cylinders shall be made for each pour over 40 C.Y. Each test cylinder shall be marked with the date, time and location of concrete and shall be tested by an independent concrete testing laboratory at 7- and 28-day intervals after each pour. The test reports shall be sent to the Architect immediately after testing.
- B. The Contractor shall employ a testing company to be on site at the time of placement of the concrete. The testing company is to monitor the reinforcement placement, the concrete placement techniques, and measure the strength and amount of air entraining in the concrete and prepare a written report indicating same. The test reports shall be sent to the Architect immediately.

**END OF SECTION 03 30 00**

**SECTION 04 22 00 – CONCRETE UNIT MASONRY**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Concrete masonry units.
  - 2. Mortar and grout.
  - 3. Miscellaneous masonry accessories.

**1.2 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

**1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
- C. Samples for Initial Selection and/or verification:
  - 1. Exposed CMUs
  - 2. Mortar color

**1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
  - 1. Masonry units.

- a. Include data on material properties.
  - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
  2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602/ACI 530.1/ASCE 6.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## **1.6 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.
- B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

**1.7 FIELD CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Do not apply uniform ceiling loads for at least 12 hours and concentrated loads for at least three days after building masonry walls.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.



## **2.2 PERFORMANCE REQUIREMENTS**

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
  - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with TMS 602/ACI 530.1/ASCE 6.

## **2.3 UNIT MASONRY, GENERAL**

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
  - 1. Where fire-resistance-rated construction is indicated, units are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

## **2.4 CONCRETE MASONRY UNITS**

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. Decorative CMUs: ASTM C90:
  - 1. Scored block to match existing in size and texture.

## **2.5 MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Alkali content is not more than 0.1 percent when tested in accordance with ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.

- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Mortar Cement: ASTM C1329/C1329M.
- E. Aggregate for Mortar: ASTM C144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water: Potable.

## **2.6 REINFORCEMENT**

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

## **2.7 TIES AND ANCHORS**

- A. General: Ties and anchors extend at least 1-1/2 inches (38 mm) into masonry but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  - 1. Stainless Steel Wire: ASTM A580/A580M, Type 304 or Type 316.
  - 2. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304 or Type 316.
- C. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
  - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

## **2.8 EMBEDDED FLASHING SYSTEM MATERIALS (NA)**

## **2.8 MISCELLANEOUS MASONRY ACCESSORIES**

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

## **2.9 MORTAR AND GROUT MIXES**

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification.
  - 1. For reinforced masonry, use Type S.
  - 2. For Glazed Masonry Units, use pigmented mortar in a color to be selected.
- D. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476, Table 1 for specified 28-day compressive strength not less than 2000 psi (14 MPa)].
  - 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured in accordance with ASTM C143/C143M.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION, GENERAL**

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### **3.3 TOLERANCES**

- A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
  2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
  3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
  2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
  3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
  4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch

in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

**C. Joints:**

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

**3.4 LAYING MASONRY WALLS**

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond: do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts and similar items unless otherwise indicated.

- H. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.

### **3.5 MORTAR BEDDING AND JOINTING**

- A. Lay hollow CMUs as follows:
  - 1. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### **3.1 MASONRY-JOINT REINFORCEMENT**

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
  - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### **3.2 CONTROL AND EXPANSION JOINTS**

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

### **3.3 REINFORCED UNIT MASONRY**

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

### **3.4 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level 2 in TMS 402/ACI 530/ASCE 5.
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.

- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- F. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content and compressive strength.
- G. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.
- H. Prism Test: For each type of construction provided, in accordance with ASTM C1314 at 28 days.

### **3.5 REPAIRING, POINTING, AND CLEANING**

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

**END OF SECTION 04 22 00**



## **SECTION 05 50 00 - METAL FABRICATIONS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

**A. Section Includes:**

1. Miscellaneous steel framing and supports.
2. Loose Steel Lintels

#### **1.2 ACTION SUBMITTALS**

**A. Product Data: For the following:**

1. Fasteners.
2. Shop primers.
3. Shrinkage-resisting grout.

**B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.**

### **PART 2 - PRODUCTS**

#### **2.1 METALS**

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.**
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.**
- C. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 316L.**
- D. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.**

#### **2.2 FASTENERS**

- A. General: Unless otherwise indicated, provide Type 316 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.**

1. Provide stainless steel fasteners for fastening aluminum, stainless steel or nickel silver.
- B. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- C. Post-Installed Anchors: chemical anchors.
  1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

## **2.3 MISCELLANEOUS MATERIALS**

- A. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

## **2.4 FABRICATION, GENERAL**

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c.

## **2.5 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

## **2.6 LOOSE STEEL LINTELS**

- A. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions unless otherwise indicated on drawings, furnish one structural steel angle for each 4" width of masonry as follows:
  - 1. Up to 5 ft. wide opening: 4" by 3-1/2" by 1/4"
  - 2. 5 ft. to 7 ft. wide opening: 5" by 3-1/2" by 5/16"
  - 3. For door openings in 12" thick block use two (2) -6" by 3 1/2" by 5/16" steel angles.
  - 4. Over 6 ft. wide opening: Verify with Architect if not indicated on drawings.
- B. Steel lintels consisting of more than one member shall be welded back to back with 2" stitch welds spaced not greater than 8" oc.
- C. Galvanize loose steel lintels.

## **2.7 GENERAL FINISH REQUIREMENTS**

- A. Finish metal fabrications after assembly.

## **2.8 STEEL AND IRON FINISHES**

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide

threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

### **3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS**

- A. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for mechanical equipment securely to, and rigidly brace from, building structure.

### **3.3 INSTALLATION OF BEARING AND LEVELING PLATES**

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### **3.4 REPAIRS**

- A. Touchup Painting:
  - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
- C. **END OF SECTION 05 50 00**

**SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 SECTION REQUIREMENTS**

- A. Submittals: ICC-ES evaluation reports for treated wood.
- 1.2 In addition to the labor and material specified herein, the contractor shall provide all fasteners, nails, bolts, ramsets, blocking, edge blocking, straps and other miscellaneous items not specifically detailed on the plans as required for a complete job in accordance with the applicable building codes.
- 1.3 Protect materials; keep under cover in transit and on the job site.

**PART 2 - PRODUCTS**

**2.1 WOOD PRODUCTS, GENERAL**

- A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.
- B. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.
  - 1. Use Exterior type for exterior locations and where indicated.
  - 2. Use Interior Type A, High Temperature (HT) where indicated.
  - 3. Use Interior Type A unless otherwise indicated.
  - 4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Provide fire-retardant treated materials for all miscellaneous rough carpentry.

**2.2 LUMBER**

- A. Miscellaneous Lumber: Standard, Stud, or No. 3 grade with 19 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

**2.3 PLYWOOD BACKING PANELS**

- A. Telephone and Electrical Equipment Backing Panels: Plywood, Exterior, AC, fire-retardant treated, not less than 3/4-inch (19-mm) nominal thickness.

**2.4 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Screws for Fastening to Metal Framing: ASTM C1002 length as recommended by screw manufacturer for material being fastened.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Set miscellaneous rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach miscellaneous rough carpentry to substrates, complying with the following:
  - 1. CABO NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in the IBC.

**END OF SECTION 06 10 53**

## SECTION 07 21 00 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Glass-fiber blanket insulation.

#### 1.2 ACTION SUBMITTALS

- A. Product Data

### PART 2 - PRODUCTS

#### 2.1 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
  - 1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
  - 2. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
  - 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches (305 mm)** and wider in width.

#### 2.2 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
  - 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
  - 2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
- C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.



## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

### 3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
  - 5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
  - 6. For wood-framed construction, install blankets according to ASTM C1320 and as follows:
    - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

**END OF SECTION 07 21 00**

## **SECTION 07 92 00 - JOINT SEALANTS**

### **PART 1 - GENERAL**

#### **1.1 SECTION REQUIREMENTS**

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).

### **PART 2 - PRODUCTS**

#### **2.1 JOINT SEALANTS**

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- B. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:
  - 1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.
- C. Sealant for Interior Use at Perimeters of Door and Window Frames:
  - 1. Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
- D. Sealant for Exterior Concrete Isolation Joints:
  - 1. One-Part High-Performance Urethane Sealant, ASTM C-920, Type S, Grade P, Class 25.
  - 2. Sikaflex Self-Leveling Sealant or approved equal. Coordinate sealant color with adjacent sealant installation.
- E. Acoustical Sealant:
  - 1. Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission as demonstrated by testing according to ASTM E 90.

## **2.2 MISCELLANEOUS MATERIALS**

- A. Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
- D. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Comply with ASTM C 1193.
- B. Coordinate with Manufacturer's Representative to complete pull tests after application of silicone sealant on Brick Masonry. Successful pull tests are required to obtain warranty in section 3.2.
- C. Do not install Exterior silicone sealant during times of large temperature swings as movement during curing may cause ripples in the sealant
- D. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal perimeters, control joints, openings, and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions. Comply with ASTM C 919.

**END OF SECTION 07 92 00**

## **SECTION 08 06 71 – DOOR HARDWARE SCHEDULE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section references specification sections relating to commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section "Door Hardware".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

#### **1.3 SUBMITTALS**

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

#### **1.5 WARRANTY**

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

#### **1.6 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

### **PART 2 - PRODUCTS**

#### **2.1 SCHEDULED DOOR HARDWARE**

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

### **PART 3 - EXECUTION**

#### **3.1 DOOR HARDWARE SETS**

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.

Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
  2. The supplier is responsible for handing and sizing all products.
  3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
  2. PE - Pemko
  3. RO - Rockwood
  4. OT - Other
  5. VD – Von Duprin
  6. SC - Schlage

### **Hardware Sets**

#### **Set: 1.0**

Doors: 024

|                        |                            |       |     |        |
|------------------------|----------------------------|-------|-----|--------|
| 3 Hinge (heavy weight) | T4A3786                    |       | MK  | 087100 |
| 1 Classroom Lock       | L9070                      | 626   | SC  | 087100 |
| 1 Core                 | Interchangeable<br>Six Pin | 626   | SC  | 087100 |
| 1 Surface Closer       | 4111 EDA                   | 689   | LCN | 087100 |
| 1 Armor Plate          | K1050 36" high CSK BEV     | US32D | RO  | 087100 |
| 1 Door Sweep           | 8192 AA                    |       | ZE  | 087100 |
| 1 Overhead Holder      | 906H                       |       | GL  | 087100 |
| 1 Threshold            | 545B                       |       | ZE  |        |



Set: 2.0

Doors: 007A, 007B, 025

|                        |                 |       |    |        |
|------------------------|-----------------|-------|----|--------|
| 3 Hinge (heavy weight) | T4A3786         | US26D | MK | 087100 |
| 1 Classroom Lock       | L9070           | 626   | SC | 087100 |
| 1 Core                 | Interchangeable | 626   | SC | 087100 |
|                        | Six Pin         |       |    |        |
| 3 Silencer             | 608 / 609       |       | RO | 087100 |

END OF SECTION 08 06 71

## SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Standard and custom hollow metal doors and frames.

- B. Related Sections:

- 1. Division 08 Section "Door Hardware".
  - 2. Division 09 Sections "High-Performance Coatings" for field painting hollow metal doors and frames.

- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

- 1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
  - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
  - 3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  - 4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
  - 5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
  - 6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
  - 10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
  - 11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

### **1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
  1. Elevations of each door design.
  2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  4. Locations of reinforcement and preparations for hardware.
  5. Details of anchorages, joints, field splices, and connections.
  6. Details of accessories.
  7. Details of moldings, removable stops, and glazing.
- D. Samples for Verification:
  1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

### **1.4 QUALITY ASSURANCE**

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.
  - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

#### **1.6 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### **1.7 COORDINATION**

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

## **1.8 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (C).
  - 2. Curries Company (CU).
  - 3. Steelcraft (S).

### **2.2 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

### **2.3 HOLLOW METAL DOORS**

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.

1. Design: Flush panel.
  2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".
    - a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
    - b. Thermal properties to rate at a fully operable minimum U-Factor 0.37 and R-Value 2.7, including insulated door, thermal-break frame and threshold.
    - c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value 2.6, including insulated door, kerf type frame, and threshold.
  3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
  4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
  5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
  6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
  7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
  2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
  3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
  4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
  5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Manufacturers Basis of Design:
1. CECO Door Products (C) Honeycomb Core - Regent Series.

2. CECO Door Products (C) Energy Efficient - Trio-E Series.

## **2.4 HOLLOW METAL FRAMES**

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
  1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
  3. Manufacturers Basis of Design:
    - a. CECO Door Products (C) – Thermal Break TQB Series.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
  1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  3. Manufacturers Basis of Design:
    - a. Curries Company (CU) - CM Series.
    - b. Curries Company (CU) - M Series.
- E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

## **2.5 FRAME ANCHORS**

- A. Jamb Anchors:
  1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## **2.6 ACCESSORIES**

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

## **2.7 FABRICATION**

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
  - 2. Hinge Reinforcement: Provide welded 12 gauge strap for hinges.
- D. Hollow Metal Frames:
  - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
  - 3. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
  - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
  - 5. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
  - 6. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
  - 7. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  - 8. Jamb Anchors: Provide number and spacing of anchors as follows:



- a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
  - 1) Two anchors per jamb up to 60 inches high.
  - 2) Three anchors per jamb from 60 to 90 inches high.
  - 3) Four anchors per jamb from 90 to 120 inches high.
  - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
- b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
  - 1) Three anchors per jamb up to 60 inches high.
  - 2) Four anchors per jamb from 60 to 90 inches high.
  - 3) Five anchors per jamb from 90 to 96 inches high.
  - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
  - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
- 9. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- 10. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## **2.8 STEEL FINISHES**

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

### **3.3 INSTALLATION**

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements with hollow metal manufacturer's written instructions.

#### **3.4 ADJUSTING AND CLEANING**

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

**END OF SECTION 08 11 13**

## **SECTION 08 51 13 – INSULATED WINDOW PANELS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes insulated glazing panels for exterior locations.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Sample warranties.

#### **1.5 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period:
    - a. Window: 10 -years from date of Substantial Completion.
    - b. Insulated Glazing Panels: 5 -years from date of Substantial Completion.
    - c. Kynar 500 Painted finish of Insulated Glazing Panel: 30 years

## **PART 2 - PRODUCTS**

### **2.1 WINDOW PERFORMANCE REQUIREMENTS**

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
  - 1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
  - 1. Minimum Performance Class: AW.
  - 2. Minimum Performance Grade: 70-FW.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.38 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40 for windows facing South, East and West. SHGC of .53 for North Facing Windows
- E. Condensation-Resistance Factor (CRF): Provide windows tested for thermal performance according to AAMA 1503, showing a CRF of not less than 77 (frame) and 72 (glass).
- F. Temperature Index (I): Provide windows tested for thermal performance according to CSA-A440 with a Temperature Index (I) not less than 73 (frame) and 66 (glass).
- G. UFC 4-010-01 DoD Minimum Antiterrorism Standards: Provide a glazing frame bite in accordance with ASTM F 2248. Accommodate insulated glazing with laminated inner layer, refer to specification 08 80 00.

### **2.2 INSULATED GLAZING PANEL**

- A. Basis of Design: Thermolite insulated glazing panels manufactured by Laminatoris Inc. – [www.laminatorsinc.com](http://www.laminatorsinc.com).
  - 1. Foam plastic core bonded on both sides to a thermoplastic stabilizer with a texture/color finished sheet of aluminum on each face and manufactured in a laminated batch (discontinuous) process using adhesives between dissimilar materials.
  - 2. Core: Polyisocyanurate (ISO): 2.0 pcf density (Type 1).
  - 3. Stabilizer: Extruded Profile Polypropylene.
  - 4. Aluminum Sheet: Face thickness 0.022 inch, Backer Thickness 0.0125 inch
  - 5. Thickness / R-Value (hr °F ft² / BTU) (tested in accordance with ASTM C518): 1-1/2" / 6.6.
  - 6. Finish: Kynar 500 Color Black

7. Stucco-Embossed

2.3 ACCESSORIES

- A. Spacers, setting blocks, gaskets and bond breakers: Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer, compatible with sealants and suitable for system performance requirements.
- B. Framing system gaskets, sealants and joint fillers as recommended by manufacturer for joint type.
- C. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section "Joint Sealants".
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- E. Interior Trims: Extruded aluminum, 6063-T6 alloy and temper, extruded to profiles and details indicated.
  - 1. Interior Trims: The interior face trim minimum wall thickness shall be 0.062" (1.57 mm). The face trim shall snap-fit onto concealed mounting clip. Exposed fasteners shall not be accepted. The mounting clip shall be extruded aluminum of 6063-T6 alloy and temper. The minimum wall thickness shall be 0.062" (1.57 mm). The trim clips shall be provided in 4" (101.6 mm) lengths and spaced a maximum of 18" (45,72 cm) center to center.
- F. Coupling Mullions: Extruded aluminum, 6063-T6 alloy and temper, extruded to manufacturer's standard profiles and details.

2.4 FABRICATION

- A. Fabricate insulated window panels in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Weather strip each operable sash to provide weathertight installation.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- E. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

**END OF SECTION 08 51 13**

**SECTION 08 71 00 - DOOR HARDWARE****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section "Hollow Metal Doors and Frames".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series.
  - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. ANSI/UL 294 - Access Control System Units.
  - 4. UL 305 - Panic Hardware.
  - 5. ANSI/UL 437- Key Locks.



### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instruction. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
  2. Plans for existing and future key system expansion.
  3. Requirements for key control storage and software.
  4. Installation of permanent keys, cylinder cores and software.
  5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  2. Review sequence of operation narratives for each unique access controlled opening.
  3. Review and finalize construction schedule and verify availability of materials.
  4. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

**1.6 COORDINATION**

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

**1.7 WARRANTY**

- A. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- B. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- C. Special Warranty Periods:
  - 1. Ten years for mortise locks and latches.
  - 2. Five years for exit hardware.
  - 3. Twenty five years for manual overhead door closer bodies.
  - 4. Two years for electromechanical door hardware, unless noted otherwise.

**1.8 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

## 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

## 2.2 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" heavy weight.
    - b. Sizes from 3'1" to 4'0": 5" heavy weight.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    - a. Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges.
  - 4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. McKinney (MK) - TA/T4A Series, 5 knuckle.
- b. Ives

## 2.3 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

1. Manufacturers:

- a. Basis of Design: Schlage

- B. Standard Lock Cylinders: ANSI/BHMA A156.5, GRADE 1 permanent cores; face finished to match lockset:

1. Core Type: Interchangeable
2. Number of Pins: Six
3. Lock Type: Mortise type

- C. Keying System: Each type of lock and cylinders to be keyed at local locksmith that manages the Belle Isle keying system.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Local Locksmith Contact:  
Fred's  
3470 2<sup>nd</sup> Ave  
Detroit, MI 48201  
(313) 831 5770

- D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

- E. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.4 MORTISE LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all features and functionality as specified herein.
  - 1. Manufacturers:
    - a. Schlage L Series
    - b. dormakaba Best (BE) - 45H Series.

## 2.5 Lockset Trim

- A. Equal to Schlage 06 (Rhodes)

## 2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
  - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
  - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
  - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
  - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
  - 4. Dustproof Strikes: BHMA A156.16.

## 2.7 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
  - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible

to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:

- a. LCN brand, Series 4000.

## 2.8 ARCHITECTURAL TRIM

### A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:



- a. Rockwood (RO).

## 2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Rockwood (RO).

## 2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  1. Pemko (PE).

- 2.11 Thresholds
  - 1. Zero Thresholds.

## 2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final

operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### 3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### 3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  - 1. Quantities listed are for each pair of doors, or for each single door.
  - 2. The supplier is responsible for handling and sizing all products.
  - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 08 06 71, Door Hardware Sets, for hardware sets.

**END OF SECTION 08 71 00**

## SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

#### 2.2 METAL FRAMING AND SUPPORTS

- A. Steel Framing Members, General: ASTM C 754.
  - 1. Steel Sheet Components: ASTM C 645. Thickness specified is minimum uncoated base-metal thickness.
  - 2. Protective Coating: Manufacturer's standard corrosion-resistant zinc coating.
- B. Suspended Ceiling and Soffit Framing:
  - 1. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625 inch diameter, or double strand of 0.0475 inch diameter wire.
  - 2. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, and 0.162-inch diameter.
  - 3. Carrying Channels: Cold-rolled steel, 0.0538 inch thick, 1-1/2 inches deep.
  - 4. Furring Channels: Steel, rigid hat-shaped channels; 7/8 inch deep, 0.0179 inch thick.
  - 5. Grid Suspension System for Interior Ceilings: Interlocking, direct-hung system.
- C. Partition and Soffit Framing:
  - 1. Studs and Runners: 20 Gauge, in depth indicated. 16 Gauge where hangers are installed for plumbing fixtures.
  - 2. Flat Strap and Backing: 0.0179 inch thick.

3. Rigid Hat-Shaped Furring Channels: In depth indicated and 0.0179 inch thick.
4. Resilient Furring Channels: 1/2 inch deep, with single- or double-leg configuration.
5. Cold-Rolled Furring Channels: 0.0538 inch thick, 3/4 inch deep.

D. Shaftwall System Framing:

1. Basis of Design: ClarkDietrich; CT Stud. 20 Gauge, in depth indicated.
2. Standard J-Profile Track with 2-1/4-inch leg and matching studs in depth and gauge.

**2.3 ACCESSORIES**

A. General: Comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Acoustical Sealant for Concealed Joints: Nonsag, latex sealant complying with ASTM C 834.

**2.4 INSTALLATION**

A. Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation and with United States Gypsum's "Gypsum Construction Handbook."

1. Gypsum Plaster Assemblies: Also comply with ASTM C 841.
2. Portland Cement Plaster Assemblies: Also comply with ASTM C 1063.
3. Gypsum Veneer Plaster Assemblies: Also comply with ASTM C 844.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Isolate steel framing from building structure, except at floor, to prevent transfer of loading imposed by structural movement.

1. Where studs are installed directly against exterior walls, install foam-gasket isolation strip between studs and wall.

D. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.

**END OF SECTION 09 22 16**

## SECTION 09 26 13 - GYPSUM VENEER PLASTER

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Work includes:
  - 1. Repairing plaster ceilings.

#### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. C 35, Specification for Inorganic Aggregates for Use in Gypsum Plaster.
  - 2. C 587, Specification for Gypsum Veneer Plaster.
  - 3. C 645, Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
  - 4. C 843, Specification for Application of Gypsum Veneer Plaster.
  - 5. C 844, Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster.
  - 6. C 1047, Specification for Accessories for Gypsum Board and Gypsum Veneer Base.
  - 7. C 1396, Specification for Gypsum Board (Gypsum Base for Veneer Plaster).

#### 1.03 SUBMITTALS

- A. Product Data: Manufacturers' specifications and installation instructions for each product specified.
- B. Shop Drawings: Show layout of control joints.

#### 1.04 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain veneer plaster base, gypsum plaster, and joint tape from a single manufacturer.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packaging and Shipping: Have materials shipped in manufacturer's original packages showing manufacturer's name and product brand name.
- B. Storage and Protection: Store materials inside and protected from damage by the elements. Protect ends, edges, and faces of gypsum veneer base from damage. Protect metal framing and accessories from bending.

#### 1.06 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with ASTM C 843.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURER

- A. Equivalent to National Gypsum Company:
  - 1. Veneer Plaster Base:
    - a. Regular: Gold Bond® BRAND Kal-Kore Base Plaster.
  - 2. Gypsum Plaster:
    - a. Base Plaster: Gold Bond BRAND Kal-Kote Plaster Base.
    - b. Finish Plaster: Kal-Kote BRAND Smooth Finish Plaster.
  - 3. Accessories:
    - a. Joint Reinforcing Tape: ProForm BRAND Paper Joint Tape.
    - b. Joint Reinforcing Tape: Kal-Mesh Tape.

### 2.02 MATERIALS

- B. Veneer Plaster Base:
  - 1. Regular: A gypsum core lathing panel surfaced with absorptive paper on front and long edges and complying with ASTM C 1396.
    - a. Thickness: 3/8 in. or 1/2 in.
    - b. Width: 4 ft.
    - c. Length: 8 ft. through 16 ft.
    - d. Edges: Square or Tapered.
- D. Gypsum Plaster:
  - 1. Base Plaster: High strength gypsum plaster complying with ASTM C 587.
  - 2. Finish Plaster: Gypsum plaster for smooth finish complying with ASTM C 587.
- E. Sand: ASTM C 35.
- F. Water: Potable.

### 2.03 ACCESSORIES

- A. Joint Reinforcing Tape: 2-1/16 in. wide paper reinforcing tape.
- B. Joint Reinforcing Tape: 2-1/2 in. wide coated fiberglass reinforcing tape.



- C. Corner Bead: Formed steel nose and flanges for 1/8 in. girth, weighing 135 lbs. per 1000 lin. ft., galvanized, and complying with ASTM C 1047.
- F. Casing Bead: L shaped steel bead with 1/2 in. and 5.8 in. legs and expanded metal flange, weighing 88 lbs. and 95 lbs. per 1000 linear ft., galvanized.
- G. Casing Bead: J shaped steel bead 1/2 in. and 5/8 in. deep with expanded metal flange, weighing 98 lbs. and 106 lbs. per 1000 linear ft., galvanized, and complying with ASTM C 1047.
- H. Control Joint: Extruded vinyl formed with V shaped slot covered with removable flexible vinyl strip and complying with ASTM C 1047.
- I. Control Joint: Bent zinc sheet formed with V shaped slot, covered with plastic tape, and perforated flanges.
- J. Furring Channel Clip: Spring steel wire clip for attaching rigid furring channels to main runner channels.

#### 2.04 MIXES

- A. Proportions and Procedures: In accordance with ASTM C 842 and the manufacturer's recommendations.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. In accordance with the following ASTM Standards and manufacturer's recommendations:
  - 1. ASTM Standards:
    - a. Veneer Plaster Base: C 844.
    - b. Veneer Plaster: C 843.

#### 3.02 CLEANING

- A. Remove plaster and protective materials from accessories and from adjacent surfaces.

**END OF SECTION 09 26 13**

## SECTION 09 29 00 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.
- C. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

#### 2.2 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. USG Corporation.
2. Thickness: 5/8 inch (15.9 mm), 1/2 inch – as indicated on drawings
3. Long Edges: Tapered.

B. IMPACT-RESISTANT Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Continental Building Products, LLC.
- b. National Gypsum Company.
- c. USG Corporation.

2. Thickness: 1/2 inch (12.7 mm).

3. Long Edges: Tapered.

## 2.3 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use sandable topping compound.

## 2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet
2. Shapes:
  - a. Cornerbead.
  - b. Bullnose bead.
  - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - d. L-Bead: L-shaped; exposed long flange receives joint compound.
  - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
  - f. Expansion (control) joint.
  - g. Curved-Edge Cornerbead: With notched or flexible flanges.

**2.5 JOINT TREATMENT MATERIALS**

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use either setting-type taping or drying-type, all-purpose compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

**2.6 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
  - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Hilti, Inc.
    - b. Specified Technologies, Inc.
    - c. USG Corporation.
  - 2. Sealant shall have a VOC content of 250 g/L or less.
  - 3. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

### **PART 3 - EXECUTION**

#### **3.1 APPLYING AND FINISHING PANELS**

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 5: At panel surfaces that will be exposed to view unless otherwise indicated
    - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

**3.2 PROTECTION**

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

**END OF SECTION 09 29 00**

**SECTION 09 65 13 - RESILIENT BASE**

**PART 1 - GENERAL**

**1.1 SECTION REQUIREMENTS**

- A. Submittals: Product Data and Samples.

**PART 2 - PRODUCTS**

**2.1 RESILIENT BASE**

- A. Products:
  - 1. Johnsonite or approved equal.
- B. Color and Pattern: As noted on Drawings
- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height: 4 inches (102 mm).
- E. Lengths: coils in manufacturer's standard lengths.
- F. Outside Corners: Job formed.
- G. Inside Corners: Preformed.
- H. Finish: As selected.

**2.2 INSTALLATION ACCESSORIES**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
- B. Adhesively install resilient wall base.
- C. Install wall base in maximum lengths possible. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required.

**END OF SECTION 09 65 13**



## SECTION 09 91 00 - PAINTING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Summary: Work includes surface preparation and application of paint systems on the below listed interior and exterior substrates: Note that existing lead-based paint is present in the facility. Refer to Appendix A Hazardous Material Report Dated Sep. 8, 2023 and Specification 02 83 00.

Exterior: 1. Hollow Metal Doors and Frames

Interior: 1. Concrete  
2. Concrete Masonry Units (CMUs)  
3. Steel  
4. Gypsum Board  
5. Plaster  
6. Metal Duct

- B. Submittals:

1. Product Data. Include printout of MPI's "MPI Approved Products List" with product highlighted.
2. Samples.

- C. All paint must be low VOC if used on site.

- D. EXTRA MATERIALS: Provide 1 gallon of each paint, unopened and clearly labeled.

### PART 2 - PRODUCTS

#### 2.1 PAINT

1. First Grade only of the following manufacturers or approved equals: Pratt & Lambert, Glidden Co., Standard Detroit Paint Co., Benjamin Moore Paints or Rustoleum Corp., Sherwin Williams.
2. Waterbased Dryfall: Sherwin Williams Dryfall #B42W SprayLastic or approved equal over manufacturer's recommended primer.
  - a. Spray apply to concrete ceilings, ductwork and exposed metal deck where exposed structural ceiling is indicated to be painted on the drawings.

- b. Clean and prepare existing surfaces per manufacturer's written recommendations. Prepare ductwork (new and existing) using a cleaner/degreaser prior to application of dryfall.
- B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."
- C. Material Compatibility: Provide materials that are compatible with one another and with substrates.
  - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- D. Use interior paints and coatings that comply with the following limits for VOC content:
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints, Coatings: 150 g/L.
  - 3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  - 4. Clear Wood Finishes, Varnishes: 350 g/L.
  - 5. Clear Wood Finishes, Lacquers: 550 g/L.
  - 6. Floor Coatings: 100 g/L.
  - 7. Shellacs, Clear: 730 g/L.
  - 8. Shellacs, Pigmented: 550 g/L.
  - 9. Stains: 250 g/L.
  - 10. Primers, Sealers, and Undercoaters: 200 g/L.

## **2.2 COLOR SELECTIONS**

- A. Color Selections: Refer to Drawings.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.
- C. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

### **3.2 APPLICATION**

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Paint exposed surfaces, new and existing, unless otherwise indicated.
  - 1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.
  - 2. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint the back side of access panels.
  - 4. Color-code mechanical piping in accessible ceiling spaces.
  - 5. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.
- C. Apply paints according to manufacturer's written instructions.
  - 1. Use brushes only for exterior painting and where the use of other applicators is not practical.
  - 2. Use rollers for finish coat on interior walls and ceilings.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
  - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- E. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

### **3.3 EXTERIOR PAINT APPLICATION SCHEDULE**

- A. Steel:
  - 1. Semigloss, Quick-Dry Enamel: Two coats over rust-inhibitive primer: MPI EXT 5.1A.

### **3.4 INTERIOR PAINT APPLICATION SCHEDULE**

- A. Steel:
  - 1. Semigloss Latex: Two coats over alkyd anticorrosive primer: MPI INT 5.1Q, unless noted otherwise below.
  - 2. On steel beam and stairs in Mechanical Room use Macropoxy 646-100 or approved equal over primer.

3. For exposed Rebar coat with Epoxy over zinc primer.
- B. Exposed Duct, concrete ceiling, pipes:
  1. Dryfall: Two Coats over Primer (Semi-gloss)
- C. Concrete Masonry Units:
  1. Semigloss Latex: Two coats over latex block filler: MPI INT 4.2A.
- D. Gypsum Board/Plaster:
  1. Eggshell Latex: Two coats minimum over primer/sealer: MPI INT 9.2A.
- E. Doors and Frames
  1. Semi-gloss Latex: Two coats minimum over primer/sealer. MPI INT 9.2A.

**END OF SECTION 09 91 00**

## **SECTION 10 14 00 - SIGNAGE**

### **PART 1 - GENERAL**

#### **1.1 SECTION REQUIREMENTS**

- A. Provide and install room signage for the first floor where indicated on Drawings.
- B. Submittals: Product Data, Shop Drawings, and Samples.
- C. Regulatory Requirements: Comply with applicable provisions in ICC/ANSI A117.1.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Aluminum Castings: Alloy recommended by sign manufacturer for casting process used and for use and finish indicated.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher, with not less than the strength and durability of 5005-H15.
- C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher, with not less than the strength and durability properties of 6063-T5.
- D. Bronze Castings: ASTM B 584, Alloy UNS C83600 (No. 1 manganese bronze).
- E. Bronze Plate: ASTM B 36/B 36M, alloy UNS No. C28000 (muntz metal).
- F. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304.
- G. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- H. Plastic Laminate: High-pressure laminate engraving stock with face and core in contrasting colors.

- I. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils (0.076 mm) with pressure-sensitive adhesive backing, suitable for exterior applications.

## **2.2 SIGNS**

- A. Interior Panel Signs: Matte-finished opaque acrylic with square edges and rounded corners. Letters 1"-2" in height.
  1. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above surface with contrasting colors.
  3. Occupancy sign. Mount near building entrance.
  4. Color of letters and background signage color to be selected from manufacturer's standard.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Locate signs where indicated or directed by Architect. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance. Coordinate sign location with the Architect.
- B. Wall-Mounted Signs:
  1. Two-Face Tape: Mount signs to smooth, nonporous surfaces, other than vinyl.
  2. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes.

**END OF SECTION 10 14 00**

## **SECTION 10 22 13 – WIRE MESH PARTITIONS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Heavy-duty wire mesh equipment cage.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.

### **PART 2 - PRODUCTS**

#### **2.1 WIRE MESH PARTITION**

#### **2.2 MATERIALS**

- A. Steel Wire: ASTM A510 (ASTM A510M).
- B. Steel Plates, Channels, Angles, and Bars: ASTM A36/A36M.
- C. Seismic Bracing: Angles with legs not less than 1-1/4 inch (32 mm) wide, formed from 0.040-inch- (1.0-mm-) thick, metallic-coated steel sheet; with bolted connections and 1/4-inch- (6-mm-) diameter bolts.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

#### **2.3 HEAVY-DUTY WIRE MESH PARTITIONS**

- A. Mesh: 0.192-inch- (4.9-mm-) diameter steel wire woven into 2-inch (50-mm) diamond mesh or welded into 1-1/2-by-2-1/2-inch (38-mm-by-65-mm) rectangular mesh.
- B. Vertical and Horizontal Panel Framing: 1-1/2-by-3/4-by-1/8-inch (38-by-19-by-3.2-mm) cold-rolled steel channels; with holes for 3/8-inch- (9.5-mm-) diameter bolts not more than 12 inches (300 mm) o.c.
- C. Finish: Hot-dip galvanized

- D. Swinging Lockable Doors. Padlock lug. Provide posts, hinges, angles and all hardware necessary for a complete installation.
- E. Provide bracing to slab as required to minimize deflection to 1-1/2" and to support 200 lb weight.

## **2.4 FABRICATION**

- A. General: Fabricate wire mesh items from components of sizes not less than those indicated. Use larger-sized components as recommended by wire mesh item manufacturer. Furnish bolts, hardware, and accessories required for complete installation with manufacturer's standard finishes.
  - 1. Fabricate wire mesh items to be readily disassembled.
  - 2. Welding: Weld corner joints of framing and grind smooth.
- B. Heavy-Duty Wire Mesh Partitions: Fabricate wire mesh partitions with cutouts for pipes and other items indicated. Finish edges of cutouts to provide a neat, protective edge.
  - 1. Mesh: Securely clinch or Weld mesh to framing.
  - 2. Framing: Fabricate framing with mortise and tenon corner construction.
    - a. Provide horizontal stiffeners as indicated or, if not indicated, as required by panel height and as recommended by wire mesh partition manufacturer. Weld horizontal stiffeners to vertical framing.
  - 3. Fabricate wire mesh partitions with 3 to 4 inches (75 to 100 mm) of clear space between finished floor and bottom horizontal framing.
  - 4. Fabricate wire mesh partitions with bottom horizontal framing flush with finished floor.
  - 5. Doors: Align bottom of door with bottom of adjacent panels.
    - a. For doors that do not extend full height of partition, provide transom over door, fabricated from same mesh and framing as partition panels.
  - 6. Hardware Preparation: Mortise, reinforce, drill, and tap doors and framing as required to install hardware.

## **2.5 STEEL AND IRON FINISHES**

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.



**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of sliding doors. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Install wire mesh partitions to comply with ASTM E 557.
- C. Adjust swinging door to operate smoothly, without warping or binding. Lubricate hardware and other moving parts.

**END OF SECTION 10 22 13**

## **SECTION 10 44 13 - FIRE EXTINGUISHER AND CABINETS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

**A. Section Includes:**

1. Portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

#### **1.2 PREINSTALLATION CONFERENCE**

- A. Preinstallation Conference:** Conduct conference at Project site.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data:** For each type of product.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.**

#### **1.5 COORDINATION**

- A. Coordinate final location with Architect prior to installation.**

#### **1.6 WARRANTY**

- A. Special Warranty:** Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Six years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- C. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

### **2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS**

- A. Carbon Dioxide Type: UL-rated 10-B:C, 15-lb (6.8-kg) nominal capacity, with carbon dioxide in manufacturer's standard enameled-metal container.

### **2.2 MOUNTING BRACKETS**

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.
- C. Materials:
  - 1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
    - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
    - b. Color: As selected by Architect from manufacturer's full range.
  - 2. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install fire extinguishers in locations and at mounting heights acceptable to authorities having jurisdiction. Typically, for extinguishers weighing less than 40 lbs, install so that the handle is between 42 to 60 inches off the floor and the bottom of the extinguisher is at least 4-inches above the floor.
- B. Identification: Apply at locations indicated.

**END OF SECTION 10 44 13**

**SECTION 20 05 00 - MECHANICAL GENERAL REQUIREMENTS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this Section.

**1.2 SUMMARY**

- A. This Section includes mechanical general administrative and procedural requirements. The following requirements are included in this Section to supplement the requirements specified in Division 01 Specification Sections.
- B. Mechanical and Electrical Specifications have been developed utilizing Construction Specifications Institute MasterFormat and make use of the Facilities Services Subgroup - Divisions 20-28; Site and Infrastructure Subgroup - Division 33; and Process Equipment Subgroup - Divisions 40 and 42.

- C. Division 01 Documents and Architectural Specifications in Divisions 02 through 14 have been developed in the MasterFormat 95 Edition and utilize Division 01 through Division 14.
- D. Where Division 15 Mechanical or Division 16 Electrical are referenced in Division 01 Documents, or within the Architectural Specifications in Divisions 02 through 14, they should refer to Division 20-28, 33, 40, and 42. For additional cross reference information refer to the Construction Specifications Institute.

### **1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com).
  - 2. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 3. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
  - 4. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
  - 5. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
  - 6. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 7. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
  - 8. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
  - 9. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
  - 10. ASTM - ASTM International; [www.astm.org](http://www.astm.org).
  - 11. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
  - 12. CSI - Construction Specifications Institute (The); [www.csiresources.org](http://www.csiresources.org).
  - 13. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 14. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
  - 15. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).
  - 16. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
  - 17. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
  - 18. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
  - 19. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
  - 20. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
  - 21. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
  - 22. NFPA - National Fire Protection Association; [www.nfpa.org](http://www.nfpa.org).
  - 23. NSF - NSF International; [www.nsf.org](http://www.nsf.org).
  - 24. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
  - 25. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
  - 26. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Systems Components Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

#### **1.5 QUALITY ASSURANCE**

- A. Scope of Work: Furnish all labor, material, equipment, technical supervision, and incidental services required to complete, test and leave ready for operation the mechanical systems as specified and as indicated on Drawings.
  - 1. Contract Documents are complimentary, and what is required by one shall be as binding as if required by all. In the event of inconsistencies or disagreements within the Construction Documents bids shall be based on the most expensive combination of quality and quantity of the work indicated.
- B. Ordinances and Codes: Perform all Work in accordance with applicable Federal, State and local ordinances and regulations, the Rules and Regulations of ASHRAE, NFPA, SMACNA and UL, unless otherwise indicated.
  - 1. Notify the Architect/Engineer in writing before submitting a proposal should any changes in Drawings or Specifications be required to conform to the above codes, rules or regulations.
  - 2. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without notice to A/E, the Contractor shall bear all costs arising from corrective measures.
- C. Source Limitations: Obtain equipment and other components of the same or similar systems through one source from a single manufacturer.
- D. Tests and Inspections: Perform all tests required by state, city, county and/or other agencies having jurisdiction. Provide all materials, equipment, etc., and labor required for tests.
- E. Performance Requirements: Perform all work in a first class and workmanlike manner, in accordance with the latest accepted standards and practices for the trades involved.

- F. Sequence and Schedule: Perform work to avoid interference with the work of other trades. Remove and relocate work which in the opinion of the Owner's Representatives causes interference.
- G. Labeling Requirement for Packaged Equipment: Electrical panels on packaged mechanical equipment shall bear UL label or label of other Nationally Recognized Testing Laboratory (NRTL) (Intertek, CSA, etc.).

#### **1.6 CODES, PERMITS AND FEES**

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for Mechanical Work shall be secured and paid for by the Contractor. All Work shall conform to all applicable codes, rules and regulations.
- B. Rules of local utility companies shall be complied with. Check with each utility company supplying service to the installation and determine all devices including, but not limited to, all valves, meter boxes, and meters which will be required and include the cost of all such items in proposal.
- C. All work shall be executed in accordance with the rules and regulations set forth in local and state codes. Prepare any detailed drawings or diagrams which may be required by the governing authorities. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.
- D. Refer to Division 22 Section "Domestic Water Piping" for purchase and installation of potable water meters.

#### **1.7 DRAWINGS**

- A. The drawings show the location and general arrangement of equipment, piping and related items. They shall be followed as closely as elements of the construction will permit.
- B. Examine the drawings of other trades and verify the conditions governing the work on the job site. Arrange work accordingly. Provide fittings, valves, and accessories as required to meet actual conditions.
- C. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The Architectural and Structural Drawings take precedence in all matters pertaining to the building structure, Mechanical Drawings in all matters pertaining to Mechanical Trades and Electrical Drawings in all matters pertaining to Electrical Trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.



- E. Drawings are not intended to be scaled for rough-in or to serve as shop drawings. Take all field measurements required to complete the Work.

## **1.8 MATERIAL AND EQUIPMENT MANUFACTURERS**

- A. Equipment: All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of plumbing, heating, ventilating and air conditioning equipment and shall be the manufacturer's latest design.
- B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment or product provided shall be equal in size, quality, durability, appearance, capacity, and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Items Requiring Prior Approval specified in this section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, piping, sheet metal, electrical work, and building alterations shall be included in the original Bid.
- C. All package unit equipment and skid mounted mechanical components that are factory assembled shall meet, in detail, the products named and specified within each section of the Mechanical and Electrical Specifications.
- D. Changes Involving Electrical Work: The design of the mechanical systems is based on the equipment scheduled on the Drawings. Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified with no additional cost to project. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
  - 1. Where equipment changes are made that involve additional Electrical Work (larger size motor, additional wiring of equipment, etc.) the Mechanical Trades involved shall compensate the Electrical Trades for the cost of the additional Work required.

## **1.9 INSPECTION OF SITE**

- A. Visit the site, examine and verify the conditions under which the Work must be conducted before submitting Proposal. The submitting of a Proposal implies that the Contractor has visited the site and understands the conditions under which the Work must be conducted. No additional charges will be allowed because of failure to make this examination or to include all materials and labor to complete the Work.
- B. No contract sum adjustments or contract time extensions will be made for Contractor claims arising from conditions which were or could have been observable, ascertainable or reasonably foreseeable from a site visit or inquiry into local conditions affecting the execution of the work.

**1.10 ITEMS REQUIRING PRIOR APPROVAL**

- A. Bids shall be based upon manufactured equipment specified. All items that the Contractor proposes to use in the Work that are not specifically named in the Contract Documents must be submitted for review prior to bids. Such items must be submitted in compliance with Division 01 specifications. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.
  - 1. Equipment to be considered for prior approval shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall fulfill the requirements of equipment arrangement and space limitations of the equipment shown on the plans and/or specified and shall be compatible with the other components of the system.
  - 2. All costs incurred to make equipment comply with other requirements, including providing maintenance, clearance, piping, sheet metal, electrical, replacement of other components, and building alterations shall be included in the original bid.
- B. Voluntary alternates may be submitted for consideration, with listed addition or deduction to the bid, but will not affect the awarding of the contract.

**1.11 ACTION SUBMITTALS**

- A. Submit for review in compliance with Division 01.
- B. Equipment and material submittals required are indicated in the Mechanical; Fire Suppression; Plumbing; and Heating, Ventilating and Air Conditioning Sections. Refer to Division 01 for submittal quantities.
- C. Submittals shall be in groupings of similar or related items. Plumbing fixture submittals shall be in one package including all fixtures intended to be used for this project. Incomplete submittal groupings will be returned "Rejected". Submit product data with identification mark number or symbol numbers as specified or scheduled on the Mechanical Drawings.
- D. Submittals shall be project specific. Standard detail drawings and schedule not clearly indicating which data is associated with this Project will be returned "Rejected".
- E. If deviations (not substitutions) from Contract Documents are deemed necessary by the Contractor, details of such deviations, including changes in related portions of the project and the reasons therefore, shall be included with the submittal for approval.

**1.12 INFORMATIONAL SUBMITTALS**

- A. Shop Drawings:

1. Prepare shop drawings to scale for the Architect/Engineer for review.
2. Shop drawings shall be reviewed by the Mechanical Contractor for completeness and accuracy prior to submitting to the Architect/Engineer for review. The shop drawings shall be dated and signed by the Mechanical Contractor prior to submission.
3. No equipment shall be shipped from stock or fabricated until shop drawings for them have been reviewed by the Architect/Engineer. Review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action indicated is subject to the requirement of the plans and specifications.
  - a. By the review of shop drawings, the Architect/Engineer does not assume responsibility for actual dimensions or for the fit of completed work in position, nor does such review relieve Mechanical Trades of full responsibility for the proper and correct execution of the work required.
  - b. Contractor is responsible for:
    - 1) Dimensions, which shall be confirmed and correlated at the job site.
    - 2) Fabrication processes and techniques of construction.
    - 3) Quantities.
    - 4) Coordination of Contractor's work with all other trades.
    - 5) Satisfactory performance of Contractor's work.
    - 6) Temporary aspects of the construction process.

#### **1.13 CLOSEOUT SUBMITTALS**

##### **A. Operation and Maintenance Instructional Manuals:**

1. Submit project specific Operation and Maintenance Instructional Manuals for review in compliance with Division 01 Specification Sections.
2. Provide complete operation and maintenance instructional manuals covering all mechanical equipment herein specified, together with parts lists. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. One copy of all manuals shall be furnished for Owner. Maintenance and operating instructional manuals shall be provided when construction is approximately 75 percent complete.
3. For Commissioned Projects: Operation and maintenance instructional manuals shall be submitted a minimum of four weeks prior to functional testing.
4. Format: Submit operation and maintenance manuals in the following format:
  - a. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
    - 1) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - 2) Enable inserted reviewer comments on draft submittals.
5. The operating and maintenance instructions shall include a brief, general description for all mechanical systems including, but not limited to:

- a. Routine maintenance procedures.
- b. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.
- c. Trouble-shooting procedures.
- d. Contractor's telephone numbers for warranty repair service.
- e. Submittals.
- f. Recommended spare parts list.
- g. Names and telephone numbers of major material suppliers and subcontractors.
- h. System schematic drawings.

**B. Record Drawings:**

1. Submit record drawings in compliance with Division 01.
2. Contractor shall submit to the Architect/Engineer, record drawings on electronic media or vellum which have been neatly marked to represent as-built conditions for all new mechanical work.
3. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the underground concealed conditions and other items of construction on field drawings as they occur. The marked up field documents shall be available for review by the Architect, Engineer and Owner at their request.

**C. Warranties:**

1. Warranty: Comply with the requirements in Division 01 Specification Sections. Contractor shall warranty that the mechanical installation is free from defects and agrees to replace or repair, to the Owner's satisfaction, any part of this mechanical installation which becomes defective within a period of one year (unless specified otherwise in other Mechanical; Fire Suppression; Plumbing; or Heating, Ventilating and Air Conditioning Sections) from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material, workmanship or failure to follow the contract documents.
2. File with the Owner any and all warranties from the equipment manufacturers including the operating conditions and performance capacities they are based on.

**1.14 INSTRUCTION OF OWNER PERSONNEL**

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of mechanical equipment and systems at agreed upon times. A minimum of 4 hours of formal instruction to Owner's personnel shall be provided for each building. Additional hours are specified in individual specification sections.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

- D. In addition to individual equipment training provide overview of each mechanical system. Utilize the as-built documents for this overview.
- E. Prepare and insert additional data in operation and maintenance manual when need for such data becomes apparent during instruction.

#### **1.15 WARRANTY**

- A. Warranty: Comply with the requirements in Division 01 Specification Sections. Contractor shall warranty that the mechanical installation is free from defects and agrees to replace or repair, to the Owner's satisfaction, any part of this mechanical installation which becomes defective within a period of one year (unless specified otherwise in other Mechanical; Fire Suppression; Plumbing; or Heating, Ventilating and Air Conditioning Sections) from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material, workmanship or failure to follow the contract documents.
- B. File with the Owner any and all warranties from the equipment manufacturers including the operating conditions and performance capacities they are based on.

#### **PART 2 - PRODUCTS (NOT APPLICABLE)**

#### **PART 3 - EXECUTION**

##### **3.1 MECHANICAL DEMOLITION WORK**

- A. Demolition of existing mechanical equipment and materials shall be done by the Contractor unless otherwise indicated. Include items such as, but not limited to, existing piping, pumps, ductwork, supports, and equipment where such items are not required for the proper operation of the modified system.
- B. Include draining of piping systems where required for demolition, modification of, or connection to existing systems.
- C. In general, demolition work is indicated on the Drawings. However, the Contractor shall visit the job site to determine the full extent and character of this Work.
- D. Unless specifically noted to the contrary, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to the appropriate trade for reuse.
  - 1. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived.
  - 2. Remove items from the systems and turn over to the Owner in their condition prior to removal. The Owner will move and store these materials.

3. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of same, away from the premises.
- E. Work that has been cut or partially removed shall be protected against damage until covered by permanent construction.
- F. Clean and flush the interior and exterior of existing relocated equipment and its related piping, valves, and accessories that are to be reused of mud, debris, pipe dope, oils, welding slag, loose mill scale, rust, and other extraneous material so that the existing equipment and accessories can be repainted and repaired as required for the proper operation and performance of the relocated equipment.
- G. Where existing equipment is to be removed, cap piping under floor, behind face of wall, above ceiling, or at mains.
- H. Cap ductwork and cap piping immediately adjacent to demolition as soon as demolition commences in order to allow existing systems to remain in operation.
  1. Cap or plug piping with same or compatible piping material.
  2. Cap or plug ducts with same or compatible ductwork material.

### **3.2 REFRIGERANT HANDLING**

- A. Refrigerant Installation and Disposal: Perform all work related to refrigerant contained in chillers, cooling coils, air conditioners, and similar equipment, including related piping, in strict accordance with the following requirements:
  1. ASHRAE Standard 15 and Related Revisions: Safety Code for Mechanical Refrigeration.
  2. ASHRAE Standard 34 and Related Revisions: Number Designation and Safety Classification of Refrigerants.
  3. United States Environmental Protection Agency (US EPA) requirements of Section 8 08 (Prohibition of Venting and Regulation of CFC) and applicable State and Local regulations of authorities having jurisdiction.
- B. Recovered refrigerant is the property of the Contractor. Dispose of refrigerant legally, in accordance with applicable rules and regulations.

### **3.3 WORK IN EXISTING BUILDINGS**

- A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once Work is started in the existing building, shall complete same without interruption so as to return work areas as soon as possible to Owner.
- B. Adequately protect and preserve all existing and newly installed Work. Promptly repair any damage to same at Contractor's expense.

- C. Consult with the Owner's Representative as to the methods of carrying on the Work so as not to interfere with the Owner's operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Owner's Representative.
- D. Prior to starting work in any area, obtain approval for doing so from a qualified representative of the Owner who is designated and authorized by the Owner to perform testing and abatement, if necessary, of all hazardous materials including but not limited to, asbestos. The Contractor shall not perform any inspection, testing, containment, removal or other work that is related in any way whatsoever to hazardous materials under the Contract.

### **3.4 TEMPORARY SERVICES**

- A. The existing building will be occupied during construction. Maintain mechanical services and provide necessary temporary connections and their removal at no additional cost to the Owner.

### **3.5 WORK INVOLVING OTHER TRADES**

- A. Certain items of equipment or materials specified in the Mechanical Division may have to be installed by other trades due to code requirements or union jurisdictional requirements. In such instances, the Contractor shall complete the work through an approved, qualified subcontractor and shall include the full cost for same in proposal.

### **3.6 ACCEPTANCE PROCEDURE**

- A. Upon successful completion of start-up and recalibration, but prior to building acceptance, substantial completion and commencement of warranties, the Architect/Engineer shall be requested in writing to observe the satisfactory operation of all mechanical control systems.
- B. The Contractor shall demonstrate operation of equipment and control systems, including each individual component, to the Owner and Architect/Engineer.
- C. After correcting all items appearing on the punch list, make a second written request to the Owner and Architect/Engineer for observation and approval.
- D. After all items on the punch list are corrected and formal approval of the mechanical systems is provided by the Architect/Engineer, the Contractor shall indicate to the Owner in writing the commencement of the warranty period.
- E. Operation of the following systems shall be demonstrated:
  - 1. Air Handling Systems.
  - 2. Refrigeration Systems.
  - 3. Domestic Hot Water Heaters.

- 4. Energy Recovery Systems.
  - 5. Temperature Controls.
- F. For systems requiring seasonal operation, demonstrate system performance within six months when weather conditions are suitable.

### **3.7 PROJECT COMMISSIONING**

- A. Refer to Division 01 "Project Commissioning" and the Commissioning Manual.
- B. Purpose: Training, documentation and verification of the operation and functional performance of mechanical systems for compliance with the "design intent."

**END OF SECTION 20 05 00**



**SECTION 20 05 10 - BASIC MECHANICAL MATERIALS AND METHODS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 22 Section "Domestic Water Piping" for flushing and cleaning of potable water piping.

## **1.2 SUMMARY**

- A. This section includes mechanical materials and installation methods common to mechanical piping systems, sheet metal systems and equipment. This section supplements all other Division 20, 21, 22, and 23 Mechanical Sections, and Division 01 Specification Sections.

## **1.3 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

## **1.4 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Transition fittings.
  - 2. Dielectric fittings.
  - 3. Mechanical sleeve seals.
  - 4. Escutcheons.

## **1.5 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with requirements in Public Law 111-380, "Reduction of Lead in Drinking Water Act," about lead content in materials that will be in contact with potable water for human consumption.
- B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.
- C. Comply with NSF 372, "Drinking Water System Components – Lead Content" for potable domestic water piping and components.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Storage and Protection: Provide adequate weather protected storage space for all mechanical equipment and materials deliveries to the job site. Storage locations will be designated by the Owner's Representative. Equipment stored in unprotected areas must be provided with temporary protection.
  - 1. Protect equipment and materials from theft, injury, or damage.

2. Protect equipment outlets, pipe and duct openings with temporary plugs or caps.
3. Materials with enamel or glaze surface shall be protected from damage by covering and/or coating as recommended in bulletin "Handling and Care of Enameled Cast Iron Plumbing Fixtures", issued by the Plumbing Fixtures Manufacturer Association, and as approved.
4. Electrical equipment furnished by Mechanical Trades and installed by the Electrical Trades: Turn over to Electrical Trades in good condition, receive written confirmation of same.
5. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
6. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

## **1.7 COORDINATION**

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations. Coordinate with other trades to ensure accurate locations and sizes of mechanical spaces, chases, slots, shafts, recesses, and openings.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Install Work to avoid interference with work of other trades including, but not limited to, Architectural and Electrical Trades. Remove and relocate any work that causes an interference at Contractor's expense.
- D. Coordinate requirements for and provide access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."
- E. The mechanical trades shall be responsible for all damage to other work caused by their work or through the neglect of their workers.
  1. All patching and repair of any such damaged work shall be performed by the trades which installed the work. The cost shall be paid by the Mechanical Trades.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

**2.2 PIPE, TUBE, AND FITTINGS**

- A. Refer to individual Division 21, 22, and 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

**2.3 JOINING MATERIALS**

- A. Refer to individual Division 21, 22, and 23 piping Sections for special joining materials not listed below.
- B. Unions: Pipe Size 2 Inches and Smaller:
  - 1. Ferrous pipe: Malleable iron ground joint type unions.
  - 2. Unions in galvanized piping system shall be galvanized.
  - 3. Copper tube and pipe: Bronze unions with soldered joints.
- C. Flanges: Pipe Sizes 2-1/2 Inch and Larger:
  - 1. Ferrous pipe: Standard weight, forged steel weld neck flanges.
  - 2. Copper tube and pipe: Slip-on bronze flanges.
- D. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- E. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated. Square head bolts and nuts are not acceptable.
- F. Brazing Filler Metals: Alloys meeting AWS A5.8.
  - 1. Use Type BcuP Series, silver-bearing, copper-phosphorus alloys for joining copper or bronze socket fittings with copper pipe. Flux is prohibited unless used with bronze fittings.
  - 2. Use Type Bag Series, cadmium-free silver alloys for joining copper with steel, stainless steel, or other ferrous alloys.
- G. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

## **2.4 PIPE THREAD COMPOUNDS**

- A. General: Pipe thread compounds for the fluid service compatible with piping materials provided.
- B. Natural Gas System: Use either of the following:
  - 1. Tetrafluoroethylene (Teflon) tape 2 to 3 mils thick for threaded joints.
    - a. Manufacturers:
      - 1) Cadillac Plastic.
      - 2) Permacel.
      - 3) Other approved.
  - 2. Lead-free pipe thread compounds suitable for service.
    - a. Manufacturers:
      - 1) HCC Holdings, Inc.; Hercules Pro Dope.
      - 2) Mill-Rose Company (The); Clean-Fit Products; Blue Monster Thread Sealant.
      - 3) Oatey; Great Blue Pipe Joint Compound.
      - 4) RectorSeal LLC: A CSW Industrials Company; No. 5, No.5 Special, and No. 5 Sub-Zero Pipe Thread Sealants.

## **2.5 DIELECTRIC FITTINGS**

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Brass Unions, Brass Nipples, Brass Couplings: For systems up to 286 deg F.
- D. Dielectric-Flange Kits: Include full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
  - 1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Capitol Manufacturing Co.
    - d. GF Piping Systems; George Fischer Central Plastics.
    - e. Epco Sales, Inc.
    - f. Pipeline Seal and Insulator, Inc.
    - g. Watts Water Technologies, Inc.; Watts Regulator Co.
    - h. Zurn Industries, Inc.; Wilkins Div.

2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

## **2.6 SLEEVES**

- A. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, and 0.375 inch wall black.
- B. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, and 0.375 inch wall galvanized, plain ends.

## **2.7 ESCUTCHEONS**

- A. Description: Manufactured wall and ceiling escutcheons, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
  1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Insulated Piping: One-piece, stamped-steel type with spring clips.
    - c. Bare Piping in Finished Spaces: One-piece, stamped-steel type.
    - d. Bare Piping in Unfinished Service Spaces or Equipment Rooms: Split-plate, stamped-steel type with concealed hinge and set screw.
  2. Existing Piping: Use the following:
    - a. Insulated Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
    - b. Bare Piping: Split-plate, stamped-steel type with set screw or spring clips.

## **2.8 GROUT**

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  2. Design Mix: 5000-psi, 28-day compressive strength.
  3. Packaging: Premixed and factory packaged.

## **PART 3 - EXECUTION**

### **3.1 PIPING SYSTEMS - COMMON REQUIREMENTS**

- A. Refer to piping application schedules on the Drawings.

- B. Install piping according to the following requirements and Division 21, 22, and 23 Sections specifying piping systems, and in accordance with manufacturer's instructions.
- C. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. The Drawings shall be followed as closely as elements of construction will permit.
- D. During the progress of construction, protect open ends of pipe, fittings, and valves to prevent the admission of foreign matter. Place plugs or flanges in the ends of all installed work whenever work stops. Plugs shall be commercially manufactured products.
- E. Prior to and during laying of pipe, maintain excavations dry and clear of water and extraneous materials. Provide minimum 4 inches of clearance in all directions for pipe passing under or through building grade beams.
- F. Clean and lubricate elastomer joints prior to assembly.
- G. Clean damaged galvanized surfaces and touch-up with a zinc rich coating.
- H. Install piping to conserve building space and not interfere with use of space.
- I. Group piping whenever practical at common elevations.
- J. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
  - 1. Install piping to allow for expansion and contraction at locations where piping crosses building or structure expansion joints.
- K. Slope piping and arrange systems to drain at low points.
- L. Slope horizontal piping containing non-condensable gases 1 inch per 100 feet, upward in the direction of the flow.
- M. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- N. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- O. In concealed locations where piping, other than black steel, cast-iron, or galvanized steel, is installed through holes or notches in studs, joists, rafters, or similar members less than 1-1/2 inches from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of 1/16 inch thick steel, shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2 inches above sole plates and below top plates.
- P. Do not penetrate building structural members unless specifically indicated on drawings.

- Q. Install piping above accessible ceilings to allow sufficient space for ceiling panel and light fixture removal.
- R. Install valves with stems upright or horizontal, not inverted.
- S. Provide clearance for installation of insulation and access to valves and fittings.
- T. Install piping to permit valve and equipment servicing. Do not install piping below valves and/or terminal equipment. Do not install piping above electrical equipment.
- U. Install piping at indicated slopes. Provide drain valves with hose end connections and caps at all piping low points, where piping is trapped and at all equipment.
- V. Install piping free of sags and bends.
- W. Install fittings for changes in direction and branch connections.
- X. Unless otherwise indicated or specified, install branch connections to mains using tee fittings in main pipe:
  - 1. Branch connected to bottom of main pipe for HVAC systems. Side connection is acceptable. Connection above centerline of main is unacceptable. For up-feed risers, connect branch to top of main pipe.
  - 2. Branch connected to top of main for steam and condensate, plumbing systems, compressible gasses, and vacuum.
- Y. Install piping to allow application of insulation.
- Z. Select system components with pressure rating equal to or greater than system operating pressure.
- AA. Install escutcheons for penetrations of walls below ceiling, and ceilings.
- BB. Sleeves are not required for core-drilled holes in poured concrete walls.
- CC. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.
  - 1. Seal openings around pipes in sleeves through walls, floors and ceilings, and where floors, fire rated walls and smoke barriers are penetrated. Firestop materials shall be UL listed and shall have a fire rating equal to or greater than the penetrated barrier.
  - 2. Refer to Division 07 Specification Sections for materials and UL Classified firestop systems.
- DD. Verify final equipment locations for roughing-in.
- EE. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.



**3.2 PIPING JOINT CONSTRUCTION**

- A. Join pipe and fittings according to the following requirements and Division 21, 22, and 23 Sections specifying piping systems.
- B. Cut piping square.
- C. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- D. Remove scale, slag, dirt, oil, and debris from inside and outside of pipe and fittings before assembly.
- E. Clean damaged galvanized surfaces and touch-up with a zinc rich coating.
- F. Make tee connections with screwed tee fittings, soldered fittings or specified welded connections. Make welded branch connections with either welding tees or forged branch outlet fittings in accordance with ASTM A234, ANSI B16.9 and ANSI B16.11. For forged branch outlets, furnish forged fittings flared for improved flow where attached to the run, reinforced against external strains and to full pipe-bursting strength requirements. "Fishmouth" connections are not acceptable.
- G. Use eccentric reducers for drainage and venting of pipe lines; bushings are not permitted.
- H. Provide pipe openings using fittings for all systems control devices, thermometers, gauges, etc. Drilling and tapping of pipe wall for connections is prohibited.
- I. Provide temperature sensing device thermal wells and similar piping specialty connections.
- J. Provide instrument connections except thermal wells with specified isolating valves at point of connection to system.
- K. Locate instrument connections in accordance with manufacturer's instructions for accurate read-out of function sensed. Locate instrument connections for easy reading and service of devices.
- L. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- M. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
- N. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- O. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on gaskets and bolt threads.
  - 1. Assemble flanged joints with fresh-stock gasket and hex head nuts, bolts or studs. Make clearance between flange faces such that the connections can be gasketed and bolted tight without strain on the piping system. Align flange faces parallel and bores concentric; center gaskets on the flange faces without projection into the bore.
  - 2. Lubricate bolts before assembly to insure uniform bolt stressing. Draw up and tighten bolts in staggered sequence to prevent unequal gasket compression and deformation of the flanges. Do not mate a flange with a raised face to a companion flange with a flat face; machine the raised face down to a smooth matching surface and use a full face gasket. After the piping system has been tested and is in service at its maximum temperature, check bolting torque to provide required gasket stress.
- P. Pressure-Sealed Joints: Use manufacturer-recommended tool and procedure. Leave insertion marks on pipe after assembly.
- Q. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials. Refer to Application Schedules on the Drawings.
- R. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  - 3. PVC Nonpressure Piping: Join according to ASTM D 2855.
- S. Remake joints which fail pressure tests with new materials including pipe, fittings, gaskets and/or a filler.

### **3.3 EQUIPMENT CONNECTIONS**

- A. Make connections to equipment, fixtures, and other items included in the work in accordance with the submittals and rough-in measurements furnished by the manufacturers of the particular equipment furnished.
  - 1. Any and all additional connections not shown on the drawings but shown on the equipment manufacturer's submittal or required for the successful operation of the equipment shall be installed as part of this Contract at no additional charge to the Owner.
- B. All piping connections to pumps, coils, and other equipment shall be installed without strain at the pipe connection of this equipment. When directed, remove the bolts in

flanged connections or disconnect piping to demonstrate that piping has been so connected.

### **3.4 PIPING CONNECTIONS**

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, where indicated on Drawings, at final connection to each piece of equipment and at all control valves.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, where indicated on Drawings, at final connection to each piece of equipment and at all control valves.

### **3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS**

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated. Housekeeping pad locations and sizes shall be coordinated by mechanical contractor prior to the placement of concrete slabs.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.
- E. For suspended equipment, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of Architect for same including loads, locations, and methods of attachment.
- F. The Contract Documents indicate items to be purchased and installed. The items are noted by a manufacturer's name, catalog number and/or brief description. The catalog number may not designate all the accessory parts for a particular application. Arrange with the manufacturer for the purchase of all items required for a complete installation.

### **3.6 PAINTING**

- A. Painting of mechanical systems, equipment, and components is specified in Division 09.
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### **3.7 CONCRETE BASES**

- A. Concrete housekeeping pads for floor mounted mechanical equipment shall be provided by Architectural Trades.

**3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Where pipe and/or equipment support members must be welded to structural building framing, Contractor shall seek prior approval from Architect and structural engineer. Scrape, brush clean, and apply one coat of zinc rich primer after welding.
- D. Field Welding: Comply with AWS D1.1.

**3.9 JACKING OF PIPE**

- A. Do not jack pipe in place except upon prior approval of proposed materials and complete details of methods.

**3.10 CUTTING, CORING AND PATCHING**

- A. Refer to Division 01 Specification Sections for requirements for cutting, coring, patching and refinishing work necessary for the installation of mechanical work.
- B. All cutting, coring, patching and repair work shall be performed by the Contractor through approved, qualified subcontractors. Contractor shall include full cost of same in bid.

**3.11 FLASHING**

- A. Provide all flashing required for mechanical work. Refer to Division 07 Specification Sections.

**3.12 LUBRICATION**

- A. Provide all lubrication for the operation of the equipment until acceptance by the Owner. Contractor is responsible for all damage to bearings up to the date of acceptance of the equipment. Protect all bearings and shafts during installation. Thoroughly grease steel shafts to prevent corrosion. Provide covers as required for proper protection of all motors and other equipment during construction.

**3.13 FILTERS**

- A. Provide and maintain filters in air handling systems throughout the construction period and prior to final acceptance of the building. Do not run air handling equipment, including fan coil units, without all prefilters and final filters as specified.

- B. Immediately prior to final building acceptance by the Owner, Contractor shall:
  - 1. Thoroughly wash, recharge, and reinstall cleanable type air filters.
  - 2. Replace all disposable type air filters with new units.

**3.14 CLEANING**

- A. Each Mechanical Trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.
- B. Flushing, cleaning, and disinfection of domestic water piping is specified in Division 22 Section "Domestic Water Piping."
- C. Exterior surfaces of all piping, ductwork and equipment shall be wiped down to remove excess dirt and debris prior to concealment by Architectural Trades work.
- D. Upon completion of work in each respective area, clean and protect work. Just prior to final acceptance, perform additional cleaning as necessary to provide clean equipment and areas to the Owner.

**END OF SECTION 20 05 10**

## SECTION 20 05 13 - MOTORS

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Mechanical Vibration Controls" for mounting motors and vibration isolation devices.
  - 3. Division 20 Section "Variable Frequency Controllers".
  - 4. Division 21, 22, and 23 Sections for application of motors and reference to specific motor requirements for motor-driven equipment.
  - 5. Division 26 Section "Enclosed Switches and Circuit Breakers".
  - 6. Division 26 Section "Enclosed Controllers".
  - 7. Division 26 Section "Fuses".

#### 1.2 SUMMARY

- A. This Section includes basic requirements for factory-installed motors

#### 1.3 DEFINITIONS

- A. ABMA: American Bearing Manufacturers Association. (Formerly AFBMA: Anti-Friction Bearing Manufacturers Association.)

- B. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.
- C. Field-Installed Motor: A motor installed at Project site and not factory installed as an integral component of motorized equipment.
- D. Packaged Self Contained Equipment: Equipment which includes component mechanical and electrical equipment mounted on common bases, skids or frames or in common enclosures with internal control and power wiring factory installed and ready to accept a single electrical service connection. Provide the equipment complete with enclosed controllers, main disconnect switches, control transformers, control devices, wiring and accessories as required.

#### **1.4 COORDINATION**

- A. Coordinate electrical scope of work to be provided by Division 20, 21, 22, and 23 with this Section, related Division 20, 21, 22, and 23 Specifications, Division 26 Specifications and the Drawings.

### **PART 2 - PRODUCTS**

#### **2.1 MOTOR REQUIREMENTS**

- A. Motor requirements apply to factory-installed motors except as follows:
  - 1. Different ratings, performance, or characteristics for a motor are specified in another Section.
  - 2. Manufacturer for a factory-installed motor requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.
  - 3. Submersible motors integral to pumps and excluded from NEMA and EISA standards.
- B. Electrical Power Supply Characteristics: Coordinate electrical system requirements with Division 26.
- C. Electrical Power System Characteristics: As scheduled on the Drawings.
- D. Electrical Connection: Conduit connection boxes, threaded for conduit. For fractional horsepower motors where connection is made directly, provide screwed conduit connection in end frame.

#### **2.2 MOTOR CHARACTERISTICS**

- A. Motors 1/2 HP and Larger: Three phase, unless otherwise indicated.
- B. Motors Smaller Than 1/2 HP: Single phase, unless otherwise indicated.

- C. Frequency Rating: 60 Hz.
- D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
- E. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
- F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
- G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- H. Brake Horsepower Input: Shall not exceed 90 percent of the rated motor horsepower.
- I. Enclosure: Open dripproof (ODP) for motors installed indoors and out of the airstream. Totally-enclosed fan-cooled (TEFC) for motors installed outdoors or within the airstream.

## **2.3 ELECTRONICALLY COMMUTATED MOTOR (ECM)**

- A. Furnish for equipment where specified or scheduled with ECM.
  - 1. Synchronous, constant torque, ECM with permanent magnet rotor. Rotor magnets to be time-stable, nontoxic ceramic magnets (Sr-Fe).
  - 2. Driven by a frequency converter with an integrated power factor correction filter. Conventional induction motors will not be acceptable.
  - 3. Each motor with an integrated variable-frequency drive, tested as one unit by manufacturer.
  - 4. Motor speed adjustable over full range from 0 rpm to maximum scheduled speed.
  - 5. Variable motor speed to be controlled by a 0- to 10 V-dc or 4- to 20-mA input.
  - 6. Integrated motor protection verified by UL to protect equipment against over-/undervoltage, overtemperature of motor, electronics, or both, overcurrent, locked rotor, and dry run (no-load condition).

## **2.4 SINGLE-PHASE MOTORS**

- A. Type: One of the following, to suit starting torque and requirements of specific motor application:
  - 1. Permanent-split capacitor.
  - 2. Split-phase start, capacitor run.
  - 3. Capacitor start, capacitor run.
- B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.



- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.
- D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.

### **PART 3 - EXECUTION**

#### **3.1 ADJUSTING**

- A. Align motors, bases, shafts, pulleys and belts. Tension belts according to manufacturer's written instructions.
- B. Set field adjustable switches and circuit breaker trip ranges.

#### **3.2 CLEANING**

- A. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean motors, on completion of installation, according to manufacturer's written instructions.

**END OF SECTION 20 05 13**

## SECTION 20 05 29 - HANGERS AND SUPPORTS

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
  - 2. Division 20 Section "Mechanical General Requirements."
  - 3. Division 20 Section "Basic Mechanical Materials and Methods."
  - 4. Division 21 Section "Fire-Suppression System" for pipe hangers for fire-protection piping.
  - 5. Division 23 Section(s) "Metal Ducts" for duct hangers and support.

#### 1.2 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry Inc.
- B. MFMA: Metal Framing Manufacturers Association.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Steel pipe hangers and supports.
  - 2. Thermal-hanger shield inserts.

**1.5 QUALITY ASSURANCE**

- A. MSS Standards: Pipe hangers, supports, and accessories shall comply with the following:
  - 1. MSS SP-58, Pipe Hangers and Supports – Materials, Design and Manufacture, Selection, Application, and Installation.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

**2.2 HANGER ROD MATERIAL**

- A. Threaded, hot rolled, steel rod conforming to ASTM A 36 or A575.
  - 1. Rod continuously threaded.
  - 2. Use of rod couplings is prohibited.

**2.3 STEEL PIPE HANGERS AND SUPPORTS**

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article, and schedules and details on the Drawings for where to use specific hanger and support types.

1. Hangers and Supports for Fire Protection Piping: UL listed or FMG approved.

**B. Manufacturers:**

1. Anvil; ASC Engineered Solutions.
2. B-Line by Eaton.
3. Carpenter & Paterson, Inc.
4. Hilti USA.
5. nVent Electric plc; CADDY.
6. PHD Manufacturing, Inc.

**C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.**

**D. Nonmetallic Coatings: Plastic coating, jacket, or liner.**

**E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.**

## **2.4 METAL INSULATION SHIELDS**

**A. Manufacturers:**

1. Anvil; ASC Engineered Solutions.
2. B-Line by Eaton.
3. Carpenter & Paterson, Inc.
4. nVent Electric plc; CADDY.
5. PHD Manufacturing, Inc.

**B. Description: MSS SP-58, Type 40, protective shields. Shields shall span an arc of 180 degrees.**

**C. Shield Dimensions for Pipe: Not less than the following:**

1. NPS 1/4 to NPS 2: 12 inches long and 0.048 inch thick.

## **2.5 PIPE COVERING PROTECTION SADDLES**

**A. Manufacturers:**

1. Anvil; ASC Engineered Solutions.
2. B-Line by Eaton.
3. Carpenter & Paterson, Inc.
4. nVent Electric plc; CADDY.
5. PHD Manufacturing, Inc.

**B. Description: MSS SP-58, Type 39A and Type 39B, for suspension of insulated hot pipe where heat losses are to be kept to a minimum.**

1. Saddles shall match insulation thickness.

2. Saddle length: 12 inches.
3. Furnish with center rib for pipe sized NPS 12 and larger.

## **2.6 FASTENER SYSTEMS**

### **A. Post-Installed Anchors:**

1. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - a. Manufacturers:
    - 1) B-Line by Eaton.
    - 2) DeWalt Engineered by Powers.
    - 3) Hilti, Inc.
    - 4) ITW Ramset/Red Head.
    - 5) MKT Fastening, LLC.
2. Internally Threaded Screw Anchors: Internally threaded, self-tapping screw anchor designed for performance in cracked and uncracked concrete. Suitable base materials include normal-weight concrete, sand-lightweight concrete and concrete over steel deck.
  - a. UL Listed or FMG approved for fire sprinkler piping.
  - b. Available Sizes: For 1/4-inch, 3/8-inch, and 1/2-inch diameter rod sizes
  - c. Manufacturers:
    - 1) B-Line by Eaton; Rapid Rod Hangers.
    - 2) DeWalt Engineered by Powers; Snake+.

## **2.7 EQUIPMENT SUPPORTS**

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

## **2.8 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi, 28-day compressive strength.

**PART 3 - EXECUTION**

**3.1 HANGER AND SUPPORT APPLICATIONS**

- A. Refer to application schedules on the Drawings.
- B. For insulated pipe, oversize hanger elements to accommodate insulation thickness.
- C. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- D. Comply with MSS SP-58 for pipe hanger selections and applications that are not specified in piping system Sections.
- E. Use hangers and supports with galvanized, metallic coatings for outdoor applications or where exposed to outdoor conditions.
- F. Use hangers and supports with plastic coating, or galvanized metallic coatings for applications in corrosive atmospheres.
- G. Use metal framing, with plastic coating, or galvanized metallic coatings for metal framing in corrosive atmospheres.
- H. Use padded hangers for piping that is subject to scratching.
- I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. MSS Type 8 or spring type to meet system requirements.
- J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  - 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  - 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  - 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  - 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- K. Concrete Structure Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Anchor Devices, Concrete and Masonry: in accordance with Group I, Group II, Type 2, Class 2, Style 1 and Style 2, Group III and Group VIII or FS FF-S-325A. Furnish cast-in floor type equipment anchor devices with adjustable positions. Furnish built in anchor devices for masonry, unless otherwise approved by the Architect. Powder actuated anchoring devices shall not be used to support any mechanical systems components.

2. Inserts, Concrete: TYPE 18 or 19. When applied to loads equivalent to piping in sizes NPS 2 and larger, and where otherwise required by imposed loads, a one foot length of 1/2 inch reinforcing rod shall be inserted and wired through wing slots. Proprietary type continuous inserts may be proposed and shall be submitted for approval.
  3. Use mechanical-expansion anchors where required in concrete construction.
- L. Hanger-Rod Attachments for Wood Construction: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. All Steel Ceiling Plates: UL listed and suitable for attachment to wood beams. For pipe sizes NPS 1/2 to NPS 2. Install in accordance with manufacturer's instructions to maintain listing.
  2. Threaded Side Beam Brackets: UL listed and FMG approved, suitable for attachment to wood beams. For pipe sizes NPS 2 to NPS 4. Install in accordance with manufacturer's instructions to maintain listing.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

### **3.2 HANGER AND SUPPORT INSTALLATION**

- A. Steel Pipe Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structural frame.
- B. Provide necessary piping and equipment supporting elements including: building structure attachments, supplementary steel, hanger rods, stanchions and fixtures, vertical pipe attachments, horizontal pipe attachments, anchors, guides, spring supports in accordance with the referenced codes, standards, and requirements specified. Support piping and equipment from building structure, not from roof deck, floor slab, other pipe, duct or equipment.
- C. At connections between piping systems, hangers and equipment of dissimilar metals, insulate, using dielectric insulating material, nonferrous piping against direct contact with the building steel by insulating the contact point of the hanger and pipe or the hanger and building steel. Test each point of dielectric insulation with an ohm meter to ensure proper isolation of dissimilar materials. Test shall be observed by the Owner's Representative and/or Architect.
- D. File and paint cut ends and shop or field prime paint supporting element components.
- E. Secure Type 40 shields to support elements in a manner that prevents movement and damage to insulation and jacket materials.
- F. Hang piping parallel with the lines of the building, unless otherwise indicated. Route piping in an orderly manner and maintain gradient. Space piping and components so a threaded pipe fitting may be removed between adjacent pipes and so there will be not less than 1/2 inch of clear space between finished surfaces and piping. Arrange hangers on adjacent parallel service lines in line with each other.

- G. Flange loads on connected equipment shall not exceed 75 percent of maximum allowed by equipment manufacturer. Flange loads in liquid containing systems shall be checked in the presence of the Architect when piping is full of liquid. No flange load is allowed on pumps, vibration isolated equipment or flexible connectors.
- H. Spring supports, within specified limitations: Constant support type, where necessary to avoid transfer of load from support to support or onto connected equipment; otherwise, variable support type located at points subject to vertical movement.
- I. Where necessary, brace piping and supports against reaction, sway and vibration.
- J. Do not hang piping from joist pans, floor decks, roof decks, equipment, ductwork, or other piping.
- K. Install turnbuckles, swing eyes and clevises to accommodate temperature changes, pipe accessibility, and adjustment for load pitch. Rod couplings are not acceptable.
- L. Install hangers and supports for piping at intervals specified, at locations not more than 3 feet from the ends of each runout, not more than 3 feet from connections to equipment, and not over 25 percent of specified interval from each change in direction of piping and for concentrated loads such as valves, etc.
- M. Base the load rating for pipe support elements on loads imposed by insulated weight of pipe filled with water. The span deflection shall not exceed slope gradient of pipe.
- N. If structural steel, roofs, or tunnels will allow support spacing greater than that shown above, Contractor shall submit proposed support system along with structural calculations documenting the allowance of such spacing, in accordance with ANSI, B31.1, and MSS Guidelines.
- O. Support vertical risers independently of connected horizontal piping whenever practical, with supports at the base and at intervals to accommodate system range of load with thermal conditions. Support vertical risers at each floor penetration for piping in shafts or chases. Guide for lateral stability. Fit horizontal piping connected to moving risers with two spring supports connected adjacent to riser, spaced according to required hanger spacing.
- P. For risers at temperatures of 100 deg F or less place riser clamps under fittings. Support carbon steel pipe at each operating level or floor and at not more than 15-foot intervals for pipe 2 inches and smaller, and at not more than 20 foot intervals for pipe 2-1/2 inches and larger.
- Q. After the piping systems have been installed, tested and placed in satisfactory operation, firmly tighten hanger rod nut and jam nut and upset threads to prevent movement of fasteners.
- R. Attach pipe anchors and pipe alignment guides to the building structure where indicated. If not indicated, the method used is optional to the Contractor, subject to approval by the Architect. In the case of structural steel, make attachment by clamping in accordance with the American Institute of Steel Construction Specification for the Design, Fabrication and Erection of Structural Steel for Building.



- S. Attach supporting elements connected to structural steel columns to preclude vertical slippage and cascading failure.
- T. Attach pipe hangers and other supporting elements to roof purlins and trusses at panel points.
- U. Where eccentric loading beam clamps are approved and where other work is supported by similar eccentric loading support element from the same structural member, locate eccentric loading support elements to minimize structural member torsion load.
- V. Limit the location of supporting elements for piping and equipment, when supported from roof, to panel points of the bar joists.
- W. Building structure shall not be reinforced except as approved by the Architect in writing.
- X. Support piping and equipment from concrete building frame, not from roof or floor slabs unless otherwise indicated.
- Y. Attach piping supports to the side of concrete beams or concrete joist. Where intermediate hangers are required to meet the hanger spacing schedule, the Contractor may propose attachment of intermediate pipe supports to the bottom of the concrete slab pending submittal of a satisfactory pull out test. The Contractor shall submit pull out test criteria, pull out test results, proposed hanger detail and hanger point loads to the Architect for written approval.
- Z. Fastener System Installation:
  - 1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- AA. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- BB. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- CC. Install lateral bracing with pipe hangers and supports to prevent swaying.
- DD. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- EE. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.
- FF. Refer to individual piping sections for hanger spacing and hanger rod sizes.

**3.3 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

**3.4 PAINTING**

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Equipment Supports: Painting is specified in Division 09 painting Sections.
- C. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- D. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION 20 05 29**

## SECTION 20 05 47 - MECHANICAL VIBRATION CONTROLS

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."

#### 1.2 ACTION SUBMITTALS

- A. Product Data: Include load deflection curves for each vibration isolation device.

### PART 2 - PRODUCTS

#### 2.1 VIBRATION ISOLATION EQUIPMENT BASES

##### A. **Type A:** Direct Isolator Attachment

- 1. Unit to be isolated is so constructed that vibration isolators of the type specified may be directly attached, provided that the edge deflection of the isolated unit base over unsupported span between mountings does not exceed specified or manufacturer's limits. If units to be isolated will not meet required deflection provisions, Type B bases shall be provided.

## 2.2 VIBRATION ISOLATORS

- A. **Type 1a** Elastomeric Isolator Pads: Oil- and water-resistant elastomer, arranged in single or multiple layers (maximum 3 layers separated by steel shims) to achieve 90 percent efficiency, molded with a nonslip pattern and galvanized steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type W, Super W, WSW, and WSWSW or comparable products by one of the following:
    - a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.
  2. Material: Standard neoprene for indoor applications.
  3. Material: Bridge-bearing neoprene, complying with AASHTO M 251 for outdoor applications.
- B. **Type 1b** Elastomeric Isolator Pads: Oil- and water-resistant elastomer, single layer, molded with a nonslip pattern and galvanized steel baseplates of sufficient stiffness for uniform loading over pad area, and 1/4 inch steel load bearing plate. Factory cut to sizes that match requirements of supported equipment.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type Super WMSW and MBSW or a comparable product by one of the following:
    - a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.
  2. Material: Standard neoprene for indoor applications.
  3. Material: Bridge-bearing neoprene, complying with AASHTO M 251 for outdoor applications.
- C. **Type 2** Elastomeric Mounts: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type ND or a comparable product by one of the following:

- a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.
  2. Durometer Rating: Selected for maximum possible static deflection with the loading of each piece of equipment.
  3. Materials: Cast-ductile-iron housing containing two separate and opposing, molded, bridge-bearing neoprene elements that prevent central threaded sleeve and attachment bolt from contacting the casting during normal operation.
  4. Neoprene: Bridge-bearing neoprene as defined by AASHTO.
- D. **Type 3** Spring Isolators: Freestanding, open-spring isolators.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type SLF or a comparable product by one of the following:
    - a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 100 psig.
  6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
- E. **Type 8a** Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type 30N or a comparable product by one of the following:
    - a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.

2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
- F. **Type 8b** Spring Hangers with Vertical-Limit Stop: Precompressed combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, Inc.; Type PC30N or a comparable product by one of the following:
    - a. Amber/Booth; a VMC Group Company.
    - b. Kinetics Noise Control, Inc.
    - c. Korfund Dynamics; a VMC Group Company.
    - d. Vibration Eliminator Co., Inc.
    - e. Vibration Mountings & Controls; a VMC Group Company.
    - f. Vibro-Acoustics.
  2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  7. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
  8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.

## **2.3 FACTORY FINISHES**

- A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
1. Powder coating on springs and housings.
  2. All hardware shall be electrogalvanized. Hot-dip galvanize metal components for exterior use.
  3. Baked enamel for metal components on isolators for interior use.
  4. Color-code or otherwise mark vibration isolation devices to indicate capacity range.

- B. Manufacturer's standard prime-coat finish ready for field painting.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and equipment to receive vibration isolation devices for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install thrust limits at centerline of thrust, symmetrical on either side of equipment.

### **3.3 APPLICATION**

- A. Refer to Vibration Isolator Application Schedule on the drawings for isolator application and minimum deflection.

### **3.4 CONNECTIONS**

- A. Vibration isolate piping connected to vibration isolated equipment using Type 8a or 8b spring hangers, and with distance to be isolated as scheduled on the Drawings. Maximum spacing between isolators same as maximum distance between pipe hangers and supports.
- B. Vibration isolate ductwork connected to air handling units, return air fans, and vibration isolated equipment using Type 8a or 8b spring hangers, and in accordance with isolation distances scheduled on the Drawings.

### **3.5 FIELD QUALITY CONTROL**

- A. Testing: Perform the following field quality-control testing:
  - 1. Isolator deflection.

### **3.6 ADJUSTING**

- A. Adjust isolators after piping systems have been filled and equipment is at operating weight.

- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.
- D. Adjust active height of spring isolators.

**3.7 CLEANING**

- A. After completing equipment installation, inspect vibration isolation devices. Remove paint splatters and other spots, dirt, and debris.

**END OF SECTION 20 05 47**



**SECTION 20 05 53 - MECHANICAL IDENTIFICATION**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.3 QUALITY ASSURANCE**

- A. ASME Compliance: Comply with ASME (ANSI) A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

**1.4 COORDINATION**

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
  - 1. Seton.
  - 2. Brady.
  - 3. EMED.
  - 4. Craftmark.
  - 5. Brimar Industries, Inc.
  - 6. Marking Services Inc. (MSI).
  - 7. Kolbi Pipe Marker Co.

**2.2 EQUIPMENT IDENTIFICATION DEVICES**

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
  - 1. Data:
    - a. Manufacturer, product name, model number, and serial number.
    - b. Capacity, operating and power characteristics, and essential data.
    - c. Labels of tested compliances.
  - 2. Location: Accessible and visible.
  - 3. Fasteners: As required to mount on equipment.
- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
  - 1. Terminology: Match schedules as closely as possible.
  - 2. Data:
    - a. Name and plan number.
    - b. Equipment service.
    - c. Design capacity.

- d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
- 3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.

## **2.3 PIPING IDENTIFICATION DEVICES**

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
  - 1. Colors: Comply with ASME (ANSI) A13.1, unless otherwise indicated.
  - 2. Type and Size of Letters: Comply with ANSI A13.1, unless otherwise indicated.
  - 3. Legends: Spelled out in full or commonly used and accepted abbreviations.
  - 4. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
  - 5. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
  - 6. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pretensioned Pipe Markers: Precoiled semirigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.

## **2.4 DUCT IDENTIFICATION DEVICES**

- A. Duct Markers: Vinyl, 2-inch minimum character height, with permanent pressure sensitive adhesive. Include direction and quantity of airflow, air handling unit or fan number, and duct service (such as supply, return, and exhaust).

## **PART 3 - EXECUTION**

### **3.1 APPLICATIONS, GENERAL**

- A. Products specified are for applications referenced in other Division 20, 21, 22, and 23 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

### **3.2 EQUIPMENT IDENTIFICATION**

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:

1. Fuel-burning units, including furnaces and water heaters.
  2. Refrigeration equipment, including condensing units.
  3. Electric unit heaters
  4. Energy recovery devices
  5. Fans, blowers,
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
  3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
    - a. Fuel-burning units, including furnaces and water heaters.
    - b. Refrigeration equipment, including condensing units.
    - c. Electric unit heaters
    - d. Energy recovery devices
    - e. Fans, blowers,

### **3.3 PIPING IDENTIFICATION**

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pretensioned pipe markers. Use size to ensure a tight fit.
- B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations as follows:
1. Near each valve and control device.
  2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
  4. At access doors, manholes, and similar access points that permit view of concealed piping.
  5. Near major equipment items and other points of origination and termination.
  6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

**3.4 DUCT IDENTIFICATION**

- A. Identify ductwork with vinyl markers and flow direction arrows.
- B. Stenciled Duct Marker Option: Stenciled markers, showing service and direction of flow, may be provided instead of laminated-plastic duct markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- C. Locate markers at air handling units, each side of floor and wall penetrations, near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

**3.5 ADJUSTING**

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

**3.6 CLEANING**

- A. Clean faces of mechanical identification devices and glass frames of valve schedules.

**END OF SECTION 20 05 53**

## SECTION 20 07 00 - MECHANICAL INSULATION

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 20 Section "Hanger and Supports" for thermal hanger shield inserts.
  - 4. Division 23 Section "Metal Ducts" for duct liners.

**1.2 SUMMARY**

- A. This Section includes mechanical insulation for pipe, duct, and equipment.
- B. After completion of asbestos abatement, reinsulate all existing systems including piping, fittings, ductwork, equipment, etc. which are remaining in service.

**1.3 DEFINITIONS**

- A. ASJ: All-service jacket.
- B. FSK: Foil, scrim, kraft paper.
- C. PSK: Polypropylene, scrim, kraft paper.
- D. PVC: Polyvinyl Chloride.
- E. PVDC: Polyvinylidene chloride.
- F. SSL: Self-sealing lap.

**1.4 INDOOR PIPING INSULATION SYSTEMS DESCRIPTION**

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are scheduled on the Drawings, or identified for each piping system and pipe size range.

**1.5 INDOOR DUCT AND PLENUM INSULATION SYSTEMS DESCRIPTION**

- A. Acceptable indoor duct and plenum insulation materials and thicknesses are scheduled on the Drawings.

**1.6 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any).
  - 1. ESR Report: For fire-rated grease duct insulation.

**1.7 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

- B. Ductwork Maximum Temperature Limits: Based on ASTM C 411 test procedures.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Prior to installation, protect insulation from exposure to water and from physical damage. Prior to installation, store insulation in manufacturer's original packaging.

## **1.9 COORDINATION**

- A. Coordinate size and location of supports, hangers, and pre-insulated pipe shields/supports specified in Division 20 Section "Hangers and Supports."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

## **1.10 SCHEDULING**

- A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## **PART 2 - PRODUCTS**

### **2.1 INSULATION MATERIALS, GENERAL REQUIREMENTS**

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- E. Adhesives used shall be fire resistant in their dry states and UL listed.



## **2.2 PIPE INSULATION MATERIALS**

- A. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Aeroflex USA, Inc.; Aerocel Tube and Sheet.
    - b. Armacell LLC; AP Armaflex.
    - c. IK Insulation Group; K-Flex USA LLC; Insul-Tube and Insul-Sheet.
- B. Glass-Fiber, Preformed Pipe Insulation, Type I:
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Johns Manville; Micro-Lok.
    - b. Knauf Insulation; 1000 Pipe Insulation.
    - c. Manson Insulation Inc.; Alley-K.
    - d. Owens Corning; Fiberglas Pipe Insulation.
  - 2. Type I, 850 deg F Materials: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ or ASJ-SSL. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.
- C. Mineral-Wool, Preformed Pipe Insulation, Type II:
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Johns Manville.
    - b. Owens Corning/Thermafiber.
    - c. Rock Wool Manufacturing Company; Delta PC and PF.
  - 2. Type II, 1200 deg F Materials: Mineral wool fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied, or field-applied ASJ or ASJ-SSL. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article. Field-applied jacket requirements are specified in Part 2 "Field-Applied Jackets" Article.

## **2.3 DUCTWORK INSULATION MATERIALS**

- A. Blanket Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the products specified.
  - a. CertainTeed Corp.; Duct Wrap.
  - b. Johns Manville; Microlite EQ.
  - c. Knauf Insulation; Duct Wrap.
  - d. Manson Insulation Inc.; Alley Wrap B.
  - e. Owens Corning; All-Service Duct Wrap.
- B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
  1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Aeroflex USA, Inc.; Aerocel Sheet.
    - b. Armacell LLC; AP Armaflex.
    - c. IK Insulation Group; K-Flex USA LLC; Insul-Sheet.

## **2.4 ADHESIVES**

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to it and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Aeroflex USA, Inc.; Aero seal and Aero seal LVOC.
    - b. Armacell LCC; 520 Adhesive.
    - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. Childers Products, H.B. Fuller Company; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. Johns Manville Industrial Insulation; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
    - f. Vimasco Corporation.
- D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  1. Products: Subject to compliance with requirements, provide one of the products specified.

- a. Childers Products, H.B. Fuller Company; CP-82.
- b. Foster Products Corporation, H. B. Fuller Company; 85-20.
- c. Johns Manville Industrial Insulation; S-90/80.
- d. Marathon Industries, Inc.; 225.
- e. Mon-Eco Industries, Inc.; 22-25.

E. PVC Jacket Adhesive: Compatible with PVC jacket.

- 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - a. Dow Chemical Company (The); 739, Dow Silicone.
  - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
  - c. P.I.C. Plastics, Inc.; Welding Adhesive.
  - d. Red Devil, Inc.; Celulon Ultra Clear.
  - e. Speedline Corporation; Speedline Vinyl Adhesive.

## **2.5 SEALANTS**

A. FSK and Metal Jacket Flashing Sealants:

- 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - a. Childers Products, H.B. Fuller Company; CP-76-8.
  - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Vimasco Corporation; 750.
- 2. Materials shall be compatible with insulation materials, jackets, and substrates.
- 3. Fire- and water-resistant, flexible, elastomeric sealant.
- 4. Service Temperature Range: Minus 40 to plus 250 deg F.
- 5. Color: Aluminum.

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

- 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - a. Childers Products, H.B. Fuller Company; CP-76.
- 2. Materials shall be compatible with insulation materials, jackets, and substrates.
- 3. Fire- and water-resistant, flexible, elastomeric sealant.
- 4. Service Temperature Range: Minus 40 to plus 250 deg F.
- 5. Color: White.

C. Joint Sealants for Cellular-Glass, Phenolic-Foam, and Polyisocyanurate:

1. Products: Subject to compliance with requirements, provide one of the products specified.
  - a. Childers Products, H.B. Fuller Company; CP-76.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Pittsburgh Corning Corporation; Pittseal 444.
  - f. Vimasco Corporation; 750.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F.
5. Color: White or gray.

## **2.6 FACTORY-APPLIED JACKETS**

- A. Insulation systems indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
  1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
  2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
  3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
  4. PSK Jacket: Metalized polypropylene, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
  5. Vinyl Jacket: UL-rated white vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

## **2.7 TAPES**

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Ideal Tape Co., Inc., an American Biltrite company; 728 Cold Seal ASJ or comparable products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.
    - b. 3M Venture Tape.
  2. Width: 3 inches.
  3. Thickness: 9 mils.
  4. Adhesion: 70 ounces force/inch in width.
  5. Elongation: 3 percent.
  6. Tensile Strength: 45 lbf/inch in width.

7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with rubber or acrylic adhesive; complying with ASTM C 1136 and UL listed.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Ideal Tape Co., Inc., an American Biltrite company; 491 FSK or 791 Cold Seal Acrylic FSK, or comparable products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.
    - b. 3M Venture Tape.
  2. Width: 3 inches.
  3. Thickness: 6 mils.
  4. Adhesion (Rubber Adhesive): 100 ounces force/inch in width.
  5. Adhesion (Acrylic Adhesive): 90 ounces force/inch in width.
  6. Elongation: 3 percent.
  7. Tensile Strength: 35 lbf/inch in width.
  8. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Ideal Tape Co., Inc., an American Biltrite company; 370 White PVC tape, or comparable products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.
    - b. 3M Venture Tape.
  2. Width: 2 inches.
  3. Thickness: 5 mils.
  4. Adhesion: 20 ounces force/inch in width.
  5. Elongation: 500 percent.
  6. Tensile Strength: 15 lbf/inch in width.

## **2.8 SECUREMENTS**

- A. Bands:
  1. Products: Subject to compliance with requirements, provide one of the products specified.
    - a. PABCO-Childers Metals; Johns Manville Industrial Insulation; Pab-Bands and Fabstraps.
    - b. RPR Products, Inc.; Bands.
  2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing or closed seal.

3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

**B. Insulation Pins and Hangers:**

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - a. Products: Subject to compliance with requirements, provide one of the products specified.
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; CD.
    - 3) Midwest Fasteners, Inc.; CD.
    - 4) Nelson Stud Welding; TPA, TPC, and TPS.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
  - a. Products: Subject to compliance with requirements, provide one of the products specified.
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; Cupped Head Weld Pin.
    - 3) Midwest Fasteners, Inc.; Cupped Head.
    - 4) Nelson Stud Welding; CHP.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the products specified.
    - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
    - 2) GEMCO; Perforated Base.
    - 3) Midwest Fasteners, Inc.; Spindle.
  - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the products specified.
    - 1) GEMCO; Nylon Hangers.
    - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
  - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
  - c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
  - a. Products: Subject to compliance with requirements, provide one of the products specified.
    - 1) AGM Industries, Inc.; RC-150.
    - 2) GEMCO; R-150.
    - 3) Midwest Fasteners, Inc.; WA-150.
    - 4) Nelson Stud Welding; Speed Clips.
  - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
6. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
  - a. Manufacturers:
    - 1) GEMCO.
    - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
- D. Wire: 0.062-inch soft-annealed, stainless steel.
  1. Manufacturers:
    - a. ACS Industries, Inc.

- b. C & F Wire.
- c. PABCO-Childers Metals; Johns Manville Industrial Insulation.
- d. RPR Products, Inc.

## **2.9 CORNER ANGLES**

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that applies to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### **3.3 COMMON INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.



- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at the 4 o'clock or 8 o'clock position on horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive as recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. For services with surface temperatures below ambient, install a continuous unbroken vapor barrier. Seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install thermal hanger insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover thermal hanger inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at the 4 o'clock or 8 o'clock position on the pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness. Where compression of insulation is possible, fabricate/install insulation per manufacturer's recommendations.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
  2. Testing agency labels and stamps.
  3. Nameplates and data plates.
  4. Manholes.
  5. Handholes.
  6. Cleanouts.

### **3.4 PENETRATIONS**

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Below-Grade Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations that Are Not Fire Rated: Install insulation through walls and partitions as detailed.
- E. Insulation Installation at Floor Penetrations:
1. Duct: Install insulation through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at angle closure of fire damper sleeves.
  2. Pipe: Install insulation continuously through floor penetrations.
    - a. Seal penetrations through fire-rated assemblies according to Division 07 Section "Through-Penetration Firestop Systems."

### **3.5 GENERAL PIPE INSULATION INSTALLATION**

- A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible Elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

### **3.6 FLEXIBLE ELASTOMERIC PIPE INSULATION INSTALLATION**

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.

2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### **3.7 GLASS-FIBER AND MINERAL WOOL PIPE INSULATION INSTALLATION**

#### **A. Insulation Installation on Straight Pipes and Tubes:**

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

#### **B. Insulation Installation on Pipe Flanges:**

1. Install PVC fitting covers when available.
2. When PVC fitting covers are not available, install preformed pipe insulation to outer diameter of pipe flange:
  - a. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  - b. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with fiberglass or mineral wool blanket insulation as specified for system.
3. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

#### **C. Insulation Installation on Pipe Fittings and Elbows:**

1. Install PVC fitting covers when available.
2. When PVC fitting covers are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

#### **D. Insulation Installation on Valves and Pipe Specialties:**

1. Install PVC fitting covers when available.
2. When PVC fitting covers are not available, install mitered sections of pipe insulation to valve body.

3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

### **3.8 DUCT AND PLENUM INSULATION INSTALLATION**

#### **A. Blanket Insulation Installation on Ducts and Plenums: Secure with insulation pins.**

1. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
  - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
  - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
  - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
  - d. Do not over compress insulation during installation.
  - e. Impale insulation over pins and attach speed washers.
  - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
2. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
  - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
  - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
3. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
4. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
5. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

6. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
  - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
  - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
7. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
8. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

### **3.9 FINISHES**

- A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system specified in Division 09 painting Sections.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

**END OF SECTION 20 07 00**

## SECTION 21 13 13 – FIRE SPRINKLER SYSTEMS

### PART 1 - GENERAL

#### 1.1 GENERAL AND SPECIAL CONDITIONS

- A. The General Requirements of these specifications shall apply to the work in this section.
- B. The Contractor shall furnish all equipment, materials, tools, labor, engineering, drawings, etc. necessary for new fire sprinkler systems, with said systems being made ready for operation in accordance with the requirements of the authorities having jurisdiction. The purpose of the furnished specifications and drawings is to convey to the Contractor the scope of work required, all of which the Contractor is responsible to furnish, install, adjust, and make operable. The omission by the Engineer of any necessary system component as required by the authorities having jurisdiction, in the specifications and drawings, shall not relieve the Contractor of the responsibility for providing such necessity, without additional cost to the Owner. The Contractor shall visit the site before submitting his bid and shall examine all existing physical conditions that may be material to the performance of his work. No extra payments will be allowed to the Contractor as a result of extra work made necessary by his failure to do so. Any case of error, omission, discrepancy or lack of clarity shall be promptly identified to the Engineer for clarification prior to the bid due date.
- C. The Contractor shall provide all devices and equipment required by these specifications and drawings. Under no circumstances will the Contractor delete any equipment or devices without the written directive of the Owner.

#### 1.2 PERFORMANCE GUIDELINES

- A. The Contractor shall be responsible for compliance with the entire project specifications as well as the following guidelines. These guidelines are not intended to be all-inclusive and do not limit the Contractor's scope of work.
- B. Work Provided Under This Section:
  - 1. Complete new fire sprinkler systems as outlined in these specifications, including all labor, materials, and shop drawings needed to provide operating systems, and all of the following:
    - a. Connection to existing water supply system piping
    - b. Wet-pipe fire sprinkler systems as specified herein
    - c. Control valves and check valves
    - d. Backflow preventer
    - e. Drain and test valves
    - f. Sprinklers
    - g. Pipe and fittings



- h. Hangers and supports per NFPA 13
- i. Pressure gauges
- j. Core drilling of walls and floors, including firestopping and watertight caulking
- k. Cutting and patching
- l. Signs per NFPA 13
- m. Furnish and install waterflow detectors and valve supervisory switches
- n. Coordination with all other trades
- o. Shop drawings, hydraulic calculations, and manufacturer's product literature
- p. Site visit to determine existing conditions
- q. System testing
- r. Contractor's Material and Test Certificates and as-built drawings
- s. Warranty of equipment and labor
- t. Training and operating instructions
- u. Spare sprinklers and special wrenches in cabinets
- v. All permits and fees for this work.

### **1.3 SYSTEM ABBREVIATIONS AND DEFINITIONS**

- |    |             |                                                                                                                                                                                       |
|----|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. | Approved:   | Unless otherwise stated, materials, equipment or submittals approved by the Engineer and the Authorities Having Jurisdiction (AHJ)                                                    |
| B. | ANSI:       | American National Standards Institute                                                                                                                                                 |
| C. | ASME:       | American Society of Mechanical Engineers                                                                                                                                              |
| D. | ASTM:       | American Society for Testing and Materials                                                                                                                                            |
| E. | AWS:        | American Welding Society                                                                                                                                                              |
| F. | Concealed:  | Where used in connection with installation of piping or conduit and accessories, shall mean, "hidden from sight" as in shafts, furred spaces, in soffits or above suspended ceilings. |
| G. | Contractor: | The company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers or fabricators.                                                                |
| H. | Engineer:   | Jensen Hughes                                                                                                                                                                         |

|    |              |                                                                                                                                                   |
|----|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| I. | Exposed:     | Where used in connection with installation of piping or conduit and accessories, shall mean "visible" or "not concealed".                         |
| J. | FACP:        | Fire Alarm Control Panel                                                                                                                          |
| K. | FM           | Factory Mutual                                                                                                                                    |
| L. | FM Approved: | Materials or equipment approved by Factory Mutual and included in the most recent edition of the FM Approval Guide.                               |
| M. | Furnish:     | Supply materials                                                                                                                                  |
| N. | gpm:         | Gallons per minute                                                                                                                                |
| O. | Install:     | Install materials, mount and connect equipment or assemblies                                                                                      |
| P. | NFPA:        | National Fire Protection Association                                                                                                              |
| Q. | Owner:       | State of Michigan, Department of Natural Resources                                                                                                |
| R. | Provide:     | Furnish, install and connect                                                                                                                      |
| S. | psi:         | Pounds per square inch                                                                                                                            |
| T. | Remove:      | Remove material and equipment and restore surface.                                                                                                |
| U. | UL:          | Underwriters Laboratories, Inc.                                                                                                                   |
| V. | UL Listed:   | Materials or equipment listed by Underwriters Laboratories and included in the most recent edition of the UL Fire Protection Equipment Directory. |

#### **1.4 RELATED WORK**

**A. Materials and methods specified in other sections:**

1. Fire Alarm System Replacement, Section 28 31 00

**B. Materials and methods provided by others specified in other sections:**

1. Painting of sprinkler piping, hangers, and valves, including placing and removal of bags or other protection devices on sprinklers to prevent paint from touching any portion of a sprinkler shall be provided under Specification Section 09 91 00.
2. Painting of finished surfaces at pipe penetrations shall be provided under Specification Section 09 91.00.

C. Materials installed in this section but wired by the Fire Alarm Contractor:

1. Valve supervisory devices.
2. Water flow switches.

#### 1.5 DESIGN CRITERIA

Design, furnish and install fire sprinkler systems in accordance with the bid drawings and the following criteria:

A. Fire sprinkler systems shall be in accordance with the 2021 Michigan Building Code and NFPA 13 – 2019 edition.

B. Water Supply:

1. The existing water supply available at the site is as follows:
  - a. Static Pressure: 52 psi
  - b. Residual Pressure: 25 psi
  - c. Flow: 1,068 gpm
  - d. Test Date: 04/29/2025
2. Fire protection water shall be supplied by an existing 4-inch underground lead-in main that enters the building near the north corner of the Basement.

C. Sprinkler Systems:

1. Complete wet-pipe automatic fire sprinkler systems shall be provided throughout the First and Second Floors.
2. Design densities, design areas of application, and sprinkler spacing criteria shall be in accordance with Table 1.

| Table 1 - Sprinkler System Design Criteria            |                             |                      |                                    |
|-------------------------------------------------------|-----------------------------|----------------------|------------------------------------|
| AREA                                                  | Design Density (gpm/sq.ft.) | Design Area (sq.ft.) | Maximum Sprinkler Spacing (sq.ft.) |
| Open Recreational Spaces, Open Office, & Toilet Rooms | 0.10                        | 945                  | 225                                |
| Mechanical Rooms, Electrical Rooms, & Storage Rooms   | 0.15                        | 945                  | 130                                |

#### 1.6 APPLICABLE STANDARDS

A. Testing Agency: All materials shall be UL listed or FM approved.

- B. Regulatory Agencies: State and local building codes and ordinances, State Fire Marshal requirements shall apply.
- C. Contractor shall include in the base bid all costs associated with complying with the applicable regulatory agencies. Failure to specifically reference on these plans and/or specifications any restrictions, materials, and/or work required by regulatory agencies shall not relieve the Contractor of the responsibility for fully complying with the regulatory agencies without additional cost to the Owner.
- D. Approvals: All plans and work shall be approved the Authorities Having Jurisdiction and the Engineer.
- E. Reference Codes and Standards: The following codes and standards are included as part of these specifications:
  - 1. Michigan Building Code, 2021 Edition.
  - 2. American National Standards Institute (ANSI), current edition:
    - a. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, 24, 125, 250 and 800 Pounds.
    - b. B16.3 - Malleable Iron Threaded Fitting, Class 150 and 300.
    - c. B16.4 - Cast Iron Threaded Fittings, Class 125 and 250.
    - d. B16.22 - Wrought Copper and Bronze Solder-joint Pressure Fittings.
    - e. B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
    - f. B18.2.1 - Square and Hex Bolts and Screws.
    - g. B18.2.2 - Square and Hex Nuts.
    - h. B112.1 - Hose Valves for Fire Protection Services.
  - 3. American Society of Mechanical Engineers (ASME)
    - a. B1.20.1- Pipe Threads, General Purpose (inch).
    - b. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
    - c. B16.3 - Malleable Iron Threaded Fittings, Class 150 and 300.
    - d. B16.4 - Cast Iron Threaded Fittings Class 125 and 250.
    - e. B16.9 - Factory-made Wrought Steel Butt Weld Fittings.
    - f. B16.21 - Non-Metallic Flat Gaskets for Pipe Flanges.
    - g. B16.25 - Butt Welding Ends for Pipe, Valves, Flanges, and Fittings.
  - 4. American Society for Testing and Materials (ASTM), current edition:
    - a. A 53 - Specifications for Welded and Seamless Steel Pipe.
    - b. A 135 - Specifications for Electric Resistance Welded Pipe.
    - c. A 795 - Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
    - d. A 307 - Carbon Steel Externally and Internally Threaded Standard Fasteners.

- e. A 325 - High-Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
- 5. American Welding Society (AWS) Standards, current edition:
  - a. B2.1 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.
  - b. D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing, Level AR-3.
- 6. National Fire Protection Association (NFPA):
  - a. NFPA 13 - Standard for the Installation of Sprinkler Systems, 2019 edition.
  - b. NFPA 25 - Standard for Inspection, Testing and Maintenance of Water-Based Extinguishing Systems, 2023 edition.
- 7. Factory Mutual Systems (FM) Publication, latest edition:
  - a. Approval Guide.
- 8. Underwriters Laboratories, Inc. (UL) Publication, latest edition:
  - a. Fire Protection Equipment Directory (Annually with Quarterly Supplements).

#### **1.7 APPROVALS**

- A. Obtain approval of shop drawings from all applicable local authorities prior to fabrication and installation of materials.

#### **1.8 SUBMITTALS**

- A. Shop Drawings
  - 1. Submit shop drawings, hydraulic calculations, and manufacturer's data as required to obtain the approval of all applicable local and state authorities.
  - 2. Submit one set of shop drawings and manufacturer's data sheets bearing the review stamp of all applicable local and state authorities to the Owner.
  - 3. Submit three (3) sets of complete shop drawings and manufacturer's data sheets to the Engineer for all necessary reviews prior to fabrication of materials.
  - 4. Contractor shall submit complete system packages. Partial system submittals will be rejected.
  - 5. Hydraulic calculations shall include a water supply graph and hydraulic cover sheet. The cover sheet shall include the name and location of the calculated area, ceiling height, occupancy, design criteria, sprinkler spacing, system type, sprinkler make, model, orifice size, K-factor, temperature rating, flow requirements, C factor used, water supply data and source of information.
  - 6. Prepare shop drawings at a minimum scale of 1/8-inch = 1'-0". Show all sprinklers, piping, hangers, type of pipe, connections, outlets, and valves as required by NFPA 13. When welding is planned, shop drawings shall indicate the sections to be shop welded and the type of welded fittings to be used.

**B. Changes**

1. Make no changes in installation from layout as shown on the approved shop drawings unless the Engineer specifically approves changes. This does not include minor revisions for the purpose of coordination (i.e., changes that do not affect the design or operation of the system).
2. Any pipe fabricated and/or installed before all approvals are obtained is at the Contractor's own expense and responsibility. Any changes made to the approved drawings other than as stated above are at the Contractor's own expense and responsibility.

**C. Manufacturer's Data**

1. Provide data from the manufacturer for the following devices, including installation, maintenance, and testing procedures, dimensions, wiring diagrams, etc. Where any devices that are provided or furnished involve work by another contractor, submit additional data copies directly to that contractor.
  - a. Pipe, fittings and hangers
  - b. Sprinklers and escutcheons
  - c. Control valves
  - d. Check valves
  - e. Backflow preventer
  - f. Test and drain valves
  - g. Waterflow devices
  - h. Valve supervisory devices
  - i. Pressure gauges
  - j. Conduit and wire
  - k. All other system components.

**D. As-Built Drawings**

1. Maintain at the site an up-to-date marked set of as-built drawings, which shall be corrected and delivered upon completion of work.

**E. Final Inspection and Test**

1. Upon completion of final inspections and tests, as required by appropriate NFPA Standards and these specifications, submit documentation of all test results and copies of the standard Contractor's Material and Test Certificates to the Engineer and Owner.

**1.9 COORDINATION**

- A. Coordinate layout and installation of sprinklers with other construction that penetrate ceilings, including light fixtures, HVAC equipment, and partition assemblies.

**1.10 SPARE PARTS**

- A. Provide sprinkler cabinets complete with a minimum of 12 spare sprinklers of each type and temperature rating installed. Each cabinet shall be equipped with sprinklers and special sprinkler wrenches required for each type of sprinkler installed.
- B. Install sprinkler cabinets. Confer with the Owner for exact location of cabinets.

**1.11 GUARANTEE**

- A. The Contractor shall guarantee all materials and workmanship for a period of one year beginning with the date of final acceptance by the Owner. The Contractor shall be responsible during the design, installation, testing and guarantee periods for any damage caused by his (or his subcontractors') work, materials, or equipment.

**1.12 BASE BID, ALTERNATES AND ALLOWANCES**

- A. Base Bid
  - 1. The base bid shall be in accordance with drawings and specifications.
- B. Alternates
  - 1. The Contractor shall state in his proposal any proposed Contractor substitution of materials or methods of installation from that specified. These alternates shall be listed on the proposal as "Contractor Alternatives". All proposed alternatives are subject to Owner approval.
- C. Overtime Work
  - 1. State in bid the extra amount to be charged for each hour of overtime work for each apprentice, fitter, foreman, supervisory person, etc., that may be working on this installation.
  - 2. The Owner's representative must authorize overtime work in writing.

**1.13 PRODUCT DELIVERY**

- A. Delivery of Materials: Delivery of all materials and equipment to the job site shall be scheduled to assure compliance with the predetermined construction schedules. Contractor will deliver all materials to area of project designated by Owner's representative. Vehicles shall not block fire lanes or fire doors during delivery of materials.
- B. Storage of Materials, Equipment and Fixtures: Contractor shall be responsible for storage of materials on job site, including furnishing of any storage facilities or structures required.
- C. Handling Materials and Equipment: Contractor shall be responsible for on-site handling of materials and equipment.

**1.14 QUALITY ASSURANCE**

- A. The Contractor shall be fully experienced and licensed in all aspects of the fire protection systems herein specified.
- B. The Contractor shall provide a single person as a point of contact who is responsible for issues of scheduling, coordination, and quality control.

**1.15 EMERGENCY SERVICE**

- A. The Contractor shall provide emergency repair service for the fire sprinkler systems within four hours of a request for such service by the Owner during the warranty period. This service shall be available on a 24-hour per day, seven-day per week basis.

**1.16 TRAINING AND OPERATION INSTRUCTIONS**

- A. The Contractor shall conduct two (2) training sessions of four hours duration each to familiarize facility personnel with the features, operation and maintenance of the new fire sprinkler systems. The Owner shall schedule the training sessions at a mutually agreeable time to the Contractor and the Owner.
- B. Operating Instructions
  - 1. At the completion of the work, provide small scale plans of the facility indicating the locations of all control valves, low point drains, and inspector's test valves. The plans shall be neatly drawn and color-coded to indicate the portion of the space protected by each system. Furnish three (3) sets of small-scale plans to the Owner.
  - 2. Furnish a copy of NFPA 25 and bound set(s) of printed operating and maintenance instructions to the Owner and adequately instruct the Owner's maintenance personnel in proper operation and test procedures of all fire protection components provided, furnished, or installed.

**1.17 PERMITS AND FEES**

- A. Contractor shall pay for all permits, fees and charges required for this work.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. All components shall be UL listed or FM Approved, except where no UL listed or FM approved components are available. Components that are not UL listed or FM approved must be approved by the Engineer.
- B. All components shall be used in accordance with the manufacturer's recommendations and its UL listing or FM approval.



## 2.2 PIPING

- A. Pipe shall be new, designed for 175 psi working pressure, conforming to ASTM specifications, and have the manufacturer's name and brand along with the applicable ASTM standard marked on each length of pipe.
  - 1. Pipe sizes 2½-inch and smaller: Standard Wall: Overhead pipe used shall be black steel and must comply with the specifications of the American Society for Testing and Materials, ASTM A 795 for black pipe, and hot dipped zinc coated galvanized welded and seamless steel pipe for fire protection use. Dimensions for all overhead pipe must be in accordance with the American Standard for Wrought Steel and Wrought Iron Pipe ANSI B36.10 for pressure up to 300 psi. Schedule 40 pipe is considered "standard wall" pipe. Pipe ends shall be welded, threaded or grooved.
  - 2. Pipe sizes 3-inch and larger: Thin Wall: Overhead pipe of the Welded and Seamless Type specified in ASTM A 53 used in welded systems shall have a minimum pipe wall thickness for pressures up to 300 psi as follows: Schedule 10 in sizes up to 5-inch; and 0.134 inch for 6-inch. Pipe ends shall be roll grooved or welded in accordance with NFPA 13.
  - 3. The use of plastic pipe or threaded thin wall pipe is prohibited.

## 2.3 FITTINGS

- A. Changes of direction shall be accomplished by the use of fittings suitable for use in sprinkler systems and defined in NFPA 13.
- B. "Plain end" fittings (push-on or mechanical locking type) shall not be used.
- C. Screwed fittings shall be cast iron, 125 pound class, black, and in accordance with ANSI B 16.4 or malleable iron, 150 pound class, black and in accordance with ANSI B 16.3.
  - 1. Bushings shall not be used.
  - 2. Fittings exposed to outside atmosphere shall be galvanized.
  - 3. Pipes with lesser wall thickness than Schedule 40 shall not be joined by threadable fittings.
- D. Flanged fittings shall be cast iron, short body, Class 125, black and in accordance with ANSI B 16.1. Gaskets shall be full-face of 1/8-inch minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B 18.2.
- E. Welded fittings shall be steel, standard weights, black, and in accordance with ANSI B 16.9, ANSI B 16.25, ANSI B 16.5, ANSI B 16.11 and ASTM A 234.
- F. Grooved couplings and mechanical fittings shall be malleable iron, in accordance with ASTM A 47. The couplings' gasket material shall be butyl rubber. Grooved couplings and mechanical fittings shall be tested and listed by UL or FM.
- G. Grooved fittings, valves and pipe shall be joined using rubber gasketed couplings produced by the manufacturer of the fitting and/or valves. Rigid grooved couplings

shall be used on all vertical risers and where horizontal piping runs require more than two couplings per run.

- H. Non-threaded fittings shall be specifically listed for use with the pipe and application.

## **2.4 SPRINKLERS**

- A. Acceptable Manufacturers: Viking Inc., Tyco Grinnell, Victaulic Corp, Reliable Sprinkler Corp.
- B. Provide quick-response, ½ inch orifice, horizontal sidewall sprinklers, 155°F temperature rated, with factory painted white finish where indicated on the drawings.
- C. Provide quick-response, ½ inch orifice, semi-recessed pendent sprinklers, 155°F temperature rated, with factory painted white finish where indicated on the drawings.
- D. Provide quick-response, ½ inch orifice, brass upright sprinklers, 155°F temperature rated, in all areas without suspended ceilings.
- E. Provide quick-response, ½ inch orifice, dry sidewall sprinklers, 155°F temperature rated, where indicated on the drawings.
- F. All sprinklers shall be UL listed and FM approved.

## **2.5 VALVES**

- A. All control valves, and check valves shall be UL listed or FM approved.
- B. Control valves with integral valve supervisory devices shall also be listed for use in Protective Signaling Systems.
- C. Control valves shall be indicating type with resilient seats, capable of mounting supervisory switches.
  - 1. OS & Y valves shall be resilient seat type.
  - 2. Butterfly valves shall be gear operated.
  - 3. Ball valves shall be gear operated with full port.
- D. Check valves shall have rubber-faced disks.
- E. Provide standard metal signs in accordance with NFPA 13 for all valves, including control valves, drain valves, and test valves to indicate their function and the area served.

## **2.6 BACKFLOW PREVENTER**

- A. Provide a double detector check valve assembly (DDCA) backflow preventer on the incoming fire protection supply main. Specific make, model, type, and installation requirements shall be confirmed with the Authority Having Jurisdiction.

- B. The DDCA shall incorporate control valves with valve supervisory switches.
- C. The DDCA shall be UL listed and FM approved for fire protection use.

## **2.7 HANGERS AND SUPPORTS**

- A. All hanger components shall be UL listed or FM approved.
- B. Below concrete construction, expansion cases shall be installed to support sprinkler piping.

Below concrete construction, inserts shall be installed for all 4-inch or larger piping or, in lieu of the inserts, expansion cases spaced not more than 10 feet apart may be installed in accordance with NFPA 13. Powder-actuated fasteners shall not be used.

## **2.8 ALARM INITIATING AND SUPERVISORY DEVICES**

- A. Waterflow switches shall be provided on wet pipe sprinkler systems. The waterflow switch shall contain a suitable, adjustable retard device, be of the vane type, and actuate upon flow from a single sprinkler. Waterflow switches shall be housed in a substantial metal housing with a gasketed cover. The waterflow switches shall actuate within 30 seconds after the inspector's test valve is opened.
- B. Valve supervisory devices shall be provided for all fire protection control valves (including OS&Y valves installed on the incoming water service and double detector check valve assembly). All switches shall be SPDT with gasketed rain-tight enclosures. The valve supervisory devices shall be installed to transmit a supervisory signal within the first two turns of the control valve handle. All supervised control valves shall be accessible.

## **2.9 PRESSURE GAUGES**

- A. Pressure gauges shall be listed to UL Standard 393.
- B. Dial Size: 3-½- to 4-½-inch diameter.
- C. Pressure Gage Range: 0 to 250 psig minimum.
- D. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

## **2.10 SIGNS**

- A. Valve signs shall indicate purpose and associated system of each control, test, trim and drain valve.
- B. Hydraulic information sign shall meet requirements of NFPA 13.

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

- A. General:

1. Clean-up:
    - a. Maintain the premises free from accumulation of waste materials or rubbish caused by this work.
    - b. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises clean.
  2. Safety:
    - a. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 and the Construction Safety Act Standards.
  3. Leak Protection
    - a. Damage: Protect all unfinished work to prevent damage and furnish protection of all surrounding areas.
    - b. The Contractor shall be responsible during the installation and testing periods of the fire protection system for any damage to the work of others, to the building or its contents caused by leaks in any equipment, by unplugged or disconnected pipes or fittings, or by overflow, and shall pay for the necessary replacements or repairs to work of others damaged by such leakage. Water shall not be introduced into the system during conditions where there is danger of freezing.
- B. Piping:
1. All piping exposed to weather shall be internally and externally galvanized. All piping must be substantially supported from building structure and only UL listed or FM approved types of hangers shall be used. Sprinkler lines under ducts shall not be supported from duct work, but shall be supported from building structure with trapeze hangers where necessary or from steel angles supporting duct work in accordance with NFPA 13.
  2. All thread rods shall not be bent.
  3. Hanger components shall be ferrous.
  4. Attach hanger to top chord of bar joists only.
  5. The use of super dope or expand type of sealants for joining of threaded sprinkler pipes is prohibited.
  6. Provide all auxiliary drains where required by NFPA 13. All drain valves shall be accessible. Plugs used for auxiliary drains shall be cast iron.
  7. Install sprinklers in suspended ceilings in center of acoustical ceiling tiles.
  8. In all areas with suspended ceilings, sprinkler piping shall be installed above ceilings. Install sprinkler piping in exposed areas as high as possible using necessary fittings and auxiliary drains to maintain maximum clear headroom.
  9. Sprig-ups shall be provided wherever necessary to provide proper deflector distances in accordance with NFPA 13 requirements.

- C. Feed and Cross Mains:
  - 1. Install at least one hanger per length of pipe up to 8-feet in length joined by grooved couplings.
  - 2. Use rigid grooved couplings where more than two couplings are used per run.
- D. Risers: Sprinkler risers shall be supported at lowest level and alternate levels above using riser clamps.
- E. System Headers: Install pipe saddle supports complete with flange bolted to floor.
- F. Coring: Contractor shall core drill floors and walls as required for this work.
  - 1. Space between core and pipe shall be filled with noncombustible packing. All penetrations through fire rated walls shall be properly fire-stopped to maintain the original rating.
  - 2. Cores through floors shall be watertight.
  - 3. Core locations shall be coordinated with, and acceptable to, the Owner and Engineer.
- G. Control Valves:
  - 1. Provide UL listed or FM approved OS&Y gate valves or gear-operated butterfly valves.
  - 2. Vane for butterfly valves shall be of symmetrical design.
- H. Drains:
  - 1. Provide main drain valves at system control valves, sized in accordance with NFPA 13, and extend piping to exterior or to floor drains at an accessible location.
  - 2. Provide all auxiliary drains where required by NFPA 13.
  - 3. Pipe all drains and auxiliary drains to locations where water drained will not damage contents, equipment, vehicles, etc. All drain valves shall be accessible.
  - 4. Plugs used for auxiliary drains shall be cast iron.
  - 5. All piping and fittings downstream of drain valves shall be galvanized.
- I. Ceiling and Wall Plates:
  - 1. Install chrome finished ceiling and wall plates wherever exposed sprinkler piping passes through floors, ceilings and walls. All penetrations through fire rated walls, floors, and ceilings shall be properly firestopped to maintain the original fire resistance rating.
- J. Flushing Connections:
  - 1. Provide flushing connections in cross mains as specified in NFPA 13.

### **3.2 INSPECTOR'S TEST STATIONS**

- A. Provide inspector's test stations at required points for testing each waterflow alarm device. Special discharge nozzle shall have same size orifice as smallest orifice sprinkler installed.
- B. Provide 1-inch sight glass if inspector's test discharge cannot be readily observed while operating valve.
- C. Pipe all inspector's test stations discharging to atmosphere to location where water drained will not damage contents, furnishings, equipment, vehicles, etc.
- D. All pipe and fittings downstream of inspector's test valve shall be galvanized.

### **3.3 SPRINKLER GUARDS**

- A. Provide guards on sprinklers installed within 7 feet of finished floor or wherever sprinklers may be subject to mechanical damage.

### **3.4 PATCHING AND FIRESTOPPING**

- A. Repair and patch surfaces to match existing finishes.
- B. Firestopping shall be installed wherever the piping penetrate floors and fire rated walls. The firestopping material shall meet the requirements of UL 1479.
- C. Installation of firestopping:
  - 1. Install firestopping in accordance with the manufacturer's recommendations and as necessary to meet the specified fire rating requirements.
  - 2. Where firestopping is used to seal around penetration through waterproof membranes, install to maintain integrity of waterproof barrier.
- D. Patch all walls, floors, and ceilings that are penetrated or damaged during construction and return the surfaces to a condition matching existing adjacent surfaces.
  - 1. All slab penetrations shall be completely sealed and made watertight.
  - 2. Restore all fire rated walls to rated conditions.

### **3.5 WELDING**

- A. No field welding of piping shall be permitted.
- B. Feed mains, cross mains, and branch lines may be shop welded using acceptable welded fittings. Welding methods shall comply with all the requirements of AWS D10.9, Level AR-3.
- C. Certify welders or brazers as being qualified for welding and/or brazing in accordance with the requirements of AWS D10.9, Level AR-3.

### **3.6 FIELD QUALITY CONTROL**

- A. Testing - General:

1. Installer shall be responsible for all tests required during the course of installation.
  2. Testing shall be in accordance with NFPA 13 and AHJ requirements.
  3. Notify the Owner and Engineer at least 5 days in advance regarding the time and date of all tests.
  4. All tests shall be witnessed by the Owner, the Engineer, and the AHJ.
  5. Prepare and submit Contractor's Material and Test Certificates in accordance with NFPA 13. Test certificates shall include the signatures of all persons witnessing the tests.
- B. Testing Overhead Pipe:
1. Test all new piping for a period of two hours, at a hydrostatic pressure of 200 psi in accordance with NFPA 13, and all piping, valves, sprinklers, etc. shall be watertight. Additives or chemicals such as sodium silicate brine shall not be used while hydrostatically testing or for stopping leaks.
- C. Waterflow Detectors and Valve Supervisory Switches:
1. Functionally test each waterflow detector by opening the inspectors' test valve.
  2. Functionally test each valve supervisory switch by closing and opening the control valve.
- D. Tests shall be conducted at the designated times.
- 3.7 ADJUSTMENT AND CLEANING
- A. Adjustment: Remove all burrs from pipe threads and fittings, and all debris and foreign material from inside all pipe and fittings before installation. Correct all system leaks prior to final acceptance test.
- B. Cleaning: Flush all piping in accordance with NFPA standards.

**END OF SECTION 21 13 13**

**SECTION 22 11 16 - DOMESTIC WATER PIPING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods" for materials and methods common to mechanical piping systems.
  - 3. Division 20 Section "Hangers and Supports."
  - 4. Division 20 Section "Meters and Gages" for thermometers, pressure gages, and fittings.
  - 5. Division 22 Section "General-Duty Valves for Plumbing."
  - 6. Division 22 Section "Domestic Water Piping Specialties" for water distribution piping specialties.



**1.2 SUMMARY**

- A. This Section includes domestic water piping inside the building. PERFORMANCE REQUIREMENTS
- A. Where not indicated on the Drawings, provide components and installation capable of producing domestic water piping systems with 125 psig, unless otherwise indicated.

**1.4 SYSTEMS DESCRIPTION**

- A. Potable and non-potable domestic water piping system materials are scheduled on the Drawing.
- B. Transition and special fittings with pressure ratings at least equal to piping rating may be used unless otherwise indicated.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For pipe, tube, fittings, and couplings.

**1.6 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.
- B. Water Samples: Specified in Part 3 "Cleaning" Article.

**1.7 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Regulatory Requirements: Comply with requirements in Public Law 111-380, "Reduction of Lead in Drinking Water Act," about lead content in materials that will be in contact with potable water for human consumption.

**1.8 PROJECT CONDITIONS**

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
  - 2. Do not proceed with interruption of water service without Owner's written permission.

**1.9 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

**2.2 PIPING MATERIALS**

- A. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

**2.3 COPPER TUBE AND FITTINGS**

- A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.
  - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
  - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- B. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.
  - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
  - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- C. Copper or Bronze Pressure-Seal Fittings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Viega North America; ProPress System.
    - b. NIBCO Inc.; Press System.
    - c. Mueller Industries, Inc.; Streamline PRS.

- d. Elkhart Products Corporation; an Aalberts Industries Company; Xpress.
  - e. Apollo Valves; by Conbraco Industries; ApolloXpress.
  - f. ASC Engineered Solutions; Anvil Press.
- 2. Housing: Copper.
  - 3. O-Rings and Pipe Stops: EPDM.
  - 4. Tools: Manufacturer's special tools.
  - 5. Maximum 200-psig working-pressure rating at 250 deg F.

## **PART 3 - EXECUTION**

### **3.1 PIPING SYSTEM INSTALLATION**

- A. Basic piping installation requirements are specified in Division 20 Section "Basic Mechanical Materials and Methods."
- B. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
  - 1. Install hose-end drain valves at low points in water mains, risers, and branches.
  - 2. Install stop-and-waste drain valves where indicated.
- C. Install domestic water piping level without pitch and plumb.

### **3.2 JOINT CONSTRUCTION**

- A. Basic piping joint construction requirements are specified in Division 20 Section "Basic Mechanical Materials and Methods."

### **3.3 HANGER AND SUPPORT INSTALLATION**

- A. Pipe hanger and support devices are specified in Division 20 Section "Hangers and Supports." Install the following:
  - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.
  - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 20 Section "Hangers and Supports."
- C. Support vertical piping and tubing at base and at each floor.

- D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for drawn-temper copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 3/4 and Smaller: 60-inches with 3/8-inch rod.
  - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
  - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
  - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
  - 6. NPS 6: 10 feet with 5/8-inch rod.
  - 7. NPS 8: 10 feet with 3/4-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.
- G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### **3.4 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect domestic water piping to existing domestic water distribution piping. Use dielectric fitting if connection dissimilar metals. Refer to Application Schedule on the Drawings and Division 20 Section "Basic Mechanical Materials and Methods" for dielectric fittings.
- C. Install piping adjacent to equipment and machines to allow service and maintenance.
- D. Connect domestic water piping to the following:
  - 1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Plumbing Fixtures."
  - 2. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

### **3.5 FIELD QUALITY CONTROL**

- A. Inspect domestic water piping as follows:
  - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
  - 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
    - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

- b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
  3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
  4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test domestic water piping as follows:
  1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  4. Cap and subject piping to static water pressure of 150 psig. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
  6. Prepare reports for tests and required corrective action.

### **3.6 ADJUSTING**

- A. Perform the following adjustments before operation:
  1. Close drain valves, hydrants, and hose bibbs.
  2. Open shutoff valves to fully open position.
  3. Open throttling valves to proper setting.
  4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
    - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
    - b. Adjust calibrated balancing valves to flows indicated.
  5. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
  6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
  7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
  8. Check plumbing specialties and verify proper settings, adjustments, and operation.

**3.7 CLEANING AND DISINFECTION**

- A. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.
- B. Clean and disinfect potable domestic water piping as follows:
  - 1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
  - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill and isolate system according to either of the following:
      - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
    - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.

**END OF SECTION 22 11 16**

**SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 22 Section "Domestic Water Piping " for water meters.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.4 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.
- B. Flow Reports and Settings: For calibrated balancing valves.
- C. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

**1.5 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with requirements in Public Law 111-380, "Reduction of Lead in Drinking Water Act," about lead content in materials that will be in contact with potable water for human consumption.
- B. NSF Compliance:
  - 1. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."
  - 2. Comply with NSF 372, "Drinking Water System Components – Lead Content" for components with wetted surfaces in contact with potable water.

**PART 2 - PRODUCTS**

**2.1 BACKFLOW PREVENTERS**

- A. Reduced-Pressure-Principle Backflow Preventers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Apollo Valves; Conbraco Industries, Inc.
    - b. FEBCO; a Division of Watts Water Technologies, Inc.
    - c. Watts Water Technologies, Inc.; Ames Fire & Waterworks.
    - d. Watts Water Technologies, Inc.; Watts Regulator Co.
    - e. Zurn Plumbing Products Group; Wilkins Div.
  - 2. Standard: ASSE 1013.
  - 3. Operation: Continuous-pressure applications.
  - 4. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
  - 5. Size and Capacities: As scheduled on the drawings.
  - 6. Body: Bronze for NPS 2 and smaller; cast-iron or ductile-iron, with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
  - 7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
  - 8. Configuration: Designed for horizontal, straight through flow.
  - 9. Accessories:



- a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
- b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.
- c. Y-Pattern strainer and soft-seated check valve.

**B. Double-Check Backflow-Prevention Assemblies:**

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Apollo Valves; Conbraco Industries, Inc.
  - b. FEBCO; a Division of Watts Water Technologies, Inc.
  - c. Watts Water Technologies, Inc.; Ames Fire & Waterworks.
  - d. Watts Water Technologies, Inc.; Watts Regulator Co.
  - e. Zurn Plumbing Products Group; Wilkins Div.
- 2. Standard: ASSE 1015.
- 3. Operation: Continuous-pressure applications, unless otherwise indicated.
- 4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
- 5. Size and Capacities: As scheduled on the drawings.
- 6. Body: Bronze for NPS 2 and smaller; cast-iron or ductile-iron, with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
- 7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
- 8. Configuration: Designed for horizontal, straight through flow.
- 9. Accessories:
  - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.

**2.2 BALANCING VALVES**

**A. Calibrated Balancing Valves NPS 1/2:**

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Armstrong International, Inc.
  - b. Armstrong Pumps, Inc.
  - c. Apollo Valves; by Conbraco Industries, Inc.
  - d. Bell & Gossett; Xylem Inc.
  - e. Flo Fab Inc.
  - f. Flow Design Inc.
  - g. Griswold Controls.
  - h. NIBCO INC.
  - i. IMI Indoor Climate; Tour & Andersson.
  - j. Taco, Inc.
  - k. Watts Water Technologies, Inc.; Watts Regulator Co.

2. Type: Ball or Y-pattern globe valve with two readout ports and memory setting indicator.
3. Body: Dezincification resistant brass, or bronze.
4. Minimum Flow Rate: 0.3 gpm.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

## **2.3 TEMPERATURE-ACTUATED WATER MIXING VALVES**

### **A. Primary, Thermostatic, Water Mixing Valves:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Acorn Controls; Morris Group International; MV17.
  - b. Apollo Valves; Conbraco Industries, Inc.
  - c. Armstrong International, Inc. (RADA).
  - d. Bradley Corporation.
  - e. Lawler Manufacturing Company, Inc.
  - f. Leonard Valve Company.
  - g. Symmons Industries, Inc.
  - h. Watts Water Technologies, Inc.; Powers Division.
  - i. Watts Water Technologies, Inc.; Watts Regulator Co.
  - j. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1017.
3. Type: Exposed-mounting, thermostatically controlled water mixing valve.
4. Material: Bronze body with corrosion-resistant interior components.
5. Connections: Threaded union inlets and outlet.
6. Accessories: Manual temperature control, check stops and strainers on hot- and cold-water supplies, and adjustable, temperature-control handle.
7. Valve Pressure Rating: 125 psig minimum, unless otherwise indicated.
8. Size, Settings, and Capacities: As scheduled on the drawings.

## **2.4 HOSE BIBBS**

### **A. Hose Bibbs:**

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Chrome or nickel plated.
9. Finish for Service Areas: Chrome or nickel plated.
10. Finish for Finished Rooms: Chrome or nickel plated.

11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

## **2.5 WALL HYDRANTS**

### **A. Nonfreeze Wall Hydrants:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Water Technologies, Inc.; Watts Regulator co.
  - f. Woodford Manufacturing Company.
  - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.21.3M for self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4 or NPS 1.
7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounting with cover.
9. Box and Cover Finish: Polished nickel bronze or chrome plated.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Refer to Division 20 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
  1. Locate backflow preventers in same room as connected equipment or system.

2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
  3. Do not install bypass piping around backflow preventers.
  4. Install strainer and soft-seated check valve upstream of backflow preventer. Exception: Fire protection backflow preventers.
- C. Install balancing valves in locations where they can easily be adjusted.
- D. Install temperature-actuated water mixing valves with strainers, and check stops or shutoff valves on inlets and with shutoff valve on outlet.
1. Install thermometers and water regulators if specified.
  2. Install cabinet-type units recessed in or surface mounted on wall as specified.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Division 20 and 22 Sections. Drawings indicate general arrangement of piping and specialties.

### **3.3 FIELD QUALITY CONTROL**

- A. Perform the following tests and prepare test reports:
1. Test each backflow prevention device according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

### **3.4 ADJUSTING**

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves as follows:
1. Set calibrated balancing valves at calculated presettings.
  2. Measure flow each station and adjust where necessary.
  3. Record settings and mark balancing devices.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

**END OF SECTION 22 11 19**

**SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements".
  - 2. Division 20 Section "Basic Mechanical Materials and Methods".
  - 3. Division 22 Section "Drainage Piping Specialties".

**1.2 PERFORMANCE REQUIREMENTS**

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
  - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
  - 2. Sanitary Sewer, Force-Main Piping: 125 psig.

**1.3 SYSTEMS DESCRIPTIONS**

- A. Sanitary waste and vent piping system materials are scheduled on the Drawing.

- B. Aboveground, soil and waste piping shall be any of the following:
  - 1. Copper DWV tube, copper drainage fittings, and soldered joints.
- C. Aboveground, indirect sanitary waste piping shall be any of the following:
  - 1. Copper DWV tube, copper drainage fittings, and soldered joints.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For pipe, tube, fittings, and couplings.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Field quality-control inspection and test reports.

#### **1.6 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

#### **1.7 PROJECT CONDITIONS**

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
  - 2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

#### **2.2 COPPER TUBE AND FITTINGS**

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- B. Hard Copper Tube: ASTM B 88, Types M, water tube, drawn temper.
  1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
  3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- C. Hard Copper Tube: ASTM B 88, Types L, water tube, drawn temper.
  1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
  3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

## **PART 3 - EXECUTION**

### **3.1 EXCAVATION**

- A. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### **3.2 PIPING SYSTEM INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Basic piping installation requirements are specified in Division 20 Section "Basic Mechanical Materials and Methods."
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

### **3.3 HANGER AND SUPPORT INSTALLATION**

- A. Pipe hangers and supports are specified in Division 20 Section "Hangers and Supports." Install the following:
  1. Vertical Piping: MSS Type 8 or Type 42, clamps.
  2. Install individual, straight, horizontal piping runs according to the following:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

- b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
  - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
- 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 20 Section "Hangers and Supports."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.

### **3.4 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
  - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
  - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
  - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
  - 4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

### **3.5 IDENTIFICATION**

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 20 Section "Mechanical Identification."



**3.6 CLEANING**

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

**END OF SECTION 22 13 16**

**SECTION 22 34 10 - CONDENSING, FUEL-FIRED DOMESTIC WATER HEATERS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Section includes the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 23 Section "Breechings, Chimneys, and Stacks."

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Shop Drawings: Detail water heater assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection
  - 1. Wiring Diagrams: Power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring.

- B. Product Certificates: For each type of water heater, signed by product manufacturer.
- C. Source quality-control test reports.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.
- B. Operation and Maintenance Data: For water heaters to include in operation and maintenance manuals.

#### **1.5 QUALITY ASSURANCE**

- A. Source Limitations: Obtain same type of water heaters through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a NRTL acceptable to authorities having jurisdiction, and marked for intended use.
- C. ASHRAE Standards: Comply with performance efficiencies prescribed for the following:
  - 1. ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings," for commercial water heaters.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

#### **1.6 COORDINATION**

- A. Coordinate size and location of concrete bases with Architectural and Structural Drawings.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

## **2.2 COMMERCIAL, GAS WATER HEATERS**

- A. Commercial, Modulating/Condensing, High-Efficiency, Tank-Type Gas Water Heaters: Comply with ANSI Z21.10.3/CSA 4.3.
1. Manufacturer's proprietary design to provide minimum thermal efficiency of 95 percent at optimum operating conditions.
  2. Manufacturers:
    - a. Bock Water Heaters, Inc.; OptiTherm Series
    - b. Bradford White Corporation; EF Series.
    - c. Heat Transfer Products, Inc. (HTP); Phoenix Series.
    - d. Laars Heating Systems; a Subsidiary of Bradford White Corporation; U.H.E. Series.
    - e. Lochinvar Corporation; Shield and TurboCharger Series.
    - f. Rheem Water Heating; Triton Series.
    - g. Smith, A. O. Water Products Company; Cyclone Xi Series.
  3. Storage-Tank Construction: Non-ASME code steel or Type 316L stainless steel with 150-psig minimum working-pressure rating.
    - a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.
      - 1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
      - 2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.
    - b. Lining for Steel Tanks: Glass complying with NSF 61 barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.
  4. Factory-Installed, Storage-Tank Appurtenances:
    - a. Anode Rod or Impressed Current Cathodic Protection: Required for glass-lined tanks.
    - b. Dip Tube: Provide unless cold-water inlet is near bottom of tank.
    - c. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
    - d. Insulation: Comply with ASHRAE/IESNA 90.1.
    - e. Jacket: Plastic, or steel with enameled finish.
    - f. Combination Temperature and Pressure Relief Valves: ANSI Z21.22/CSA 4.4. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating.
  5. Burner and Heat Exchanger:
    - a. Pre-mix power burner and submerged combustion chamber.
    - b. Helical or spiral heat exchanger coil.

- c. Comply with ANSI Z21.10.3, UL 795 or approved NRTL requirements for high-efficiency water heaters and for natural-gas fuel.
6. Sealed Combustion/Direct Vent: Combustion air is ducted to the combustion chamber from the outdoors.
7. Temperature Control: Digital display for system monitoring and temperature adjustment.
8. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
9. Energy Management System Interface: Normally closed dry contacts for enabling and disabling water heater.
10. Capacity and Characteristics: Refer to Schedule on Drawings.

### **2.3 EXPANSION TANKS**

- A. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
  1. Manufacturers:
    - a. AMTROL Inc.
    - b. Armstrong Pumps, Inc.
    - c. Bell & Gossett; Xylem Inc.
    - d. Taco, Inc.
    - e. Wessels Co.
  2. Construction:
    - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
    - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    - c. Air-Charging Valve: Factory installed.
  3. Capacity and Characteristics: Refer to Schedule on Drawings.
- B. Description: Steel, pressure-rated tank, ASME-code constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
  1. Manufacturers:
    - a. AMTROL Inc.
    - b. Armstrong Pumps, Inc.
    - c. Bell & Gossett; Xylem Inc.
    - d. Taco, Inc.
    - e. Wessels Co.
  2. Construction:

- a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
  - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
  - c. Air-Charging Valve: Factory installed.
3. Capacity and Characteristics: Refer to Schedule on Drawings.

## **2.4 WATER HEATER ACCESSORIES**

- A. Gas Shutoff Valves: ANSI Z21.15/CGA 9.1, manually operated. Furnish for installation in piping.
- B. Gas Pressure Regulators: ANSI Z21.18, appliance type. Include pressure rating, capacity, and pressure differential required between gas supply and water heater.
- C. Combination Temperature and Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select each relief valve with sensing element that extends into storage tank.
1. Gas Water Heaters: ANSI Z21.22/CSA 4.4.
  2. Oil-Fired Water Heaters: ASME rated and stamped and complying with ASME PTC 25.3.
- D. Flue Side Condensate Neutralizer:
1. Description: Designed to raise the PH level of flue side condensate to near neutral prior to condensate entering the sanitary drainage system.
  2. Materials: Neutralizer constructed of PVC pipe and fittings mounted on channel strut base with galvanized or stainless steel clamps and hardware; and charged with calcium carbonate.
  3. Manufacturers:
    - a. Axiom Industries Ltd.; NeutraPal and NeutraPro Series.
    - b. BKI Industries, Inc.; Acid Neutralizer Kits.
    - c. J.J.M. Boiler Works; JM Neutralizing Tubes.
    - d. Neutrasafe Corporation; Neutra-Safe Condensate Neutralizers.
    - e. Any of the approved water heater manufacturers.

## **2.5 SOURCE QUALITY CONTROL**

- A. Test and inspect water heater storage tanks, specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test water heater storage tanks before shipment to minimum of one and one-half times pressure rating.
- C. Prepare test reports.

## **PART 3 - EXECUTION**

### **3.1 WATER HEATER INSTALLATION**

- A. Install commercial water heaters on concrete bases.
  - 1. Exception: Omit concrete bases for commercial water heaters if installation on stand, bracket, suspended platform, or direct on floor is indicated.
  - 2. Concrete base construction requirements are specified in Division 20 Section "Basic Mechanical Materials and Methods."
- B. Install water heaters level and plumb, according to layout drawings, original design, and PBA Note: Select NFPA 54 for Natural Gas or NFPA 58 for Propane.
- C. Install gas water heaters according to NFPA 54.
- D. Install gas shutoff valves on gas supplies to gas water heaters without shutoff valves.
- E. Install gas pressure regulators on gas supplies to gas water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
- F. Install combination temperature and pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater, relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- G. Install pressure relief valves in water piping for water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- H. Install thermometer on outlet piping of water heaters. Refer to Division 20 Section "Meters and Gages" for thermometers.
- I. Install piping-type heat traps on inlet and outlet piping of water heater storage tanks without integral or fitting-type heat traps.
- J. Fill water heaters with water.
- K. Install expansion tanks with isolation and drain valves. Charge expansion tanks with air.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Division 20 and 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of water heaters.

- C. Connect vent to full size of water heater flue outlet. Refer to Division 23 Section "Breechings, Chimneys, and Stacks" for venting materials.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding."
- E. Connect wiring according to Division 26 Section "Conductors and Cables."

### **3.3 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.

**END OF SECTION 22 34 10**



**SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 23 Section "Testing, Adjusting, and Balancing."

**1.2 SUMMARY**

- A. This Section includes common requirements for fans and air moving equipment.

**1.3 QUALITY ASSURANCE**

- A. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
- B. Fan Performance Data: AMCA Standard 210.

C. Sound Power Level Ratings:

1. Ducted Fans - Rated per AMCA 301, when tested per AMCA 300.
2. Nonducted Fans - Rated in Zones at 5 feet from acoustic center of fan rated per AMCA 301, tested per AMCA 300 and converted per AMCA 302.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate equipment for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 FAN SHAFTS

- A. Fan Shafts: Ground from solid cold rolled steel, and proportioned to run at least 25 percent below the first critical speed.

2.3 FAN POWER TRANSMISSION

- A. V-Belt Type Fan Drives: In accordance with Engineering Standard Specification for Drives Using Multiple V-Belts, sponsored by the Mechanical Power Transmission Association and the Rubber Manufacturer's Association.
- B. A given manufacturer's V-belt drive, as applied to specific equipment provided under the Contract, shall conform to the equipment manufacturer's published recommendations, except as otherwise specified.
- C. Base horsepower rating of drive on minimum pitch diameter of small sheave.
- D. Locate belt drives outboard of bearings. Align drive and driven shafts by the four-point method.
- E. Adjust belt tension in accordance with the manufacturer's recommendations.
- F. Perform alignment and final belt tensioning in the presence of the Architect.

**2.4 MOTOR REQUIREMENTS**

- A. Furnish motors in accordance with Division 20 Section "Motors."

**2.5 FAN BEARINGS**

- A. Bearings: Anti-friction ball or roller type with provision for self-alignment and thrust load. Made in U.S.A. with ABMA L<sub>10</sub> minimum life of 200,000 hours. Use cast iron housings and dust-tight seals suitable for lubricant pressures.
  - 1. Lubrication Provisions - Use surface ball check type supply fittings. Provide extension tubes to allow safe maintenance while equipment is operating. Provide manual or automatic pressure relief fittings to prevent overheating or seal blow-out due to excess lubricant or pressure. Arrange relief fittings opposite supply but visible for normal maintenance observation.
  - 2. Bearings on Equipment with less than 1/2 horsepower rating or on shafts smaller than 1-3/4 inch in diameter: Permanently sealed, pre-lubricated anti-friction bearings per specified materials and ABMA L<sub>10</sub> life requirements.

**2.6 IDENTIFICATION**

- A. Nameplate: Affix metallic, corrosion-resistant data plate for each fan in a conspicuous location. Include selection point capacity conditions.

**2.7 ACCESSORIES**

- A. Bird Screens: Of material to match adjacent contact construction, 1/2 inch mesh or equal expanded metal. Use on inlet or outlet of each nonducted fan.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Field Rigging: Do not negate balancing. Do not bend shaft. Use lifting eyes.
- B. Install sheaves where recommended by Testing, Adjusting, and Balancing agency.
- C. Refer to individual Division 23 HVAC equipment Sections for additional requirements.

**END OF SECTION 23 05 00**

**SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 23 Section "Common Work Results for HVAC."

**1.2 SUMMARY**

- A. This Section includes testing, adjusting, and balancing to produce design objectives for the following:
  - 1. Air Systems:

- a. Constant-volume air systems.
- B. Include rebalancing of air systems, or system portions affected by recommended sheave changes.

### 1.3 DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. AHJ: Authority having jurisdiction.
- C. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.
- D. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.
- E. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- F. NC: Noise criteria.
- G. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- H. RC: Room criteria.
- I. Report Forms: Test data sheets for recording test data in logical order.
- J. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- K. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- L. TAB: Testing, adjusting, and balancing.
- M. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- N. Test: A procedure to determine quantitative performance of systems or equipment.
- O. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: Within 45 days from Contractor's Notice to Proceed, submit electronic copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 45 days from Contractor's Notice to Proceed, submit electronic copies of the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 90 days from Contractor's Notice to Proceed, submit electronic copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.

**1.5 CLOSEOUT SUBMITTALS**

- A. Certified TAB Reports: Submit electronic copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.
- B. Warranties specified in this Section.

**1.6 QUALITY ASSURANCE**

- A. Approved Balancing Agencies.
  - 1. The TAB firm selected shall be from the following list:
    - a. Airflow Testing Inc.; Lincoln Park, MI.
    - b. Barmatic Inspecting Co., Inc.; Lincoln Park, MI.
    - c. Ener-Tech Testing; Holly, MI.
    - d. Enviro-Aire/Total Balance Co.; St. Clair Shores, MI.
    - e. International Test & Balance Inc.; Southfield, MI.
    - f. Quality Air Service; Portage, MI.
    - g. Third Coast Test and Balance
- B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
  - 2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." TAB firm's forms approved by Architect.

- D. Instrumentation Type, Quantity, and Accuracy: As described in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
  - 1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

#### **1.7 PROJECT CONDITIONS**

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

#### **1.8 COORDINATION**

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
- B. Notice: Provide seven days advance notice for each test. Include scheduled test dates and times.
- C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

#### **1.9 WARRANTY**

- A. National Project Performance Guarantee: If AABC standards are used, provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:
  - 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
  - 2. Systems are balanced to optimum performance capabilities within design and installation limits.
- B. Special Guarantee: If NEBB standards are used, provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- B. Examine system and equipment test reports.
- C. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- D. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- E. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning.
- F. Examine plenum ceilings used for supply air to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.
- G. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- H. Examine equipment for installation and for properly operating safety interlocks and controls.
- I. Examine automatic temperature system components to verify the following:
  1. Dampers, valves, and other controlled devices are operated by the intended controller.
  2. Dampers and valves are in the position indicated by the controller.
  3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
  4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.



5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
  6. Sensors are located to sense only the intended conditions.
  7. Sequence of operation for control modes is according to the Contract Documents.
  8. Controller set points are set at indicated values.
  9. Interlocked systems are operating.
  10. Changeover from heating to cooling mode occurs according to indicated values.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### **3.2 PREPARATION**

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Perform the following field tests and inspections to new and renovated portions of duct systems according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:
1. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
  2. Maximum Allowable Leakage: Leakage rates are scheduled on the Drawings.
- C. Complete system readiness checks and prepare system readiness reports. Verify the following:
1. Permanent electrical power wiring is complete.
  2. Hydronic systems are filled, clean, and free of air.
  3. Automatic temperature-control systems are operational.
  4. Equipment and duct access doors are securely closed.
  5. Balance, smoke, and fire dampers are open.
  6. Isolating and balancing valves are open and control valves are operational.
  7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  8. Windows and doors can be closed so indicated conditions for system operations can be met.

### **3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING**

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

- B. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.
- C. Take and report testing and balancing measurements in inch-pound (IP) units.

### **3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS**

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts, or use reduced scale contract documents with notations.
- C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- D. Cut insulation, and drill ducts for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes with neat patches, neoprene plugs, threaded plugs, or threaded twist-on metal caps, and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.
- E. Check air flow within intake plenums and mixing boxes of air handling units for uneven flow and temperature stratification and prepare a report with profile elevations (temperature and velocity) on each coil or filter face for Architect.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling unit components.
- L. Check for proper sealing of air duct system.

### **3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS**

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure fan static pressures to determine actual static pressure as follows:

- a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
    - b. Measure static pressure directly at the fan outlet.
    - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
    - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
  2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
    - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
  3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
  4. Do not recommend fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow at a point downstream from the balancing damper and adjust volume dampers until the proper airflow is achieved.
    - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure terminal outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  2. Adjust patterns of adjustable outlets for proper distribution without drafts.

**3.6 PROCEDURES FOR CONDENSING UNITS**

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

**3.7 PROCEDURES FOR HEAT-TRANSFER COILS**

- A. Refrigerant Coils: Measure the following data for each coil:
  - 1. Dry-bulb temperature of entering and leaving air.
  - 2. Wet-bulb temperature of entering and leaving air.
  - 3. Airflow.
  - 4. Air pressure drop.
  - 5. Refrigerant suction pressure and temperature.

**3.8 PROCEDURES FOR TEMPERATURE MEASUREMENTS**

- A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.
- B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.
- C. Measure outside-air, wet- and dry-bulb temperatures.

**3.9 TOLERANCES**

- A. Set HVAC system airflow and water flow rates within the following tolerances:
  - 1. Air handling equipment and outlets: Plus or minus 5 percent.
    - a. Where terminal units serve 6 or more outlets within a common room, individual outlets may vary up to plus or minus 10 percent of design flow rates if overall room supply is within plus or minus 5 percent.

**3.10 REPORTING**

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

- B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.11 FINAL REPORT

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
  - 1. Include a list of instruments used for procedures, along with proof of calibration.
- C. Final Report Contents: In addition to certified field report data, include the following:
  - 1. Fan curves.
  - 2. Manufacturers' test data.
  - 3. Field test reports prepared by system and equipment installers.
  - 4. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.
- D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
  - 1. Title page.
  - 2. Name and address of TAB firm.
  - 3. Project name.
  - 4. Project location.
  - 5. Architect's name and address.
  - 6. Engineer's name and address.
  - 7. Contractor's name and address.
  - 8. Report date.
  - 9. Signature of TAB firm who certifies the report.
  - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  - 11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  - 12. Nomenclature sheets for each item of equipment.
  - 13. Notes to explain why certain final data in the body of reports varies from indicated values.
  - 14. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outside-, return-, and exhaust-air dampers.

- b. Conditions of filters.
  - c. Cooling coil, wet- and dry-bulb conditions.
  - d. Face and bypass damper settings at coils.
  - e. Fan drive settings including settings and percentage of maximum pitch diameter.
  - f. Inlet vane settings for variable-air-volume systems.
  - g. Settings for supply-air, static-pressure controller.
  - h. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
  - 1. Quantities of outside, supply, return, and exhaust airflows.
  - 2. Water flow rates.
  - 3. Terminal units.
  - 4. Balancing stations.
- F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
  - 1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Unit arrangement and class.
    - g. Discharge arrangement.
    - h. Sheave make, size in inches, and bore.
    - i. Sheave dimensions, center-to-center, and amount of adjustments in inches.
    - j. Number of belts, make, and size.
    - k. Number of filters, type, and size.
  - 2. Motor Data:
    - a. Make and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.
    - f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
    - g. Power factor efficiency.
  - 3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Filter static-pressure differential in inches wg.
    - f. Preheat coil static-pressure differential in inches wg.

- g. Cooling coil static-pressure differential in inches wg.
  - h. Heating coil static-pressure differential in inches wg.
  - i. Outside airflow in cfm.
  - j. Return airflow in cfm.
  - k. Outside-air damper position.
  - l. Return-air damper position.
  - m. Vortex damper position.
- G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
  - 1. Unit Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Fuel type in input data.
    - g. Output capacity in Btuh.
    - h. Ignition type.
    - i. Burner-control types.
    - j. Motor horsepower and rpm.
    - k. Motor volts, phase, and hertz.
    - l. Motor full-load amperage and service factor.
    - m. Sheave make, size in inches, and bore.
    - n. Sheave dimensions, center-to-center, and amount of adjustments in inches.
  - 2. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Entering-air temperature in deg F.
    - c. Leaving-air temperature in deg F.
    - d. Air temperature differential in deg F.
    - e. Entering-air static pressure in inches wg.
    - f. Leaving-air static pressure in inches wg.
    - g. Air static-pressure differential in inches wg.
    - h. Low-fire fuel input in Btuh.
    - i. High-fire fuel input in Btuh.
    - j. Manifold pressure in psig.
    - k. High-temperature-limit setting in deg F.
    - l. Operating set point in Btuh.
    - m. Motor voltage at each connection.
    - n. Motor amperage for each phase.
    - o. Heating value of fuel in Btuh.
- H. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
  - 1. Unit Data:

- a. System identification.
    - b. Location.
    - c. Coil identification.
    - d. Capacity in Btuh.
    - e. Number of stages.
    - f. Connected volts, phase, and hertz.
    - g. Rated amperage.
    - h. Airflow rate in cfm.
    - i. Face area in sq. ft.
    - j. Minimum face velocity in fpm.
  2. Test Data (Indicated and Actual Values):
    - a. Heat output in Btuh.
    - b. Airflow rate in cfm.
    - c. Air velocity in fpm.
    - d. Entering-air temperature in deg F.
    - e. Leaving-air temperature in deg F.
    - f. Voltage at each connection.
    - g. Amperage for each phase.
- I. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and size.
    - e. Manufacturer's serial number.
    - f. Arrangement and class.
    - g. Sheave make, size in inches, and bore.
    - h. Sheave dimensions, center-to-center, and amount of adjustments in inches.
  2. Motor Data:
    - a. Make and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.
    - f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
    - g. Number of belts, make, and size.
  3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Suction static pressure in inches wg.



- J. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:
  - a. System and air-handling unit number.
  - b. Location and zone.
  - c. Traverse air temperature in deg F.
  - d. Duct static pressure in inches wg.
  - e. Duct size in inches.
  - f. Duct area in sq. ft.
  - g. Indicated airflow rate in cfm.
  - h. Indicated velocity in fpm.
  - i. Actual airflow rate in cfm.
  - j. Actual average velocity in fpm.
  - k. Barometric pressure in psig.

- K. Air-Terminal-Device Reports:

1. Unit Data:
  - a. System and air-handling unit identification.
  - b. Location and zone.
  - c. Test apparatus used.
  - d. Area served.
  - e. Air-terminal-device make.
  - f. Air-terminal-device number from system diagram.
  - g. Air-terminal-device type and model number.
  - h. Air-terminal-device size.
  - i. Air-terminal-device effective area in sq. ft.
2. Test Data (Indicated and Actual Values):
  - a. Airflow rate in cfm.
  - b. Air velocity in fpm.
  - c. Preliminary airflow rate as needed in cfm.
  - d. Preliminary velocity as needed in fpm.
  - e. Final airflow rate in cfm.
  - f. Final velocity in fpm.
  - g. Space temperature in deg F.

- L. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:
  - a. System and air-handling unit identification.
  - b. Location and zone.
  - c. Room or riser served.
  - d. Coil make and size.
  - e. Flowmeter type.

2. Test Data (Indicated and Actual Values):
  - a. Airflow rate in cfm.
  - b. Entering-water temperature in deg F.
  - c. Leaving-water temperature in deg F.
  - d. Water pressure drop in feet of head or psig.
  - e. Entering-air temperature in deg F.
  - f. Leaving-air temperature in deg F.

**M. Air-to-Air Heat-Recovery Unit Reports:**

1. Unit Data:
  - a. Unit identification.
  - b. Location.
  - c. Service.
  - d. Make and type.
  - e. Model and serial numbers.
2. Motor Data:
  - a. Make and frame type and size.
  - b. Horsepower and rpm.
  - c. Volts, phase, and hertz.
  - d. Full load amperage and service factor.
  - e. Sheave make, size in inches, and bore.
  - f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
3. If fans are an integral part of the unit, include the following for each fan:
  - a. Make and type.
  - b. Arrangement and size.
  - c. Sheave make, size in inches, and bore.
  - d. Sheave dimensions, center-to-center, and amount of adjustments in inches.
4. Test Data (Indicated and Actual Values):
  - a. Total exhaust airflow rate in cfm.
  - b. Purge exhaust airflow rate in cfm.
  - c. Outside airflow rate in cfm.
  - d. Total exhaust fan static pressure in inches wg.
  - e. Total outside-air fan static pressure in inches wg.
  - f. Pressure drop on each side of recovery wheel in inches wg.
  - g. Exhaust air temperature entering in deg F.
  - h. Exhaust air temperature leaving in deg F.
  - i. Outside-air temperature entering in deg F.
  - j. Outside-air temperature leaving in deg F.
  - k. Calculate sensible and total heat capacity of each airstream in MBh.

**3.12 INSPECTIONS**

**A. Initial Inspection:**

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.
2. Randomly check the following for each system:
  - a. Measure airflow of at least 10 percent of air outlets.
  - b. Measure water flow of at least 5 percent of terminals.
  - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
  - d. Measure sound levels at two locations.
  - e. Measure space pressure of at least 10 percent of locations.
  - f. Verify that balancing devices are marked with final balance position.
  - g. Note deviations to the Contract Documents in the Final Report.

**END OF SECTION 23 05 93**

## SECTION 23 09 33 - TEMPERATURE CONTROLS

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."
  - 3. Division 23 Section "Testing, Adjusting, and Balancing."
  - 4. Division 26 Section "Electrical General Requirements."
  - 5. Division 26 Section "Control-voltage Electrical Power Cables."
  - 6. Division 26 Section "Hangers and Supports for Electrical Systems."
  - 7. Division 26 Section "Raceways and Boxes."

**1.2 SUMMARY**

- A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

**1.3 DEFINITIONS**

- A. BACnet: Communications open protocol for building automation system networks and control (developed by ASHRAE and documented per ANSI/ASHRAE Standard 135-2012.
- B. BAS: Building Automation System
- C. CAD: Computer Aided Design.
- D. TC: Temperature Control.

**1.4 SYSTEM DESCRIPTION**

- A. Temperature control building automation system consisting of direct digital control system controllers, sensors, transducers, relays, switches, data communication network, etc. and all associated control wiring and raceway systems.
- B. Electric thermostats, control valves, dampers, operators, control wiring, etc.
- C. Gauges, indicating devices, electric and electronic control accessories, and other control system devices.

**1.5 SEQUENCE OF OPERATION**

- A. Control sequences for HVAC systems, subsystems, and equipment are indicated on project drawings.

**1.6 SUBMITTALS**

- A. Submit under Division 20 and 23 provisions of respective project and as supplemented in this section.
- B. All control submittal requirements shall be submitted at one time with exception to control valves, automated dampers, and initial phases of work associated with fast-track projects (when required). Early submittals of control valves and automated dampers shall be incorporated with the complete temperature controls submittal.
- C. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.

1. Each control device labeled with setting or adjustable range of control
- D. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- E. Shop Drawings:
  1. Shop drawings shall be done on CAD. Minimum size 11" x 17".
  2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
  3. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
  4. Details of control enclosure including panel faces and interior, including controls, instruments, terminations blocks and component labeling.
  5. Written sequence of operation for each controlled system.
  6. Schedule of dampers including size, leakage, and flow characteristics (Refer to Design Data).
  7. Schedule of valves including leakage and flow characteristics (Refer to Design Data).
  8. Complete bill of materials to identify and quantify all control components.
  9. Overall system schematic showing communication trunk cabling from Building Network Supervisory Controller(s) to BAS field level controllers including component locations and wire termination details.
  10. DDC controller layouts showing connected data points and LAN connections. DDC controller terminations including power supply and remote control component termination details shall be provided.
  11. Point list for each DDC controller including point descriptions and addresses. This information may be incorporated with DDC controller layouts.
  12. List of system graphics to be provided with proposed tree diagram of graphics organization. Items to include: Each system, floor plan.
- F. Graphic Displays: One month after TC Shop Drawing submittal, TC Contractor shall submit graphical display backgrounds for preliminary Engineer review. Concept for each floor plan, each system, each terminal unit template. Engineer understands that final representation of graphics may not be available until BAS database is established during course of construction. Thorough graphics review will be conducted by Engineer as part of the TC/BAS acceptance procedure.
- G. Design Data: Provide indicated component selection and sizing criteria for the following component categories:
  1. Dampers:
    - a. Component tag.
    - b. Equipment served/function.
    - c. Overall damper size (inch width x inch height).
    - d. Quantity of damper sections with respective size(s):
    - e. Material and gauge of thickness.
    - f. Mounting orientation (horizontal or vertical).
    - g. Blade configuration (parallel or opposed)

- h. Pressure drop (in. WG).
    - i. Shut-off rating/differential pressure rating (in. wg).
    - j. Leakage rating (CFM/sq.ft. at 4 in. wg).
    - k. Normal position (normally open, normally closed, floating).
    - l. Actuator spring range (where applicable).
    - m. Actuator power requirement.
    - n. Actuator torque requirement.
    - o. Actuator quantity.
    - p. Damper manufacturer/model number.
    - q. Actuator manufacturer/model number.
  - H. Wall mounted temperature sensor, thermostat and/or other temperature control device cover color shall be coordinated to match color of wall mounted electrical device components and cover plates – coordinate with electrical contractor. Provide samples of available temperature control device cover colors to Architect upon request or if available temperature control device colors do not match electrical device colors so a desired color selection may be determined. Provide sample of temperature sensor / thermostat guard upon request of Architect, Engineer or Owner.
  - I. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
  - J. Submit field reports indicating operating conditions after detailed check out of systems at Date of Substantial Completion.
  - K. Project Record Documents: Include the following:
    - 1. Revise Shop Drawings to reflect actual installation and operating sequences.
    - 2. Record actual locations of control components, including control units, thermostats, and sensors.
    - 3. Submit the electronic files for all as-built shop drawings in pdf format on USB Flash Drives (3 Total).
  - L. Maintenance Manuals: Include the following:
    - 1. Product data with installation details, maintenance instructions and lists of spare parts for each type of control device.
    - 2. Keypad illustrations and step-by-step procedures indexed for each operator function, where applicable.
    - 3. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
    - 4. Calibration records and list of set points.
- 1.7 REFERENCES
- A. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.
  - B. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure fittings.
  - C. ANSI/ASTM B32 - Solder Metal.

- D. ANSI/NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- E. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- F. ASTM B75 - Seamless Copper Tube for General Engineering Purposes.
- G. ASTM D1693 - Environmental Stress - Cracking of Ethylene Plastics.
- H. ASTM E1 - Specification for ASTM Thermometers.
- I. MMC – Michigan Mechanical Code, version applicable for project.
- J. NEMA DC 3 - Low-Voltage Room Thermostats.
- K. UL 1820 - Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics Only.

#### **1.8 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who is a certified installer of the automatic control system manufacturer for both installation and maintenance of units required for this Project.
- B. Manufacturer Qualifications: A firm experienced in manufacturing automatic temperature-control systems similar to those indicated for this Project and with a record of successful in-service performance.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with all applicable code requirements for project.

#### **1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Factory-Mounted Components: Where control devices specified in this Section are indicated or optional to be factory mounted on equipment, arrange for shipping of control devices to unit manufacturer.

#### **1.10 COORDINATION**

- A. Coordinate work under Division 20 and 23 provisions and as supplemented in this section.
- B. Coordinate location of thermostats with plans and room details before installation.
- C. Coordinate installation of system components with installation of mechanical systems and equipment to achieve compatibility.



- D. Ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate equipment with Division 28 Section "Fire Alarm" to achieve compatibility with equipment that interfaces with that system.
- F. Ensure control system installation is complete, checked, tested and functioning properly prior to system balancing and Owner/Engineer system checkout.
- G. Cooperate fully with the Test and Balance Contractor and provide labor to operate the temperature control system as required to meet the scope of work defined in Division 23 Section "Testing, Adjusting and Balancing."

**1.11 WARRANTY**

- A. Provide warranty per Division 20 Section "Mechanical General Requirements" and as supplemented in this section.
- B. Provide 24 hour per day emergency service during warranty period, with maximum response period of four (4) hours. Provide phone number(s) for quick assistance by a Service Engineer regarding hardware or software problems.
- C. Provide scheduled maintenance service during warranty period to inspect, calibrate, and adjust controls. Make a minimum of one four hour service call. Notify Owner prior to scheduled inspection trip. Submit written report upon completion of service.

**1.12 PROTECTION OF PROPRIETARY INFORMATION**

- A. Non-disclosure agreement(s) that may be subject to proprietary manuals and software shall be submitted by the proprietary equipment manufacturer to the Owner for approval and signature during the warranty period.

**PART 2 - PRODUCTS**

**2.1 DESCRIPTION OF THE BUILDING AUTOMATION SYSTEM (BAS)**

- A. Approved Manufacturer – System / Approved Installer (Locations) as listed:
  - 1. Distech Controls with BACnet Controllers / by:
    - a. Johnson Controls, Inc. (Auburn Hills, MI) – NOT Metasys Products.
    - b. W.J. O'Neil Controls Group. (Livonia, MI).

**2.2 DAMPERS - AUTOMATED**

- A. Performance: Test in accordance with AMCA 500.

- B. Frames: Galvanized steel, minimum 16 gauge, minimum 2 inches in width, welded or riveted with corner reinforcement for 12 gage structural equivalence.
- C. Blades: Galvanized steel, minimum 14 gauge, maximum blade size 8 inches wide, 60 inches long, attached to minimum 1/2 inch shafts. Dampers which are required to have a static pressure rating over 4 inch W.G. shall have minimum 3/4 inch solid shafts.
- D. Blade Seals: Synthetic elastomeric or Neoprene, mechanically attached, field replaceable.
- E. Jackshafts (where required): Minimum 1/2 inch galvanized steel.
- F. Jamb Seals: Stainless steel.
- G. Bearings: Oil impregnated sintered bronze or lubricant free, solid stainless steel. Provide thrust washers at bearings for all dampers which are to be mounted with blades in the vertical position.
- H. Linkages: Accessible for maintenance. Linkages may be located in airstream. Linkages located in damper frame shall be external to the duct, accessible for maintenance. Linkages located in the airstream shall be zinc-plated.
- I. Leakage: Less than 8 CFM per square foot based on 4 inches W.G. pressure differential.
- J. Static Pressure Rating: As scheduled on the drawings, or if not scheduled, minimum 4" W.G.
- K. Maximum Velocity: As scheduled on the drawings, or design for maximum velocity to be encountered in location where installed.
- L. Temperature Limits: -40 to 200 deg F.
- M. Dampers located in stainless steel or PVC coated ductwork (Refer to Division 23 Section "Metal Ducts" for ductwork requirements) and dampers located within stainless steel or corrosion-resistant coated environmental equipment (Refer to Division 23 Section "Environmental Equipment" for environmental equipment requirements): Fabricate and size as indicated above, with the following additional requirements.
  - 1. Frames: Type 316 stainless steel.
  - 2. Blades and shafts: Type 316 stainless steel.
  - 3. Blade seals: Type 316 stainless steel, mechanically attached.
  - 4. Jackshafts (where required): Minimum 3/4 inch stainless steel.
  - 5. Bearings: Solid stainless steel.
  - 6. Linkages: Accessible for maintenance. Linkages located in damper frames shall be external to the duct, accessible for maintenance. Linkages located in the airstream shall be Type 316 stainless steel.
  - 7. All components exposed to the airstream shall be constructed of Type 316 stainless steel:
- N. Manufacturers:

1. American Warming & Ventilating.
2. Arrow United Industries.
3. Greenheck.
4. Honeywell.
5. Johnson Controls.
6. Louvers & Dampers, Inc.
7. Ruskin.
8. Tamco.
9. Vent Products.

**2.3 DAMPERS, INSULATED OUTDOOR AIR / RELIEF AIR / EXHAUST AIR -  
AUTOMATED**

- A. Performance: AMCA certified for Air Performance and Air Leakage.
- B. Frames: Extruded aluminum, .080-inch thickness minimum, 4 inches deep minimum, thermally broken, and insulated with polystyrene or polyurethane foam insulation.
- C. Blades: Extruded aluminum, internally insulated, and thermally broken. Maximum blade size 8 inches wide, 60 inches long.
- D. Shafts: Minimum 7/16 inch hexagonal or square corrosion resistant zinc plated steel.
- E. Blade Seals: Extruded EPDM, silicone, or synthetic elastomeric, mechanically attached.
- F. Jamb Seals: Silicone, or synthetic elastomeric, mechanically attached.
- G. Bearings: Dual bearing assembly of durable synthetic polymer resulting in no metal-to-metal contact. Provide thrust washers at bearings for all dampers which are to be mounted with blades in the vertical position.
- H. Linkage: Linkage shall be installed in the frame side and shall be constructed of aluminum and/or corrosion resistant zinc plated steel.
- I. Leakage: Less than 3 CFM per square foot at 1 inch W.G. pressure differential at minus 40 deg F.
- J. Static Pressure Rating: As scheduled on the drawings, or if not scheduled, minimum 4 inches W.G.
- K. Maximum Velocity: As scheduled on the drawings, or design for maximum velocity to be encountered in location where installed.
- L. Temperature Limits: Minus 40 to 155 deg F.
- M. Manufacturers:
  1. Greenheck ICD-45.

**2.4 DAMPER OPERATORS - ELECTRIC**

- A. Electric damper motor shall be 24 or 120 volt two-position or modulating as required with spring return type and sized to operate the damper with sufficient reserve power for smooth operation from full close to full open and tight shut-off. Damper motor shall have "O ring" gaskets for weatherproof operation.
- B. Number: Sufficient to achieve unrestricted movement throughout damper range. Provide sufficient number of operators such that one operator does not operate more than the maximum square footage of damper area as recommended in standard catalog of manufacturer.
- C. Manufacturers:
  - 1. Belimo.
  - 2. Delta Control Products.
  - 3. Honeywell.
  - 4. Schneider Electric Controls.
  - 5. Johnson Controls.
  - 6. Siemens.

**2.5 ELECTRICAL REQUIREMENTS FOR CONTROLS WORK**

- A. Electrical accessories such as relays, switches, contactors and control transformers shall meet the requirements of the Division 26 Specifications of respective project.
- B. Electrical wiring and conduit shall meet the requirements of the Division 26 Specifications.
- C. All control wiring in mechanical rooms and any other exposed areas shall be run in conduit. Low voltage temperature control wiring in concealed accessible locations (i.e. above lay-in ceilings), as well as low voltage temperature control wiring within partitions, may be run using plenum rated cable, neatly tie-wrapped and fastened to the building structure (not to ceiling or ceiling support wires).
- D. Conduits carrying control wiring shall be sized for a maximum fill of 40% of capacity.
- E. Where raceway is required, two separate raceway systems shall be provided; one for A.C. wiring and the other for D.C. wiring.
- F. Data transmission cabling and equipment grounding procedures shall meet the latest FCC guidelines for electromagnetic field generation.
- G. All control wiring sizes and types shall meet or exceed the equipment manufacturer's recommendations.
- H. TC Contractor shall provide 24V power supply transformers for TC Contractor provided controllers. Maximum Transformer circuit for controls shall be 100VA serving controllers within mechanical room control panels or for remote terminal unit controllers served from

common 24V power supply circuit. Transformers shall be located within enclosures provided by TC Contractor.

## **2.6 LIMIT SWITCHES**

- A. Oil tight type with operator as required providing required function. Limit switches used on dampers should be set at approximately 75% of full stroke.
- B. Manufacturers:
  - 1. Allen-Bradley.
  - 2. General Electric.
  - 3. Square D.
  - 4. Westinghouse.
  - 5. Micro-switch.

## **2.7 THERMOSTATS – ELECTRONIC & ELECTRIC**

- A. Electronic Floating Control Room Thermostats: Microprocessor based tri-state (floating)proportional thermostat providing individual room control with setpoint adjustment, locking cover and range stops, output status LED's, night setback/setup feature with local override switch. Manufacturer: Honeywell, Model T6984 or similar.
- B. Electronic Modulating Control Room Thermostats: Microprocessor based modulating 2-10V DC thermostat providing individual room control with setpoint adjustment, locking cover and range stops, output status LED's, night setback/setup feature with local override switch. Capable of single and dual modulating outputs to meet required control application. Manufacturer: Honeywell, Model T7984 or similar.
- C. Line Voltage Room Thermostats: Adjustable single setpoint with exposed setpoint indicator and exposed thermometer for a range of 55 deg F to 85 deg F with maximum dead band of 1-1/2 degrees F, and locking cover. Contacts shall be rated for load, single-pole or two-pole as required. Provide with integral manual On/Off/Auto selector switch where indicated on control details. Power Requirement: 24 V, ac or 120 V, ac as required.
- D. Room Thermostat Accessories:
  - 1. Thermostat Covers: Manufacturers standard with finish as selected by Architect.
  - 2. Insulating Bases: Provide one inch insulating base for thermostats located on exterior walls.
  - 3. Adjusting Key: As required for device.
- E. Electric Low Limit Duct Thermostat (freezestat): Snap acting which trips if temperature sensed across any 12 inches of bulb length is equal to or below setpoint, fixed 5 deg F differential, range 30 deg F to 60 deg F, requiring minimum 20 feet length of bulb. Manual-reset unless indicated on drawings to be auto-reset type. Provide one thermostat for every 20 sq ft of coil surface. Switch shall be UL listed and rated for 10

amps at 120 VAC. Provide additional switch or contacts for connection to monitoring system.

- F. Electric High Limit Duct Thermostat: Snap acting, manual reset switch.
- G. Electric; water-immersion type thermostat, for installation in hot-water circulation piping adjustable for control of water circulation pump. Operation of pump to be On or Off upon setpoint as required per control details. Contacts shall be rated for load. Provide transformer for 24 V, ac or 120 V, ac duty as required.
- H. Electric; strap-on piping type thermostat for control of fans with hot water heating coils. Operation of fan to be Off when temperature is below setpoint as required per control details. Contacts shall be rated for load. Provide transformer for 24 V, ac or 120 V, ac duty as required
- I. Manufacturers for listed Thermostat Types:
  - 1. Honeywell International, Inc.
  - 2. Johnson Controls, Inc.
  - 3. Schneider Electric USA, Inc.
  - 4. Siemens Industry, Inc.; Building Technologies Division.
  - 5. White-Rodgers Div.; Emerson Electric Co.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION - CONTROL SYSTEMS**

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats and other exposed control sensors with plans and room details before installation. Locate room temperature sensors and thermostats 48 inches above floor unless noted otherwise.
- C. The location of all control-related items to be mounted on the exterior of the building must be approved by the Architect prior to installation. Indicate proposed locations on the shop drawings.
- D. Caulk both sides of damper frames to duct walls to prevent leakage between damper frame and duct.
- E. Provide conduit and electrical wiring where required.
- F. All wiring in altered and unaltered areas shall be run concealed. "Wiremold" in finished areas shall be allowed when wiring cannot be run concealed in walls or partitions. Minimize "wiremold" routing.
- G. All equipment which has moving parts and is remotely started by the control system shall be provided with warning labels no less than 2 inches in height, and in bright warning

color, stating that the equipment is remotely started by automatic controls. Such labels shall be posted clearly in the area of any moving parts, such as belts, fans, pumps, etc.

- H. Coil and conceal excess capillary on remote element instruments.
- I. Install all gauges and thermometers in locations where they are easily read from normal floor level. Provide tubing or wiring as required.
- J. Locate all control components and accessories such that they are easily accessible for adjustment, service and replacement.
- K. Locate, size and support sensing elements in airstreams so that they properly sense the representative condition. Controlling, transmitting and indicating elements shall be located to sense the average condition. Safety elements shall be located to sense the extreme condition.
- L. Locate and size sensing elements in liquid lines so that they are in moving liquid and not in stagnant or turbulent locations. Wells shall not obstruct the flow of the liquid being measured. Pipes one inch and smaller shall be increased at least one pipe size at the point of insertion.
- M. Locate pressure sensing taps in liquid lines in straight runs of pipe with at least 10 pipe diameters of straight pipe both upstream and downstream of pressure tap. Provide a shut-off cock in sensing line at each pressure tap.
- N. Install pressure sensing elements in ducts and casings with clean, sharp taps to accurately read true static pressure, avoiding velocity influence and turbulence.
- O. Locate, support and install all control components and accessories so that they will not be subject to vibration, excessive temperatures, dirt, moisture or other harmful conditions beyond their rated limitations.
- P. Where insulation is penetrated due to the installation of sensing elements or tubing, reseal the openings air and vapor tight. Provide brackets for devices to be located on insulated surfaces so as to clear the finished surface of the insulation and to avoid puncturing the vapor seal.
- Q. Provide all necessary relays, switches, linkages, control devices, accessories and connections as required for a complete and operational control system as specified herein and shown.
- R. All electric valve and damper operators shall be capable of moving from full closed to full open, or vice versa, within 120 seconds.

### **3.2 TC CONTRACTOR DESIGN & INSTALLATION COORDINATION MEETINGS**

- A. Temperature Controls Shop Drawing Pre-submittal Meeting: TC Contractor's option to schedule a meeting at the Engineer's Office to review project design documentation for clarification purposes to aide in the TC Contractor development of TC/BAS shop drawings. For simple clarification items, TC Contractor may contact Engineer via

telephone to discuss. For project scope questioning items, TC Contractor shall utilize the formal Request of Information (RFI) process.

- B. Temperature Controls Shop Drawing Submittal Meeting: Project Design Engineer's option to schedule a meeting at the Engineer's Office to review the TC Contractor's formally submitted drawings to address Engineer's comments and concerns that indicate TC Contractor's shop drawings vary from project design intent. This meeting can be avoided if TC Contractor's shop drawing submittal is complete and Engineer is confident that documents are going to lead to an installation that meets project design intent.
- C. Temperature Controls Installation Technician Meeting: Project Design Engineer's option to schedule a meeting at the project site to meet and discuss project expectations with the TC Contractor's field installation technician and/or project manager. Discussion may include
  - 1. Shop drawing review comments to ensure installation technician has the most up-to-date TC submittal.
  - 2. Owner training agenda and scheduling.
  - 3. TC/BAS system acceptance procedures.

### **3.3 IDENTIFICATION AND MARKING**

- A. All sensors, relays, switches, etc. shall be marked with the same identification number as used on the as-built shop drawings. Use Brother P-touch label maker or similar with black text on clear or white super adhesive tape. If label applied in wet environment, spray label with clear enamel for waterproofing.
- B. Wire shall be color coded according to functional use. Identify color coding format on record drawings.
- C. Identify each wire as to ID number at each controller termination, field device termination or on the field device.
- D. All control panels and auxiliary enclosures shall be supplied with engraved phenolic nameplate permanently attached on the front exterior with panel identification to match details of temperature control submittals and include system(s) served and area(s) served on the labeling. Include labeling near 120VAC terminations within panel identifying power source panel ID and specific circuit breaker used.
- E. Temperature control conduit and junction box covers shall be painted white to signify that it is used for temperature controls. All junction box covers shall be painted white and the conduit shall be painted with an white mark (approximately 6 inches long) every 36" to 48", and on both sides of all penetrations.

### **3.4 CALIBRATION AND START-UP**

- A. After installation and connection of control components, test, adjust and re-adjust as required all control components in terms of function, design, systems balance and performance. Make systems ready for environmental equipment acceptance tests.



- B. After environmental equipment has been accepted and after the systems have operated in normal service for two weeks, check the adjustment on control components and recalibrate where required. Components not in calibration shall be recalibrated to function as required, or shall be replaced. Control devices, linkages, and other control components shall be calibrated and adjusted for stable and accurate operation in accordance with the design intent and to obtain optimum performance from the equipment controlled. Cause every device to automatically operate as intended to ensure its proper functionality.

### **3.5 ACCEPTANCE PROCEDURE**

- A. Upon successful completion of start-up and recalibration as indicated in this section, the Architect shall be requested in writing to inspect the satisfactory operation of the control systems.
- B. Demonstrate operation of all control systems, including each individual component, to the Owner and Architect.
- C. After correcting all items appearing on the punch list, make a second written request to the Owner and Architect for inspection and approval.
- D. After all items on the punch list are corrected and formal approval of the control systems is provided by the Architect, the Contractor shall indicate to the Owner in writing the commencement of the warranty period.

### **3.6 EMS/DDC POINTS LISTS**

- A. Following this section are the lists of required input/output points for the building automation system (BAS) / direct digital control (DDC) system for this project. Associated application software required for each point and/or system is listed on these sheets.
- B. Where any discrepancy occurs between the points lists and drawings, the drawings shall take precedence.

**END OF SECTION 23 09 33**

**SECTION 23 11 23 - FUEL GAS PIPING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."

**1.2 SUMMARY**

- A. This Section includes facility fuel gas piping.

**1.3 DEFINITIONS**

- A. Gas Main: Utility's natural gas piping.
- B. Gas Distribution: Piping from gas main to individual service-meter assemblies.
- C. Service-Meter Assembly: Piping, valves, service regulator, service meter, and specialties.
- D. Point of Delivery: Piping outlet from service-meter assembly.
- E. Fuel Gas Piping: Piping that conveys fuel gas from point of delivery to fuel gas utilization devices.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Minimum Operating-Pressure Ratings:
  - 1. Piping and Valves: Performance requirements are scheduled on the Drawings.

**1.5 SYSTEMS DESCRIPTIONS**

- A. Fuel gas piping system materials are scheduled on the Drawings.

**1.6 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Specialty valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
  - 2. Pressure regulators. Include pressure rating, capacity, and settings of selected models.

**1.7 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.

**1.8 QUALITY ASSURANCE**

- A. NFPA Standard: Comply with NFPA 54, "National Fuel Gas Code."

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Handling Flammable Liquids: Remove and legally dispose of liquids from drips in existing gas piping. Handle cautiously to avoid spillage and ignition. Notify fuel gas supplier.

Handle flammable liquids used by Installer with proper precautions and do not leave on premises from end of one day to beginning of next day.

- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

#### **1.10 PROJECT CONDITIONS**

- A. Design values of fuel gas supplied for these systems are as follows:
  - 1. Nominal Heating Value: 1000 Btu/cu. ft.
  - 2. Nominal Specific Gravity: 0.6.

#### **1.11 COORDINATION**

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Owner written permission.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

#### **2.2 BLACK STEEL PIPE AND FITTINGS**

- A. Black Steel Pipe: ASTM A 53/A 53M or ASTM A 106; Type E or S; Grade B; Schedule 40. Wall thickness of wrought-steel pipe shall comply with ASME B36.10M.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern, with threaded ends according to ASME B1.20.1.
  - 2. Steel Threaded Fittings: ASME B16.11, forged steel with threaded ends according to ASME B1.20.1.

3. Steel Welding Fittings: ASME B16.9, wrought steel or ASME B16.11, forged steel.
4. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends according to ASME B1.20.1.
5. Cast-Iron Flanges and Flanged Fittings: ASME B16.1, Class 125.
6. Joint Compound and Tape: Suitable for natural gas.
7. Steel Flanges and Flanged Fittings: ASME B16.5.
8. Gasket Material: Thickness, material, and type suitable for natural gas.

## **2.3 PIPING SPECIALTIES**

- A. Flexible Connectors: ANSI Z21.24, copper alloy.
- B. Quick-Disconnect Devices: ANSI Z21.41, convenience outlets and matching plug connector.
- C. Y-Pattern Strainers:
  1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
  2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
  3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
  4. CWP Rating: 125 psig.

## **2.4 JOINING MATERIALS**

- A. Refer to Division 20 Section "Basic Mechanical Materials and Methods."

## **2.5 SPECIALTY VALVES**

- A. Valves, NPS 3 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
- B. Natural Gas Valves, NPS 3 and Smaller: Use the following:
  1. Ball Valves: Bronze or brass body with AGA or CSA stamp, UL listed or FM approved for service, with chrome-plated brass ball and lever handle; 125-psig minimum pressure rating.
    - a. Manufacturers:
      - 1) Apollo Valve; Conbraco Industries, Inc.
      - 2) Jomar International Ltd.
      - 3) Legend Valve and Fitting, Inc.
      - 4) Milwaukee Valve Company.
      - 5) NIBCO INC.
      - 6) Watts Water Technologies, Inc.; Watts Regulator Co.

**PART 3 - EXECUTION**

**3.1 EXCAVATION**

- A. Refer to Division 31 Section "Earthwork" for excavating, trenching, and backfilling.

**3.2 EXAMINATION**

- A. Examine roughing-in for fuel gas piping system to verify actual locations of piping connections before equipment installation.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.3 PREPARATION**

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 and the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 and the International Fuel Gas Code requirements for prevention of accidental ignition.

**3.4 PIPING SYSTEM INSTALLATION**

- A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Basic piping installation requirements are specified in Division 20 Section "Basic Mechanical Materials and Methods."
- D. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels, unless indicated to be exposed to view.
- E. Concealed Locations:
  - 1. Above Inaccessible Ceiling Locations: Gas piping with welded joints may be installed in inaccessible spaces, subject to approval of authorities having jurisdiction, whether or not such spaces are used as plenums. Do not locate valves or unions above inaccessible ceilings.
  - 2. Above Accessible Ceiling Locations: Gas piping with welded joints may be installed in accessible ceiling spaces, subject to approval of authorities having jurisdiction,

whether or not such spaces are used as plenums. Do not locate valves or unions above ceilings used as plenums.

- F. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of service meters. Locate where readily accessible for cleaning and emptying. Do not install where condensate would be subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use minimum-length nipple of 3 pipe diameters, but not less than 3 inches long, and same size as connected pipe. Install with space between bottom of drip and floor for removal of plug or cap.
- G. Install fuel gas piping at uniform grade of 0.1 percent slope upward toward risers.
- H. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- I. Connect branch piping from top or side of horizontal piping.
- J. Install pressure gage upstream and downstream from each line pressure regulator. Pressure gages are specified in Division 20 Section "Meters and Gages."
- K. Locate valves for easy access.
- L. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- M. Install flanges when connecting to valves, specialties, and equipment having NPS 2-1/2 and larger connections.
- N. Install gas valve or plug valve and strainer upstream from each line pressure regulator or appliance pressure regulator.
- O. Install vent piping for gas pressure regulators and gas trains, extend outside building, and vent to atmosphere. Terminate vents with turned-down, reducing-elbow fittings with corrosion-resistant insect screens in large end.
- P. Install containment conduits for gas piping below slabs, within building, in gastight conduits extending minimum of 4 inches outside building, and vented to atmosphere. Terminate vents with turned-down, reducing-elbow fittings with corrosion-resistant insect screens in large end. Prepare and paint outside of conduits with coal-tar, epoxy-polyamide paint according to SSPC-Paint 16.

### **3.5 JOINT CONSTRUCTION**

- A. Basic piping joint construction is specified in Division 20 Section "Basic Mechanical Materials and Methods."
- B. Use materials suitable for fuel gas.

### **3.6 HANGER AND SUPPORT INSTALLATION**

- A. Pipe hanger and support and equipment support materials and installation requirements are specified in Division 20 Section "Hangers and Supports."
- B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
  - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
  - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
  - 5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.
- C. Support vertical steel pipe at each floor and at spacing not greater than 15 feet.

### **3.7 CONNECTIONS**

- A. Drawings indicate general arrangement of fuel gas piping, fittings, and specialties.
- B. Install piping adjacent to appliances to allow service and maintenance.
- C. Connect piping to appliances using gas with shutoff valves and unions. Install valve upstream from and within 72 inches of each appliance. Install union downstream from valve.
- D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance using gas.

### **3.8 LABELING AND IDENTIFYING**

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each service meter, pressure regulator, and specialty valve.
  - 1. Text: In addition to name of identified unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
  - 2. Nameplates, pipe identification, and signs are specified in Division 20 Section "Mechanical Identification."
  - 3. Trace Wire: Yellow insulated, minimum 18 AWG wire, having copper or other approved conductor, with insulation suitable for direct burial, installed adjacent to underground nonmetallic piping, with aboveground access to tracer wire at each end of pipe.

### **3.9 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.



- B. Tests and Inspections:
  - 1. Test, inspect, and purge natural gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.
- C. Additional Testing: Subject welded fuel gas piping installed within ceiling spaces used as plenums to test pressure of 150 psig for a minimum of 2 hours.
- D. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

**END OF SECTION 23 11 23**

**SECTION 23 23 00 - REFRIGERANT PIPING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 07 Section "Penetration Firestopping" for materials and methods for sealing pipe penetrations through fire and smoke barriers.
  - 2. Division 07 Section "Joint Sealants" for materials and methods for sealing pipe penetrations through exterior walls.
  - 3. Division 20 Section "Mechanical General Requirements.
  - 4. Division 20 Section "Basic Mechanical Materials and Methods."
  - 5. Division 20 Section "Hangers and Supports" for pipe supports and installation requirements.
  - 6. Division 20 Section "Mechanical Identification" for labeling and identifying refrigerant piping.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Line Test Pressure for Refrigerants: 535 psig.

**1.3 SYSTEMS DESCRIPTIONS**

- A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.
- B. Suction Lines NPS 4 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

**1.4 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.
- B. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

**1.5 QUALITY ASSURANCE**

- A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."
- C. UL Standard: Provide products complying with UL 207, "Refrigerant-Containing Components and Accessories, Nonelectrical"; or UL 429, "Electrically Operated Valves."

**1.6 PRODUCT STORAGE AND HANDLING**

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

**1.7 COORDINATION**

- A. Coordinate layout and installation of refrigerant piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.
- B. Coordinate pipe sleeve installations for foundation wall penetrations.
- C. Coordinate pipe sleeve installations for penetrations in exterior walls and floor assemblies. Coordinate with requirements for firestopping specified in Division 07 Section "Through-Penetration Firestop Systems" for materials and methods for sealing pipe penetrations through fire and smoke barriers.
- D. Coordinate pipe fitting pressure classes with products specified in related Sections.

## **PART 2 - PRODUCTS**

### **2.1 COPPER TUBE AND FITTINGS**

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.

### **2.2 REFRIGERANTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Arkema Inc.
  - 2. DuPont; Fluorochemicals Div.
  - 3. Honeywell International Inc.; Genetron Refrigerants.
  - 4. Mexichem Fluor Inc.

## **PART 3 - EXECUTION**

### **3.1 PIPING SYSTEM INSTALLATION**

- A. Install refrigerant piping according to ASHRAE 15.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping adjacent to machines to allow service and maintenance.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Select system components with pressure rating equal to or greater than system operating pressure.
- I. Refer to Division 23 Section "Temperature Controls" and Sequence of Operation on the Drawings for solenoid valve controllers, control wiring, and sequence of operation.

- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
  - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
  - 2. Install horizontal suction lines with a uniform slope downward to compressor.
  - 3. Install traps and double risers to entrain oil in vertical runs.
  - 4. Liquid lines may be installed level.
- O. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.
- R. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.
- S. Identify refrigerant piping and valves according to Division 20 Section "Mechanical Identification."

### **3.2 PIPE JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube." Brazing filler metals are specified in Division 20 Section "Basic Mechanical Materials and Methods."

- E. Purge pipe and fittings with nitrogen, during brazing to prevent scale formation.

### **3.3 HANGERS AND SUPPORTS**

- A. Hanger, support, and anchor products are specified in Division 20 Section "Hangers and Supports."
- B. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
  - 1. NPS 3/4, and soft copper tubing: Continuous support v-shaped plastic pipe channel, maximum hanger spacing 8 feet.
  - 2. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
  - 3. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
  - 4. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
- C. Support multifloor vertical runs at least at each floor.

### **3.4 FIELD QUALITY CONTROL**

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
  - 1. Comply with ASME B31.5, Chapter VI.
  - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
  - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
    - a. Fill system with nitrogen to the required test pressure.
    - b. System shall maintain test pressure at the manifold gage throughout duration of test.
    - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

### **3.5 SYSTEM CHARGING**

- A. Charge system using the following procedures:
  - 1. Install core in filter dryers after leak test but before evacuation.
  - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
  - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
  - 4. Charge system with a new filter-dryer core in charging line.

**3.6 ADJUSTING**

- A. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- B. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- C. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
  - 1. Open shutoff valves in condenser water circuit.
  - 2. Verify that compressor oil level is correct.
  - 3. Open compressor suction and discharge valves.
  - 4. Open refrigerant valves except bypass valves that are used for other purposes.
  - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- D. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

**END OF SECTION 23 23 00**

## SECTION 23 31 13 - METAL DUCTS

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  1. Division 20 Section "Mechanical General Requirements."
  2. Division 23 Section "Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

#### 1.2 SUMMARY

- A. This Section includes metal ducts for supply, return, outside, relief air, and exhaust air-distribution systems.



**1.3 DEFINITIONS**

- A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
- B. Low Pressure: Up to and including 2 inch WG and velocities less than 1,500 fpm.
- C. Medium Pressure: Greater than 2 inch WG to 6 inch WG and velocities greater than 1,500 fpm and less than 2,500 fpm.
- D. High Pressure: Greater than 6 inch WG to 12 inch WG and velocities greater than 2,500 fpm.

**1.4 SYSTEM DESCRIPTION**

- A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

**1.5 PERFORMANCE REQUIREMENTS**

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Application Schedule" Article.

**1.6 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.

**1.7 QUALITY ASSURANCE**

- A. NFPA Compliance:
  - 1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
  - 2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Ch. 3, "Duct System," for range hood ducts, unless otherwise indicated.
- C. Duct Liner Maximum Temperature Limits: Based on ASTM C 411 test procedures.
  - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.8 COORDINATION**

- A. Sheet metal trades shall cooperate fully with the Laboratory Airflow Controls Trades and shall attend all field installation training sessions.
- B. Sheet metal trades shall cooperate fully with the Test and Balance Contractor and provide all miscellaneous caps and any other materials required for structural integrity and leakage testing of the complete duct system in whole or in part. Refer to Division 23 Section "Testing, Adjusting and Balancing."
  - 1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
- C. Sheet metal trades shall participate in the above ceiling coordination program. Refer to Division 01 requirements.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

**2.2 SHEET METAL MATERIALS**

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation.
- C. Galvannealed Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation, and annealed after the galvanizing process.
- D. Reinforcement Shapes and Plates:
  - 1. Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
  - 2. Compatible materials for aluminum and stainless-steel ducts.
- E. Tie Rods:
  - 1. Galvanized Steel Duct: Galvanized steel, 3/8-inch minimum diameter.
  - 2. Ducts in Humid or Corrosive Atmospheres: Stainless steel, 1/4-inch diameter for lengths 36 inches or less; 3/8-inch diameter for lengths longer than 36 inches.

## 2.3 DUCT LINER

### A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.

#### 1. Manufacturers:

- a. CertainTeed Corp.; Insulation Group.
- b. Johns Manville International, Inc.
- c. Knauf Fiber Glass GmbH.

#### 2. Materials: ASTM C 1071, Type I, flexible; surfaces exposed to airstream shall be coated to prevent erosion of glass fibers.

- a. Thickness: 1 inch.
- b. Density: 1-1/2 pounds per cubic foot.
- c. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
- d. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
- e. Maximum Operating Temperature: 250 deg F when tested according to ASTM C 411.
- f. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
- g. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.
  - 1) Tensile Strength: Indefinitely sustain a 50-lb- tensile, dead-load test perpendicular to duct wall.
  - 2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch into airstream.
  - 3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

#### 3. Noise reduction coefficient (NRC): Sound absorption coefficients shall not be less than those in the table below as tested by ASTM C423 using an ASTM E795 Type A mounting.

| Sound absorption coefficients at<br>octave band center frequencies, Hz |     |     |     |      |      |      |     |
|------------------------------------------------------------------------|-----|-----|-----|------|------|------|-----|
| Thickness<br>Inches                                                    | 125 | 250 | 500 | 1000 | 2000 | 4000 | NRC |
| 1                                                                      | .08 | .31 | .59 | .84  | .91  | .90  | .70 |

## 2.4 SEALANTS AND GASKETS

### A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

- B. Elastomeric Sealant Tape: 3 inches wide; modified butyl adhesive backed.
  - 1. Manufacturers:
    - a. Hardcast; Foil-Grip 1402 and Foil-Grip 1402-181BFX.
- C. Water-Based Joint and Seam Sealant:
  - 1. Manufacturers:
    - a. Design Polymerics; DP1010 Water Based Duct Sealant.
    - b. Hardcast; Flex-Grip 550 and Versa-Grip 181.
    - c. Polymer Adhesives; No. 11.
    - d. United McGill.
  - 2. Application Method: Brush on.
  - 3. Solids Content: Minimum 63 percent.
  - 4. Shore A Hardness: Minimum 20.
  - 5. Water resistant.
  - 6. Mold and mildew resistant.
  - 7. VOC: Maximum 75 g/L (less water).
  - 8. Maximum Static-Pressure Class: 0-inch wg, positive and negative.
  - 9. Service: Indoor or outdoor.
  - 10. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
  - 1. General: Single-component, acid-curing, silicone, elastomeric.
  - 2. Type: S.
  - 3. Grade: NS.
  - 4. Class: 25.
  - 5. Use: O.
- E. Gaskets: Chloroprene elastomer, 40 durometer, 1/8 inch thick, full face, one piece vulcanized or dovetailed at joints.
- F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

## **2.5 HANGERS AND SUPPORTS**

- A. Building Attachments: Concrete inserts, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
  - 1. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

2. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
  3. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
  4. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials. Attachments for stainless steel and PVC-coated duct shall be stainless steel.
- D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
- E. Load Rated Cable Suspension System for Noncorrosive Environments: Tested to five times the Safe Working Loads and verified by the SMACNA Testing and Research Institute.
1. Cable: Aircraft quality 7 x 7 and 7 x 19 wire rope.
    - a. Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
    - b. Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
  2. Fastener: One-piece, die-cast zinc housing with Type 302 S26 stainless steel hardened and tempered springs, and oil impregnated, sintered, hardened and tempered steel locking wedges.
  3. End Fixings: Loop, stud or toggle; or plain end suitable for wire rope beam clamp.
  4. Manufacturers:
    - a. B-Line by Eaton; KwikWire.
    - b. Ductmate Industries, Inc.; Clutcher and EZ-Lock.
    - c. Duro Dyne Corp.; Dyna-Tite System.
    - d. Gripple Inc.; Hang-Fast System.

## **2.6 RECTANGULAR DUCT FABRICATION**

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" unless otherwise indicated. For metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals, comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible", unless otherwise indicated.
1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
  2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

3. Internal Tie Rods: As allowed by SMACNA's "HVAC Duct Construction Standards-Metal and Flexible."
- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's and SMACNA guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.
  1. Manufacturers:
    - a. Ductmate Industries, Inc.
    - b. Nexus Inc.
- C. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.

## **2.7 APPLICATION OF LINER IN RECTANGULAR DUCTS**

- A. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
- B. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
- C. Butt transverse joints without gaps and coat joint with adhesive.
- D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
- E. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.
- F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm or greater.
- G. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
- H. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
  1. Fan discharges.
  2. Intervals of lined duct preceding unlined duct.
  3. Upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm or where indicated.

**2.8 ROUND AND FLAT-OVAL DUCT AND FITTING FABRICATION**

- A. Diameter as applied to flat-oval ducts in this Article is the diameter of a round duct with a circumference equal to the perimeter of a given size of flat-oval duct.
- B. Round, Spiral Lock-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" or SMACNA "Industrial Duct Construction Standards" as required based on pressure class.
  - 1. Round fittings shall be factory fabricated welded design. Use of field fabricated fittings (welded design) shall only be permitted when factory fabricated fittings are unavailable.
- C. Round, Longitudinal-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards-Metal and Flexible."
- D. Duct Joints:
  - 1. Ducts up to 20 Inches in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.
  - 2. Ducts 21 to 72 Inches in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.
  - 3. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.
  - 4. Flat-Oval Ducts: Prefabricated connection system consisting of two flanges and one synthetic rubber gasket.
- E. Low Pressure Ductwork (plus or minus 2 inches W.G. Static Pressure Class)
  - 1. Fabricate according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" unless otherwise indicated.
- F. Medium and High Pressure Ductwork (For Static Pressure Class Greater than plus or minus 2 inches W.G.)
  - 1. Geometry of fittings shall be according to SMACNA's HVAC Duct Construction Standards--Metal and Flexible unless otherwise indicated.
  - 2. Fittings shall be continuously welded, and shall be two gauges heavier than duct gauges indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
  - 3. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- G. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.
- H. Diverging-Branch Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.

- I. Fabricate elbows using die-formed, gored, pleated, or mitered construction. Unless elbow construction type is indicated, fabricate elbows as follows:
  1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
  2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg:
    - a. Ducts 3 to 36 Inches in Diameter: 0.034 inch.
    - b. Ducts 37 to 50 Inches in Diameter: 0.040 inch.
    - c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
    - d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
  3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg:
    - a. Ducts 3 to 26 Inches in Diameter: 0.034 inch.
    - b. Ducts 27 to 50 Inches in Diameter: 0.040 inch.
    - c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
    - d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
  4. Flat-Oval Mitered Elbows: Welded construction with same metal thickness as longitudinal-seam flat-oval duct.
  5. 90-Degree, 2-Piece, Mitered Elbows: Use only for supply systems or for material-handling Class A or B exhaust systems and only where space restrictions do not permit using radius elbows. Fabricate with single-thickness turning vanes.
  6. Round Elbows 8 Inches and Less in Diameter: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
  7. Round Elbows 9 through 14 Inches in Diameter: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees unless space restrictions require mitered elbows. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
  8. Round Elbows Larger Than 14 Inches in Diameter and All Flat-Oval Elbows: Fabricate gored elbows unless space restrictions require mitered elbows.
  9. Die-Formed Elbows for Sizes through 8 Inches in Diameter and All Pressures 0.040 inch thick with 2-piece welded construction.
  10. Round Gored-Elbow Metal Thickness: Same as non-elbow fittings specified above.
  11. Flat-Oval Elbow Metal Thickness: Same as longitudinal-seam flat-oval duct specified above.
  12. Pleated Elbows for Sizes through 14 Inches in Diameter and Pressures through 10-Inch wg: 0.022 inch.

### **PART 3 - EXECUTION**



**3.1 DUCTWORK APPLICATION SCHEDULE**

- A. Ductwork materials and performance requirements are scheduled on the Drawing.

**3.2 DUCT INSTALLATION**

- A. Install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
- B. Install round ducts in lengths not less than 12 feet unless interrupted by fittings.
- C. Install ducts with fewest possible joints.
- D. Install fabricated fittings for changes in directions, size, and shape and for connections.
- E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches, with a minimum of 3 screws in each coupling.
- F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.
- J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.
- L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.
- N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, and sleeves. Fire and smoke dampers are specified in Division 23 Section "Duct Accessories."
  - 1. Where ducts not having fire dampers, smoke dampers, or combination fire and smoke dampers pass through fire-rated partitions, maintain indicated fire rating.

Seal penetrations with firestop materials. Refer to Division 07 Specification Sections for materials and UL classified firestop systems.

- O. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

### **3.3 INSTALLATION OF EXPOSED DUCTWORK**

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.
  - 1.

### **3.4 DUCT SEALING**

- A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated. Ducts must be properly cleaned and sealed in strict accordance with sealant manufacturer's instructions.
  - 1. Seal Class: Refer to Application Schedule on the Drawings.
  - 2. Seal ducts before external insulation is applied.
  - 3. After pressure testing, remake leaking joints until leakage is equal to or less than maximum allowable. Refer to Application Schedule on the Drawings for allowable leakage rates.

### **3.5 HANGER AND SUPPORT INSTALLATION**

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

- C. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- D. Support ductwork from building structure, not from roof deck, floor slab, pipe, other ducts, or equipment.
- E. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.
- F. Install roof mounted duct supports in accordance with manufacturer's instructions. Provide additional membrane layer or walkpads under support bases as required.
- G. Use load rated cable suspension system for round duct in exposed locations.

### **3.6 CONNECTIONS**

- A. Make connections to equipment with flexible connectors according to Division 23 Section "Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### **3.7 FIELD QUALITY CONTROL**

- A. Duct System Cleanliness Tests:
  - 1. Visually inspect duct system to ensure that no visible contaminants are present.
- B. Duct system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

### **3.8 START UP**

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing."

**END OF SECTION 23 31 13**

**SECTION 23 33 00 - DUCT ACCESSORIES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 23 Section "Testing, Adjusting, and Balancing" for duct test holes.
  - 3. Division 23 Section "Temperature Controls" for motorized control dampers.

**1.2 DEFINITIONS**

- A. NVLAP: National Voluntary Laboratory Accreditation Program.
- B. Low Pressure: Up to 2 inch WG and velocities less than 1,500 fpm. Construct for 2 inch WG positive or negative static pressure.
- C. Medium Pressure: Greater than 2 inch WG to 6 inch WG and velocities greater than 1,500 fpm and less than 2,500 fpm. Construct for 6 inch WG positive or negative static pressure.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
  - 1. For turning vanes, include data for pressure loss generated sound power levels.

**1.4 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

**1.5 QUALITY ASSURANCE**

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

**2.2 SHEET METAL MATERIALS**

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation.

**2.3 LOW PRESSURE MANUAL VOLUME DAMPERS**

- A. Manufacturers:
  - 1. American Warming and Ventilating; Mestek, Inc.
  - 2. Arrow United Industries; Mestek, Inc.
  - 3. Greenheck Fan Corporation.
  - 4. Krueger-HVAC; Air Distribution Technologies, Inc.; a JCI Company.
  - 5. Louvers and Dampers, Inc.; Mestek, Inc.
  - 6. Nailor Industries Inc.
  - 7. Pottorff.

8. Ruskin Company.
  9. Vent Products Co., Inc.
  10. Young Regulator Co.
- B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
1. Except for dampers in round ductwork sized 12 inches and smaller, provide end bearings.
- C. Rectangular Volume Dampers: Multiple-opposed-blade design, AMCA certified for maximum leakage of 2 percent of total fan volume at shutoff, and suitable for horizontal or vertical applications.
- D. Round Volume Dampers 16-inch Diameter and Smaller: Single-blade design, AMCA certified for maximum leakage of 2 percent of total fan volume at shutoff, and suitable for horizontal or vertical applications.
- E. Round Volume Dampers Larger than 16-inch Diameter: Multiple-opposed-blade design AMCA certified for maximum leakage of 2 percent of total fan volume at shutoff, and suitable for horizontal or vertical applications.
- F. Damper Materials:
1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
  2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized sheet steel.
  3. Blade Axles: Galvanized steel.
  4. Bearings: Oil-impregnated bronze, molded synthetic, or stainless-steel sleeve type.
  5. Tie Bars and Brackets: Galvanized steel.
- G. Jackshaft: 1-inch- diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
1. Length and Number of Mountings: Appropriate to connect linkage of each damper in multiple-damper assembly.
- H. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.
- 2.4 MOTORIZED CONTROL DAMPERS
- A. Refer to Division 23 Section "Temperature Controls."

**2.5 TURNING VANES**

**A. Manufactured Turning Vanes:**

1. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.
2. Double-vane or airfoil-shaped, curved blades of galvanized sheet steel set into vane runners suitable for duct mounting.
3. Generated sound power level shall not exceed 54 decibels in octave band 4 at 2000 fpm in a 24-inch by 24-inch duct.
4. Manufacturers:
  - a. Aero-Dyne Sound Control; H-E-P Turning Vanes & Rail.
  - b. Ductmate Industries, Inc.
  - c. Duro Dyne Corporation.
  - d. Ward Industries, Inc.; a JCI Company.

**2.6 DUCT-MOUNTING ACCESS DOORS**

**A. General Description:** Fabricate doors airtight and suitable for duct pressure class. Doors may be field fabricated in accordance with SMACNA Standards, or commercially produced.

**B. Door:** Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

**1. Manufacturers:**

- a. Air Balance, Inc.; Mestek, Inc.
- b. Greenheck Gan Corporation.
- c. Nailor Industries Inc.
- d. Ruskin Company.

**2. Frame:** Galvanized sheet steel, with bend-over tabs and foam gaskets. Provide number of hinges and locks as follows:

- a. Less Than 12 Inches Square: Secure with two sash locks.
- b. Up to 18 Inches Square: Two hinges and two compression locks.
- c. Up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
- d. Sizes 24 by 48 Inches and Larger: One additional hinge.

**C. Door:** Double wall, duct mounting, and round; fabricated of galvanized sheet metal with insulation fill and 1-inch thickness. Include cam latches.

**1. Manufacturers:**

- a. Ductmate Industries, Inc.
- b. Flexmaster U.S.A.; a Masterduct Company.

- 2. Frame: Galvanized sheet steel, with spin-in notched frame.
- D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
- E. Insulation: 1-inch-thick, fibrous-glass or polystyrene-foam board.

## **2.7 FLEXIBLE CONNECTORS**

- A. Manufacturers:
  - 1. ADSCO Manufacturing LLC.
  - 2. Duro Dyne Corp.
  - 3. Senior Flexonics Pathway.
  - 4. Ventfabrics, Inc.
- B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.
- C. Metal-Edged Connectors: Factory fabricated with a fabric strip minimum 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Select metal compatible with ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd.
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 20 to plus 200 deg F.

## **2.8 DUCT ACCESSORY HARDWARE**

- A. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## **2.9 FINISHES**

- A. Chemical Resistant Coating: P-403 manufactured by Heresite Chemical Company.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION AND INSTALLATION**

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in



stainless-steel ducts and PVC coated ducts; and aluminum accessories in aluminum ducts.

- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  - 1. Install steel volume dampers in steel ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install duct access doors on ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. On upstream side of duct coils.
  - 2. On downstream side of air duct coils.
  - 3. Upstream from duct filters.
  - 4. At outdoor-air intakes and mixed-air plenums.
  - 5. At drain pans.
  - 6. Downstream from control dampers, backdraft dampers, and duct mounted equipment.
  - 7. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links.
  - 8. Control devices requiring inspection, including airflow measuring devices. Size access doors appropriately to facilitate service of each device.
  - 9. Elsewhere as indicated.
- F. Install access doors with swing against duct static pressure.
- G. Install duct-mounting, rectangular access doors with long dimension at right angles to direction of airflow and of largest standard size which can be accommodated in duct. Maximum size: 21 by 14 inches.
- H. Install pressure relief doors vertically and level in accordance with manufacturer's instructions, between the fan and first operable damper.
- I. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- J. Connect flexible ducts to metal ducts with plenum-rated draw bands.
- K. Install flexible duct elbow supports at each diffuser, grille, or register, and elsewhere as indicated.
- L. Install turning vanes in rectangular duct elbows in excess of 45 degrees, and where indicated:
  - 1. Use manufactured double-vane turning vanes unless otherwise specified.
  - 2. Seat outboard-most vane in heel of duct elbow.

3. Provide vanes for all runner punchings. Practice of eliminating every other vane is prohibited.
4. Use single-vane turning vanes in low pressure square elbows.

### **3.2 FIELD QUALITY CONTROL**

#### **A. Tests and Inspections:**

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

### **3.3 ADJUSTING**

- A. Adjust duct accessories for proper settings.
- B. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

**END OF SECTION 23 33 00**

## SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 23 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each product indicated, include the following:
  - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
  - 2. Diffuser, Register, and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.

### PART 2 - PRODUCTS

#### 2.1 AIR DIFFUSION DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Krueger-HVAC; Air Distribution Technologies, Inc.; a JCI Company.
  - 2. Nailor Industries, Inc.

3. Price Industries.
  4. Titus; Air Distribution Technologies, Inc.; a JCI Company.
  5. Tuttle & Bailey; Air Distribution Technologies, Inc.; a JCI Company.
- B. Terminal air diffusion devices have been chosen in terms of specific air distribution requirements, spacing, and sound characteristics.
- C. Provide plaster frames for units installed in plaster ceilings.
- D. Provide gaskets for supply terminal air devices mounted in finished surfaces.
- E. Finish:
1. Device Face and Visible Trim: Standard off white baked enamel finish unless noted otherwise.
  2. Device Interior Surfaces, Including Blank-Offs and Boots: Black matte finish.
- F. Air pattern adjustments shall be made from the face of the device.
- G. Refer to drawings and schedules for quantities, types, and finishes.
- H. Coordinate frame types with Architectural Reflected Ceiling Plan.

## **2.2 SOURCE QUALITY CONTROL**

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."
- B. Acoustical Applications and Sound Evaluation: Based on ARI Standard 885-98, "Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets."

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install diffusers, registers, and grilles level and plumb.

- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Wall-Mounted Supply Registers: Install 6 inches below finished ceiling unless otherwise indicated.
- D. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

### **3.3 ADJUSTING**

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION 23 37 13**

**SECTION 23 51 00 - BREECHING, CHIMNEYS, AND STACKS**

|                                                               |   |
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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 20 Section "Basic Mechanical Materials and Methods."

**1.2 QUALITY ASSURANCE**

- A. Source Limitations: Obtain listed system components through one source from a single manufacturer.
- B. Certified Sizing Calculations: Manufacturer shall certify venting system sizing calculations.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Combustion-Air Intake: Complete system, stainless steel, pipe, vent terminal with screen, inlet air coupling, and sealant.
- B. PVC Plastic Pipe: ASTM D 1785, Schedules 40 plain end.
  - 1. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D 2466 for Schedule 40 pipe.
  - 2. PVC Solvent Cement: ASTM D 2564.

- C. CPVC Plastic Pipe: ASTM F 441/F 441M, Schedule 40 Pipe.
  - 1. CPVC Schedule 40 Fittings: ASTM F 438, socket type.
  - 2. CPVC Solvent Cement: ASTM F 493.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 APPLICATION**

- A. PVC Plastic Pipe and Fittings: Condensing gas appliances.
- B. CPVC Plastic Pipe and Fittings: Condensing gas water heaters reaching sanitizing temperatures.

### **3.3 INSTALLATION OF UNLISTED VENTS, CHIMNEYS AND STACKS**

- A. Seal between sections of positive-pressure vents according to manufacturer's written installation instructions, using sealants recommended by manufacturer.
- B. Support vents at intervals recommended by manufacturer to support weight of vents and all accessories, without exceeding appliance loading.
- C. Slope breeching down in direction of appliance, with condensate drain connection at lowest point piped to nearest drain.

### **3.4 CLEANING**

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.
- B. Clean breeching internally, during and after installation, to remove dust and debris. Clean external surfaces to remove welding slag and mill film. Grind welds smooth and apply touchup finish to match factory or shop finish.
- C. Provide temporary closures at ends of breeching, chimneys, and stacks that are not completed or connected to equipment.

**END OF SECTION 23 51 00**

## SECTION 23 54 16 - GAS-FIRED FURNACES

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

##### A. Section Includes:

1. Gas-fired, condensing furnaces and accessories complete with controls.
2. Air filters.
3. Air cleaners.
4. UV germicidal lights.
5. Humidifiers.
6. Ventilation heat exchangers.
7. Refrigeration components.



**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

**1.4 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
    - a. Furnace and accessories complete with controls.
    - b. Air filter.
    - c. Refrigeration components.

**1.5 QUALITY ASSURANCE**

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

**PART 2 - PRODUCTS**

**2.1 GAS-FIRED FURNACES, CONDENSING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bryant Heating & Cooling Systems; a unit of United Technologies Corp.
  - 2. Carrier Corporation; a unit of United Technologies Corp.
  - 3. Lennox Industries, Inc.; Lennox International.
  - 4. Rheem Manufacturing Company; Heating and Cooling Products.
  - 5. Trane; a Trane Technologies Brand.
  - 6. YORK; a Johnson Controls Company.
- B. Cabinet: Steel or galvanized steel.

1. Cabinet interior around heat exchanger shall have factory-installed insulation.
  2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
  3. Factory paint external cabinets in manufacturer's standard color.
  4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- C. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.
1. Fan Motors: Comply with requirements in Division 20 Section "Motors."
  2. Special Motor Features, ECM: Electronically controlled motor (ECM) controlled by integrated furnace/blower control.
- D. Type of Gas: Natural.
- E. Heat Exchanger:
1. Primary: Stainless steel.
  2. Secondary: Stainless steel.
- F. Burner:
1. Gas Valve: 100 percent safety modulating main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
  2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.
- G. Gas-Burner Safety Controls:
1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
  2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
  3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.
- H. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.
- I. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories.
- J. Accessories:
1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through outside wall
  2. CPVC Plastic Vent Materials:
    - a. CPVC Plastic Pipe: Schedule 40, complying with ASTM F441/F441M.
    - b. CPVC Plastic Fittings: Schedule 40, complying with ASTM F438, socket type.

- c. CPVC Solvent Cement: ASTM F493.
- 3. PVC Plastic Vent Materials:
  - a. PVC Plastic Pipe: Schedule 40, complying with ASTM D1785.
  - b. PVC Plastic Fittings: Schedule 40, complying with ASTM D2466, socket type.
  - c. PVC Solvent Cement: ASTM D2564.
- K. Capacities and Characteristics: As scheduled on the Drawings.

## **2.2 CONTROLS**

- A. Furnace Controls: Include components required for satisfactory operation of furnaces and auxiliary equipment in all seasons. Include single-wire twinning where indicated.
- B. Controls shall comply with requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air Conditioning."
- C. Control Transformer: 24-V ac output, factory installed, and wired in furnace.
- D. Cooling Relay: To start condensing unit.
- E. Fan Control: Staged, low-medium heating and high-speed cooling.
- F. Thermostat: 24-V ac, solid-state, programmable, microprocessor-based wall-mounting unit with automatic switching from heating to cooling, preferential rate control, multiple temperature presets selectable by day and time, and battery backup protection of program settings against power failure.
- G. Solid-State, Combination Thermostat and Humidistat: Wall-mounted, programmable, microprocessor-based unit with automatic switching from heating to cooling and humidifying to dehumidifying, preferential rate control, seven-day programmability with minimum of four temperature presets per day, and battery backup protection against power failure for program settings.
- H. Power wiring is specified in Division 26 Section "Conductors and Cables."

## **2.3 AIR FILTERS**

- A. Washable Filters: 1-inch- thick urethane pad.
- B. Disposable Filters: 4-inch- thick fiberglass media in sheet metal frame.

## **2.4 REFRIGERATION COMPONENTS**

- A. General Refrigeration Component Requirements:

1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IES 90.1.
- B. Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with AHRI 210/240. Match size with furnace. Include condensate drain pan with accessible drain outlet
  1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.
- C. Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.
  1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I, minimum 1 inch thick.
- D. Refrigerant Piping: Comply with requirements in Division 23 Section "Refrigerant Piping."
- E. Air-Cooled Compressor-Condenser Unit:
  1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
  2. Compressor: Hermetically sealed reciprocating or scroll type.
    - a. Crankcase heater.
    - b. Vibration isolation mounts for compressor.
    - c. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
    - d. Two-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
    - e. Refrigerant: R-407C or R-410A.
  3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with AHRI 210/240, and with liquid subcooler.
  4. Heat-Pump Components: Reversing valve and low-temperature air cut-off thermostat.
  5. Fan: Aluminum-propeller type, directly connected to motor.
  6. Motor: Permanently lubricated, with integral thermal-overload protection.
  7. Low Ambient Kit: Permits operation down to 45 deg F.
  8. Mounting Base: Polyethylene.
- F. Capacities and Characteristics: As scheduled on the Drawings.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for gas and refrigerant piping systems to verify actual locations of piping connections before equipment installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.
- B. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.
- C. Controls: Install thermostats and humidistats at mounting height of 60 inches above floor.
- D. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.
- E. Install ground-mounted compressor-condenser components on polyethylene mounting base.

### **3.3 PIPING CONNECTIONS**

- A. Gas piping installation requirements are specified in Division 23 Section "Fuel Gas Piping." Drawings indicate general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.
  - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
  - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - a. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
  - b. CPVC Piping: Join according to ASTM D2846/D2846M, Appendix.
  - c. PVC Pressure Piping: Join schedule number ASTM D1785 PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
4. Slope pipe vent back to furnace or to outside terminal.
- D. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled compressor-condenser unit.
- E. Comply with requirements in Division 23 Section "Refrigerant Piping" for installation and joint construction of refrigerant piping.

### **3.4 DUCTWORK CONNECTIONS**

- A. Connect ducts to furnace with flexible connector. Comply with requirements in Division 23 Section "Duct Accessories."

### **3.5 ELECTRICAL CONNECTIONS**

- A. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
  1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Division 26 Section "Identification for Electrical Systems."

### **3.6 CONTROL CONNECTIONS**

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Division 26 Section "Control-Voltage Electrical Power Cables."

### **3.7 STARTUP SERVICE**

- A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
  - 1. Inspect for physical damage to unit casings.
  - 2. Verify that access doors move freely and are weathertight.
  - 3. Clean units and inspect for construction debris.
  - 4. Verify that all bolts and screws are tight.
  - 5. Adjust vibration isolation and flexible connections.
  - 6. Verify that controls are connected and operational.
- B. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.
- C. Measure and record airflows.
- D. Verify proper operation of capacity control device.
- E. After startup and performance test, lubricate bearings.

### **3.8 ADJUSTING**

- A. Adjust initial temperature and humidity set points.
- B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

### **3.9 CLEANING**

- A. After completing installation, clean furnaces internally according to manufacturer's written instructions.
- B. Install new filters in each furnace within 14 days after Substantial Completion.

### **3.10 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Perform electrical test and visual and mechanical inspection.
  - 2. Leak Test: After installation, charge systems with refrigerant and test for leaks. Repair leaks, replace lost refrigerant, and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
  - 4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.

5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

**END OF SECTION 23 54 16**



**SECTION 23 72 10 - LIGHT COMMERCIAL AIR-TO-AIR ENERGY RECOVERY EQUIPMENT**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 20 Section "Mechanical General Requirements."
  - 2. Division 23 Section "Temperature Controls" for control wiring and control devices connected to energy recovery units.

**1.2 ACTION SUBMITTALS**

- A. Product Data: Include rated capacities, furnished specialties, and accessories.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other Work. For installed products indicated to comply with design loads, include structural analysis data.
  - 2. Wiring Diagrams: Power, signal, and control wiring.

**1.4 CLOSEOUT SUBMITTALS**

- A. Field quality-control test reports.

**1.5 QUALITY ASSURANCE**

- A. Source Limitations: Obtain air-to-air energy recovery units through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of air-to-air energy recovery units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by an NRTL acceptable to authorities having jurisdiction, and marked for intended use.
- D. AHRI Compliance: Ratings for energy recovery devices shall comply with AHRI 1060, "Rating Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."
- E. ASHRAE Compliance:
  - 1. Capacity ratings for air-to-air energy recovery equipment shall comply with ASHRAE 84, "Method of Testing Air-to-Air Heat Exchangers."
- F. NRCA Compliance: Roof curbs for roof-mounted equipment shall be constructed according to recommendations of NRCA.
- G. UL Compliance:
  - 1. Packaged heat recovery ventilators shall comply with requirements in UL 1812, "Ducted Heat Recovery Ventilators"; or UL 1815, "Nonducted Heat Recovery Ventilators."
  - 2. Electric coils shall comply with requirements in UL 1995, "Heating and Cooling Equipment."

**1.6 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

**1.7 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace heat exchangers, Fans and components that fail in materials or workmanship within specified warranty period.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

**2.2 ENERGY RECOVERY VENTILATORS**

- A. Manufacturers:
1. Venmar CES; an affiliate of CES Group.
  2. Thermal Corporation; a Division of Nailor International, Inc.
  3. Ruskin Company.
  4. RenewAire LLC; member of the Soler & Palau Ventilation Group.
  5. Loren Cook Company.
  6. Greenheck.
  7. Dunham-Bush, Inc.
  8. American ALDES Ventilation Corporation.
- B. Description: Factory assembled and tested; designed for interior installation; consisting of fixed-plate or enthalpy wheel heat exchanger, supply-air fan, exhaust-air fan, filters, dampers, basic unit controls and interface to BAS.
- C. Casing: Manufacturer's double-wall galvanized sheet metal construction with exterior enamel paint finish. Units having single-wall casing construction are not acceptable.
1. Finish able to withstand minimum 500-hour salt spray test in accordance with ASTM B117.
  2. Hinged access doors with neoprene gaskets for inspection and access to internal parts.
  3. Minimum 1-inch- thick thermal insulation.
  4. Perforated-metal liner on supply-air fan discharge section.
  5. Knockouts for electrical and piping connections.
  6. Exterior condensate drain connection.
  7. Lifting lugs.
- D. Supply-Air Fan: Airfoil, or backward inclined as scheduled, centrifugal, direct-driven or V-belt driven with fixed motor sheaves, grease-lubricated ball bearings, and motor. Fans shall be provided with vibration isolation.
- E. Exhaust Fan: Forward curved or airfoil, centrifugal, belt driven with fixed motor sheaves, grease-lubricated ball bearings, and motor. Fans shall be provided with vibration isolation.

- F. Filters: Size, type, and rating as scheduled on the Drawings, in filter racks or galvanized-steel frames as required by filter type.
  - 1. Air Filter and Filter-Holding System Manufacturers:
    - a. AAF International.
    - b. ECO Air.
    - c. Farr Co.
    - d. Flanders Filters, Inc.
- G. Electrical:
  - 1. Factory installed and wired, and functionally tested at factory before shipment.
  - 2. Single-point, field-power connection to nonfused disconnect switch. Minimum SCCR according to UL 508 shall be as indicated on the Drawings or 5,000A, whichever is greater.
    - a. Branch power circuit to each motor, dedicated elical load, and controls with disconnect switch or circuit breaker.
      - 1) NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 60947-4-1.
      - 2) NEMA AB 1, motor-circuit protector (circuit breaker) with field-adjustable, short-circuit-trip set point.
    - b. NEMA ICS 2, Class A, full-voltage, nonreversing motor controller, hand-off-auto switch, and overcurrent protection for each motor.
    - c. Control-circuit transformer with primary and secondary side fuses.
  - 3. Terminal blocks with numbered and color-coded wiring to match wiring diagram. Spare wiring terminal block for connection to external controls or equipment.
- H. Unit Controls: Solid-state control board and components contain at least the following features:
  - 1. Supply-air fan control relay.
  - 2. Exhaust air fan control relay.
  - 3. Default control to ensure proper operation after power interruption.
  - 4. Service relay output.
  - 5. Unit diagnostics and diagnostic code storage.
  - 6. Field-adjustable control parameters.
- I. BAS Communication Link (with or without unit manufacturer provided Programmable DDC): Stand-alone control module providing link between unit controls and DDC temperature-control system. Control module shall be compatible with temperature-control system specified in Division 23 Section "HVAC Instrumentation and Controls."

## **2.3 MOTORS**

- A. Comply with requirements in Division 20 Section "Motors."

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Hoist, transport, and rig units or their shipping sections into position following procedures recommended by the manufacturer.
- B. Install units level and plumb, maintaining manufacturer's recommended clearances. Install according to AHRI - SMACNA Guideline B.
- C. Install units with clearances for service and maintenance.
- D. Unit Support: Install unit level on structural curbs. Coordinate wall penetrations and flashing with wall construction. Secure units to structural support with anchor bolts.
- E. Install heat wheels so supply and exhaust airstreams flow in opposite directions and rotation is from exhaust side to purge section to supply side.
  - 1. Install access doors in both supply and exhaust ducts, both upstream and downstream, for access to wheel surfaces, drive motor, and seals.
  - 2. Install removable panels or access doors between supply and exhaust ducts on building side for bypass during startup.
  - 3. Access doors and panels are specified in Division 23 Section "Duct Accessories."
  - 4. For outdoor units: Provide waterproof roof with standing seam construction and positive slope to ensure water drainage.
- F. Install new filters at completion of equipment installation and before testing, adjusting, and balancing.
- G. Pipe condensate drains from heat exchanger units and drain pans to nearest floor drain or roof drain. Use same size piping as condensate drain connection. For equipment located outdoors, insulate and provide electrical heat trace for condensate drains.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Division 20 and 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. Units shall be provided complete for single point connection to hydronic piping system.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Duct and fan installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts, fittings, and specialties.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding."

- E. Connect wiring according to Division 26 Section "Conductors and Cables."
- F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
  - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 2. Adjust seals and purge.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 4. Set initial temperature and humidity set points.
  - 5. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- B. Air-to-air energy recovery equipment will be considered defective if it does not pass tests and inspections.
- C. Remove malfunctioning units, replace with new units, and retest as specified above.

**END OF SECTION 23 72 10**

**SECTION 26 00 10 - ELECTRICAL GENERAL REQUIREMENTS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

## 1.2 SUMMARY

- A. This Section includes electrical general administrative and procedural requirements. The following requirements are included in this Section to supplement the requirements specified in Division 1 Specification Sections.

## 1.3 REFERENCES

- A. All materials shall be new. The electrical and physical properties of all materials, and the design, performance characteristics, and methods of construction of all items of equipment, shall be in accordance with the latest issue of the various, applicable Standard Specifications of the following recognized authorities:
  - 1. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 2. ASTM - ASTM International; [www.astm.org](http://www.astm.org).
  - 3. CSI - Construction Specifications Institute (The); [www.csiresources.org](http://www.csiresources.org).
  - 4. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
  - 5. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
  - 6. NEC - National Electrical Code
  - 7. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
    - a. NECA 1-2000, "Practices for Good Workmanship in Electrical Contracting (ANSI)."
  - 8. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
  - 9. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
  - 10. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).

## 1.4 QUALITY ASSURANCE

- A. Scope of Work: Furnish all labor, material, equipment, technical supervision, and incidental services required to complete, test, and leave ready for operation the electrical systems as specified in the Division 26 Sections and as indicated on Drawings.
  - 1. Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In the event of inconsistencies or disagreements within the Construction Documents bids shall be based on the most expensive combination of quality and quantity of the work indicated.
  - 2. The Contractor understands that the work herein described shall be complete in every detail.
- B. Ordinances and Codes: Perform all Work in accordance with applicable Federal, State, and local ordinances and regulations, the Rules and Regulations of NFPA, NECA, and UL, unless otherwise indicated.
  - 1. Notify the Architect/Engineer if revisions to the Drawings or Specifications are required to conform to applicable ordinances, codes, or regulations. Identify the cost associated with these revisions in the bid.



- C. Source Limitations: All equipment of the same or similar systems shall be by the same manufacturer.
- D. Tests and Inspections: Perform all tests required by state, city, county, and/or other agencies having jurisdiction. Provide all materials, equipment, etc., and labor required for tests.
- E. Performance Requirements: Perform all work in a first class and workmanlike manner, in accordance with the latest accepted standards and practices for the trades involved.
- F. Sequence and Schedule: Avoid interference with the work of other trades. Remove and relocate any work which in the opinion of the Owner's Representatives causes interference.

#### **1.5 CODES, PERMITS AND FEES**

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals, and fees for electrical work shall be secured and paid for by the Contractor. All work shall conform to all applicable codes, rules, and regulations.
- B. Comply with rules of local utility companies. Coordinate with the utility company supplying service to the installation and determine all devices including, but not limited to, all current and potential transformers, meter boxes, C.T. cabinets, and meters which will be required and include the cost of all such items and all utilities costs in proposal.
- C. All work shall be executed in accordance with the rules and regulations outlined in local and state codes. Prepare any detailed Drawings or diagrams which may be required by the governing authorities. Where the Drawings and/or Specifications indicate materials or construction that exceed code requirements, the Drawings and/or Specifications shall govern.

#### **1.6 DRAWINGS**

- A. The Drawings show the location and general arrangement of equipment, electrical systems, and related items. They shall be followed as closely as elements of the construction will permit.
- B. Examine the Drawings of other trades and verify the conditions governing the work on the job site. Arrange work accordingly, providing such fittings, conduit, junction boxes, and accessories as may be required to meet such conditions.
- C. Deviations from the Drawings, apart from minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The architectural and structural Drawings take precedence in all matters pertaining to the building structure, mechanical Drawings in all matters pertaining to mechanical trades, and electrical Drawings in all matters pertaining to electrical trades. Where there

are conflicts or differences between the Drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.

- E. Drawings are not intended to be scaled for rough-in or to serve as shop drawings. Take all field measurements required to complete the Work.

#### **1.7 MATERIAL AND EQUIPMENT MANUFACTURERS**

- A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new, be standard products of manufacturers regularly engaged in the production of electrical equipment and be of the manufacturer's latest design.
- B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment or product provided shall be equal in size, quality, durability, appearance, capacity, and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Items Requiring Prior Approval specified in this section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, electrical work, and building alterations shall be included in the original Bid. Similar equipment shall be by one manufacturer.
- C. Where existing equipment is modified to include new switches, circuit breakers, metering, or other components, the new components shall be by the original equipment manufacturer and shall be listed for installation in the existing equipment. Where original equipment manufacturer components are not available, third-party aftermarket components shall be listed for the application and submitted to the engineer for approval. Reconditioned or salvaged components shall not be used unless specifically indicated on the drawings.

#### **1.8 INSPECTION OF SITE**

- A. Visit the site, examine, and verify the conditions under which the Work must be conducted before submitting Proposal. The submitting of a Proposal implies that the Contractor has visited the site and understands the conditions under which the Work must be conducted. No additional charges will be allowed because of failure to make this examination or to include all materials and labor to complete the Work.

#### **1.9 ITEMS REQUIRING PRIOR APPROVAL**

- A. Bids shall be based upon manufactured equipment specified. All items that the Contractor proposes to use in the Work that are not specifically named in the Contract Documents must be submitted for review prior to bids. Such items must be submitted in compliance with Division 1 specifications. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information, and performance data in the form given in

the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

1. Equipment to be considered for prior approval shall be equal in quality, durability, appearance, capacity, and efficiency through all ranges of operation, shall fulfill the requirements of equipment arrangement and space limitations of the equipment shown on the plans and/or specified and shall be compatible with the other components of the system.
  2. All costs incurred to make equipment comply with other requirements, including providing maintenance, clearance, electrical, replacement of other components, and building alterations shall be included in the original bid.
- B. Voluntary alternates may be submitted for consideration, with listed addition or deduction to the bid.

#### **1.10 SHOP DRAWINGS/SUBMITTALS**

- A. Submit project-specific submittals for review in compliance with Division 1.
- B. All shop Drawings shall be submitted in groupings of similar and/or related items (lighting fixtures, switchgear, etc.). Incomplete submittal groupings will be returned unchecked.
- C. If deviations (not substitutions) from the Contract Documents are deemed necessary by the Contractor, the details of such deviations, the reason for the deviation, and the resulting changes shall be included with the submittal for approval.
- D. Submit for approval shop drawings for electrical systems or equipment indicated in other sections of electrical specs. Where items are referred to by symbolic designation on the Drawings and Specifications, all submittals shall bear the same designation (light fixtures).

#### **1.11 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS**

- A. Submit project specific Operation and Maintenance Instructional Manuals for review in compliance with Division 01 Specification Sections.
- B. Provide complete operation and maintenance instructional manuals covering all electrical equipment herein specified, together with parts lists. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Manual shall be provided on electronic media. All literature shall be combined in one document and shall be properly bookmarked with all applicable sections. Maintenance and operating instructional manuals shall be provided when construction is approximately 75% complete.
- C. The operating and maintenance instructions shall include a brief, general description for all electrical systems including, but not limited to:
  1. Routine maintenance procedures.

2. Trouble-shooting procedures.
3. Contractor's telephone numbers for warranty repair service.
4. Submittals.
5. Recommended spare parts list.
6. Names and telephone numbers of major material suppliers and subcontractors.
7. System schematic drawings on 8-1/2" x 11" sheets.

#### **1.12 RECORD DRAWINGS**

- A. Submit record drawings in compliance with Division 01.
- B. Contractor shall submit to the Architect/Engineer, record drawings on electronic media which have been neatly marked to represent as-built conditions for all new electrical work. Modifications to original drawings shall be marked with a contrasting color so the marks are readily apparent.
- C. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the underground concealed conditions and other items of construction on field drawings as they occur. The marked up field documents shall be available for review by the Architect, Engineer, and Owner at their request during construction.

#### **1.13 INSTRUCTION OF OWNER PERSONNEL**

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of electrical equipment and systems at agreed upon times. A minimum of two hours of formal instruction to Owner's personnel shall be provided for each building. Additional hours are specified in individual specification sections.
- B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. In addition to individual equipment training provide overview of each electrical system. Utilize the as-built documents for this overview.
- D. Prepare and insert additional data in operation and maintenance manual when need for such data becomes apparent during instruction, or as requested by Owner.

#### **1.14 WARRANTY**

- A. Warranty: Comply with the requirements in Division 01 Specification Sections. Contractor shall warranty that the electrical installation is free from defects and agrees to replace or repair, to the Owner's satisfaction, any part of this electrical installation which becomes defective within a period of one year (unless specified otherwise in other Division 26 sections) from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material, workmanship, or failure to follow the contract documents.

- B. Contractor shall be responsible for any temporary services including equipment and installation required to maintain operation as a result of any equipment failure or defect during warranty period.
- C. File with the Owner all warranties from the equipment manufacturers including the operating conditions and performance capacities they are based on.

#### **1.15 USE OF EQUIPMENT**

- A. The use of any equipment, or any part thereof for purposes other than testing even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor be construed to obligate the Owner in any way to accept improper work or defective materials.
- B. Do not use Owner's lamps for temporary lighting except as allowed and directed by the Owner. Equip lighting fixtures with new lamps when the project is turned over to the Owner.

#### **1.16 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. To ensure that connecting raceways, cables, and wireways will be clear of obstructions; and to maintain the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

#### **PART 2 - PRODUCTS (NOT APPLICABLE)**

#### **PART 3 - EXECUTION**

**3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION**

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange, and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to raceways and piping systems installed at a required slope.

**3.2 DEMOLITION WORK**

- A. All demolition of existing electrical equipment and materials will be done by this Contractor unless otherwise indicated. Include all items related to the existing systems that are being removed such as, but not limited to, electrical equipment, cabinets, devices, lighting fixtures, conduit, fittings, boxes, wiring, and supports. No abandoned components of the electrical systems indicated to be removed shall remain.
  - 1. Where electrically powered equipment is included in the demolition scope of other trades, disconnect electrical wiring connections and remove circuit wiring complete.
- B. In general, demolition work is indicated on the Drawings. However, the Contractor shall visit the job site to determine the full extent and character of this work.
- C. Unless specifically noted otherwise, removed materials shall not be reused in the work.
  - 1. Materials indicated to be salvaged shall be carefully removed, stored, and protected from damage.
  - 2. Salvaged materials intended to be re-used shall be thoroughly cleaned, refurbished if necessary, and determined to be fully functional prior to placing back into service.
  - 3. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Items that the Owner has waived ownership shall become the property of the Contractor, who shall remove and legally dispose of same, away from the premises.
- D. Where equipment or fixtures are removed, outlet boxes that remain recessed in walls shall be properly blanked off, and conduits capped. After alterations are complete, the entire installation shall present a "finished" look, as approved by the Architect/Engineer. The original function of the present electrical systems remaining in service shall not be changed unless specifically indicated as part of the project scope.

- E. Reroute signal wires, lighting, and power wiring as required to maintain services that are to remain and/or unaffected by the renovations. Where walls and ceilings are to be removed as shown on the Drawings, the conduit is to be cut off by the Electrical Trades so that the abandoned conduit in these walls and ceilings may be removed with the walls and ceilings by the Architectural Trades. All dead-end conduit runs shall be plugged at the remaining line outlet boxes or the panels.
- F. Where new walls and/or floors are installed which interfere with existing outlets, devices, etc., the Electrical Trades shall adjust, extend and reconnect such items as required to maintain continuity of same.
- G. All electrical work in altered and unaltered areas shall be run concealed wherever possible. Use of surface raceway or exposed conduits will be permitted only where specifically indicated on the drawings or approved by the Architect/Engineer.
- H. Existing lighting shall be reused where indicated on plans. Reused fixtures shall be detergent cleaned, re-lamped, and reconditioned suitable for satisfactory operation and appearance.

### **3.3 INSTALLATION OF EQUIPMENT**

- A. Install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions conflict with the Drawings and Specifications, report such conflicts to the Architect/Engineer for resolution.
- B. Device Location:
  - 1. Allow for wiring devices and control devices to be relocated within a 10' radius to accommodate final coordination with furnishings and other finish elements. Devices relocated prior to installation shall be done without additional cost to the project.

### **3.4 WORK IN EXISTING BUILDINGS**

- A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once Work is started in the existing building, shall complete same without interruption to return work areas as soon as possible to Owner.
- B. Adequately protect and preserve all existing and newly installed Work. Promptly repair any damage to same at Contractor's expense.
- C. Consult with the Owner's Representative as to the methods of carrying on the Work so as not to interfere with the Owner's operation any more than necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Owner's Representative.
- D. Prior to starting work in any area, obtain approval for doing so from a qualified representative of the Owner who is designated and authorized by the Owner to perform

testing and abatement of all hazardous materials including but not limited to, asbestos. The Contractor shall not perform any inspection, testing, containment, removal, or other work that is related in any way whatsoever to hazardous materials under the Contract.

### **3.5 TEMPORARY SERVICES**

- A. Provide and remove upon completion of the project, following the general conditions and as described in Division 01, a complete temporary electrical and telephone service during construction.

### **3.6 DISPOSAL**

#### **A. Fluorescent Lamps**

1. Fluorescent lamps are known to contain mercury and are classified as hazardous material. All fluorescent lamps shall be assumed to contain mercury unless tested and confirmed otherwise with a toxicity characteristic leaching procedure (TCLP).
2. Hazardous materials (fluorescent lamps), shall be sent to a lamp recycling facility. The materials shall be properly packaged with labels that meet the Department of Transportation Regulations and stored in a secure location before transportation.
3. The Contractor shall identify the costs of the lamp disposal process including, but not limited to, the lamp packaging, storage, transportation, disposal, and any profile fees.
4. Upon completion of the project, provide documentation to verify that the lamps have been properly disposed of in accordance with all local, state, and federal guidelines.

#### **B. Ballasts**

1. Lighting ballasts manufactured prior to 1979 have been known to contain polychlorinated biphenyls (PCBs). Unless specifically noted on the ballast as containing "No PCBs," the ballast shall be assumed to contain components with PCB materials.
2. Hazardous materials (ballasts with PCBs), shall be disposed of at a hazardous waste incineration facility, or at a recycling facility in accordance with the Code of Federal Regulations as administered by the EPA in regards to this issue. The ballasts shall be packaged/stored in fifty-five gallon steel drums with labels that meet the Department of Transportation Regulations.
3. The Contractor shall identify the costs of the ballast disposal process including, but not limited to, the packaging, storage, transportation, disposal, and any profile fees.
4. Provide at completion of the project documentation (manifests) to verify that the ballasts have properly been disposed of in accordance with all local, state, and federal guidelines.



**3.7 CHASES AND RECESSES**

- A. Provided by the architectural trades, but the Contractor shall be responsible for their accurate location and size.

**3.8 CUTTING, PATCHING AND DAMAGE TO OTHER WORK**

- A. Refer to General Conditions for requirements.
- B. All cutting, patching, and repair work shall be performed by the Contractor through approved, qualified subcontractors. Contractor shall include full cost of same in bid.

**3.9 EXCAVATION AND BACKFILLING**

- A. Provide all excavation, trenching, tunneling, dewatering, and backfilling required for the electrical work. Coordinate the work with other excavating and backfilling in the same area.
- B. Where conduit is installed less than 2'6" below the surface of pavement, provide concrete encasement, 4" minimum coverage, all around or as shown on the electrical Drawings.
- C. Backfill all excavations with well-tamped granular material. Backfill all excavations under wall footings with lean mix concrete up to underside of footings and extend concrete within excavation a minimum of four (4) feet each side of footing. Granular backfill shall be placed in layers not more than 8 inches in thickness, 95 percent compaction throughout with approved compaction equipment. Tamp, roll as required. Excavated material shall not be used.
- D. Backfill all excavations inside building, under drives, and parking areas with well-tamped granular material. Granular backfill shall be placed in layers not more than 8 inches in thickness, 95 percent compaction throughout with approved compaction equipment. Tamp, roll as required. Excavated material shall not be used.
- E. Backfill outside building with granular material to a height 12 inches over top of pipe compacted to 95 percent compaction as specified above. Backfill remainder of excavation with unfrozen excavated material in such a way as to prevent settling.

**3.10 EQUIPMENT CONNECTIONS**

- A. Make connections to equipment and other items included in the work in accordance with the approved shop Drawings and rough-in measurements furnished by the manufacturers of the particular equipment furnished. All additional connections not shown on the Drawings, but called out by the equipment manufacturer's shop Drawings shall be provided.

**3.11 CLEANING**

- A. All debris shall be removed daily as required to maintain the work area in a neat, orderly condition.
- B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

**3.12 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS**

- A. Equipment and materials shall be protected from theft, injury, or damage.
- B. Protect conduit openings with temporary plugs or caps.
- C. Provide adequate storage for all equipment and materials delivered to the job site. Location of the space will be designated by the Owner's representative or Architect/Engineer. Equipment set in place in unprotected areas must be provided with temporary protection.

**3.13 EXTRA WORK**

- A. For additional electrical work which may be proposed or requested, furnish an itemized cost breakdown of material and labor required to complete the work. Proceed only after receiving a written authorization.
- B. Before providing an itemized break-down for additional electrical work, submit unit prices for the following items: 1/2", 3/4", 1", 1-1/2" EMT conduit; #12, #10, #8, #6, #2 building wire; duplex receptacles, GFCI receptacles, data box and raceway, and other common electrical work which may be anticipated for any future revisions. These unit costs, once agreed to, shall be applied to additions and deducts for all project change orders.

**3.14 DRAWINGS AND MEASUREMENTS**

- A. The Drawings are not intended to be scaled for rough-in measurements nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement are the Contractor's responsibility. The Contractor shall check latest Architectural Drawings and locate light switches from same where door swings are different from Electrical Drawings.

**END OF SECTION 26 00 10**

## SECTION 26 05 19 - CONDUCTORS AND CABLES

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes:

- 1. Building wires and cables rated 600V and less.
- 2. Connectors, splices, and terminations rated 600 V and less.

- B. Related Sections include the following:

- 1. Division 26 Section "Control-Voltage Electrical Power Cables" for multi-conductor cables for electrical control and communications systems operating at 70V and less.

#### 1.3 ACTION SUBMITTALS

- A. Submit letter of compliance (intent) for copper building wire.
- B. Provide product data for the following:

1. Metal-Clad Cable, Type MC

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Field Quality-Control Test Reports.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Standards:
  1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
  2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- D. Conductor Insulation:
  1. Type THHN/THWN-2: Comply with UL 83.
  2. Type XHHW-2: Comply with UL 44.

#### 2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Manufacturers:
  1. AFC Cable Systems
  2. Alpha Wire Company
  3. American Bare Conductor
  4. Belden

5. Encore
6. General Cable
7. Okonite
8. Service Wire Co.
9. Southwire Company

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Single circuit and multi-circuit with color-coded conductors for branch circuit distribution.

E. Conductors:

1. Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

F. Ground Conductor: Insulated. Ground conductor sized as indicated on drawings (reduced ground conductor is not acceptable).

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

H. Armor: Aluminum, interlocked.

## 2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Refer to application schedule on the drawings
- B. Feeders and Branch Circuits: Solid or stranded for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

- C. Each feeder shall be of the same conductor and insulation material (phase, neutral, and parallel).
- D. Use conductor not smaller than 14 AWG for 120V control circuits.
- E. Where equipment is listed for use with copper conductors only, use copper conductors for the entire length of feeder.

### **3.2 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- G. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- H. Provide a separate neutral conductor for each circuit unless multi-wire branch circuits are specifically indicated on the drawings.
- I. Electrical Contractor shall be responsible for de-rating of conductors as required by N.E.C. when more than three current carrying conductors are installed in a single raceway or cable. Neutral conductors shall be considered current carrying conductors.
- J. Type MC cable shall be supported and secured at intervals not exceeding 4'-0" in new construction.
- K. Where MC cable is bundled, without spacing, the contractor shall apply the appropriate de-rating factors to the conductors.
- L. Between support, hangers and termination no more than 3" deflection from the bottom of the cable to a horizontal line between the support/hanger or termination.

### **3.3 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- D. Clean conductor surfaces before installing lugs and connectors.
- E. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- F. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and larger.
- G. Use piercing connector with insulating covers for conductor splices and taps, 8 AWG and larger only for taps to existing feeders. Do not use piercing connectors in new construction.
- H. Use Sta-Kon connectors to terminate stranded conductors #10 AWG and smaller to screw terminals.
- I. Use insulated spring wire connectors with plastic caps (wire nuts) for copper conductor splices and taps, 10 AWG and smaller. Push-in style connectors are not permitted.
- J. Provide lugs suitable for bussing and conductor material used.
- K. Use appropriately sized compression pin adapters to make terminations at equipment where equipment lugs cannot accommodate conductors that are oversized for voltage drop or similar conditions.

### **3.4 IDENTIFICATION**

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### **3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 33 "Raceways and Boxes."

**3.6 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping".

**3.7 FIELD QUALITY CONTROL**

- A. Perform the following field quality control tests in accordance with Division 26 Section "Electrical Testing".
  - 1. Description: Test all feeders rated 100 A and above.
  - 2. Visual and Mechanical Inspection
    - a. Inspect cables for physical damage and proper connection in accordance with the one line diagram.
    - b. Test cable mechanical connections with an infrared survey.
    - c. Check cable color-coding against project Specifications and N.E.C. requirements.
  - 3. Electrical Tests
    - a. Perform insulation resistance test on each conductor with respect to ground and adjacent conductors. Applied potential to be 1000 volts dc for 1 minute.
    - b. Perform continuity test to insure proper cable connection.
  - 4. Test Values
    - a. Minimum insulation resistance values shall be not less than fifty mega-ohms.
- B. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

**END OF SECTION 26 05 19**



**SECTION 26 05 23 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes control-voltage electrical power cables for the following systems:
1. Temperature controls
  2. Lighting control
  3. Low voltage lighting power limited circuits
  4. Class 1 and Class 2 power limited circuits supplying LED lighting on the secondary of low voltage drivers or power supplies.
  5. Any control voltage, signal cable or power limited circuit required.
- B. Section Includes the following:

1. Category 5e balanced twisted pair cable.
2. Category 6 balanced twisted pair cable.
3. Category 6a balanced twisted pair cable.
4. Balanced twisted pair cable hardware.
5. RS-232 cable.
6. RS-485 cable.
7. Control cable.
8. Control-circuit conductors.

C. Related Requirements:

1. Section 26 00 10 "Electrical General Requirements".
2. Section 26 05 29 "Hangers and Supports for Electrical Systems".
3. Section 26 05 33 "Raceways and Boxes".

**1.3 INFORMATIONAL SUBMITTALS**

- A. Source quality-control reports.
- B. Field quality-control reports.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Cable specifications shall meet the minimum requirements of the equipment or control system manufacturer for which the cables are intended to support, or as specified in other sections.
  1. Coordinate with submittals for each special system, where applicable.
  2. Where cable specifications for specific systems differ from these specifications, use the cable with performance characteristics required by the manufacturer, with the appropriate environmental rating and color coding as indicated.
  3. All execution articles in this section shall apply to all control voltage cable systems in addition to control system manufacturer requirements. Where these specifications differ or conflict with the system manufacturer instructions or recommendations, the more restrictive requirements shall apply.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.
  1. Flame Travel Distance: 60 inch or less.
  2. Peak Optical Smoke Density: 0.5 or less.

3. Average Optical Smoke Density: 0.15 or less.

- D. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.
- E. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

## **2.2 CATEGORY 5E BALANCED TWISTED PAIR CABLE**

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.
- B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.
- C. Conductors: 100 ohm, No. 24 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP)
- E. Cable Rating: Plenum.
- F. Jacket: Color coded thermoplastic.

1. Color shall be determined by system served by cabling.

## **2.3 CATEGORY 6 BALANCED TWISTED PAIR CABLE**

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.
- B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- C. Conductors: 100 ohm, No. 23 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: Color coded thermoplastic.

1. Color shall be determined by system served by cabling.

## **2.4 CATEGORY 6A BALANCED TWISTED PAIR CABLE**

- A. Description: Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6a cable at frequencies up to 500 MHz.

- B. Standard: Comply with TIA-568-C.2 for Category 6a cables.
- C. Conductors: 100 ohm, No. 23 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: Color coded thermoplastic.
  - 1. Color shall be determined by system served by cabling.

## **2.5 BALANCED TWISTED PAIR CABLE HARDWARE**

- A. Description: Hardware designed to connect, splice, and terminate balanced twisted pair copper communications cable.
- B. General Requirements for Balanced Twisted Pair Cable Hardware:
  - 1. Comply with the performance requirements of balanced twisted pair cable required for the system.
  - 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
  - 3. Cables must be terminated with connecting hardware of same category or higher.
- C. Source Limitations: Obtain balanced twisted pair cable hardware from single source from single manufacturer.
- D. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
  - 1. Features:
    - a. Universal T568A and T568B wiring labels.
    - b. Labeling areas adjacent to conductors.
    - c. 24 or 48 ports.
  - 2. Construction: 16-gauge steel and mountable on 19 inch equipment racks.
  - 3. Number of Jacks per Field: One for each four-pair cable indicated plus spares and blank positions adequate to suit specified expansion criteria.
- E. Patch Cords: Factory-made, four-pair cables in lengths required for specific application; terminated with an eight-position modular plug at each end.
  - 1. Patch cords must have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords must have latch guards to protect against snagging.
- F. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.
3. Marked to indicate transmission performance.

**G. Jacks and Jack Assemblies:**

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Designed to snap-in to a patch panel or faceplate.
3. Standards:
  - a. Category 5e, unshielded balanced twisted pair cable must comply with IEC 60603-7-2.
  - b. Category 6, unshielded balanced twisted pair cable must comply with IEC 60603-7-4.
  - c. Category 6a, unshielded balanced twisted pair cable must comply with IEC 60603-7-41.
4. Marked to indicate transmission performance.

**H. Faceplate:**

1. Four port, minimum, vertical single-gang faceplates designed to mount to single-gang wall boxes.
2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 26 27 26 "Wiring Devices".
3. Metal Faceplate: Stainless steel, complying with requirements in Section 26 27 26 "Wiring Devices".
4. For use with snap-in jacks accommodating any combination of balanced twisted pair, optical fiber, and coaxial work area cords.
  - a. Flush mounting jacks, positioning the cord at a 45-degree angle.

**I. Legend:**

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

**2.6 RS-232 CABLE**

**A. Plenum-Type, TIA 232-F:**

1. Three or Nine, No. 22 AWG, stranded (7x30) tinned copper conductors. Conductor quantity as required for application.
2. PE insulation.
3. Aluminum foil-polyester tape shield with 100 percent shield coverage.

4. Fluorinated ethylene propylene jacket.
5. Conductors are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

## **2.7 RS-485 CABLE**

### **A. Plenum-Rated Cable: NFPA 70, Type CMP.**

1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: NFPA 262.

## **2.8 CONTROL CABLE**

### **A. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.**

1. Multi-pair, twisted, No. 16 AWG, stranded (19x29) or No. 18 AWG stranded tinned-copper conductors. Number of pairs and gauge as required by the application.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

## **2.9 CONTROL-CIRCUIT CONDUCTORS**

### **A. Class 1 Control Circuits:**

1. Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
2. Type TC, complying with UL 1277 in raceway.
3. Type MC, complying with UL 1569.

### **B. Class 2 Control Circuits:**

1. Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
2. Power-limited cable, concealed in building finishes.

### **C. Class 3 Remote-Control and Signal Circuits:**

1. Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
2. Power-limited cable, concealed in building finishes.
3. Type TW or Type TF, complying with UL 83, in raceway.

### **D. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.**

1. Smoke control signaling and control circuits.

## 2.10 SOURCE QUALITY CONTROL

- A. Factory test twisted pair cables according to TIA-568-C.2.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Test category 5E, 6 and 6A cables on receipt at Project site.
  1. Test each pair of twisted pair cable for open and short circuits.

### 3.2 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 26 05 33 "Raceways and Boxes" for raceway selection and installation requirements for conduits as supplemented or modified in this Section.
  1. Outlet boxes for cables must be no smaller than 4 inch square by 2-1/8 inch deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
  2. Flexible metal conduit must not be used.
- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Raceway Installation in Equipment Rooms:
  1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
  2. Secure conduits to backboard if entering the room from overhead.
  3. Extend conduits 3 inch above finished floor.
  4. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
  1. Comply with TIA-568-C Series of standards.

2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
3. Terminate all conductors; cable must not contain unterminated elements. Make terminations only at indicated outlets, terminals, control panels, cross-connect and patch panels.
4. Cables may not be spliced and must be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points unless specifically allowed and indicated in the system manufacturers installation instructions.
5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
6. Secure and support cables at intervals not exceeding 30 inch and not more than 6 inch from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Do not use heat lamps for heating.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
11. Support: Do not allow cables to lie on removable ceiling tiles.
12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
13. Provide strain relief.
14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
15. Ground wire must be copper, and grounding methods must comply with IEEE C2.
16. Where ceilings consist of exposed construction, cable shall be installed on top of joists, beams etc. and shall be concealed from view. Where the structural elements do not allow for the cable to be installed in a concealed fashion, then install the cable in conduit.
17. Install all cable in conduit in mechanical rooms, loading docks and similar service spaces.
18. Drops to surface mounted devices shall be installed in conduit in service spaces or surface raceway in finished spaces.
19. Where the ceiling is exposed, route the conduit or raceway up to the structural member that will conceal the cable.
20. No exposed cable shall be visible below the ceiling.

**C. Balanced Twisted Pair Cable Installation:**

1. Comply with TIA-568-C.2.
2. Do not untwist balanced twisted pair cables more than 1/2 inch at the point of termination to maintain cable geometry.

**D. Installation of Control-Circuit Conductors:**



1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.

**E. Open-Cable Installation:**

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces and other equipment rooms with terminating hardware and interconnection equipment.
2. Suspend cable that is not in a raceway a minimum of 8 inch above ceilings by cable supports not more than 30 inch apart.
3. Unless specifically permitted otherwise for open ceiling applications in finished areas, cable must not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

**F. Separation from EMI Sources:**

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment must be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inch.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inch.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inch.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment must be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inch.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inch.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inch.
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures must be as follows:
  - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inch.
  - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inch.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inch.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inch.

### **3.4 REMOVAL OF CONDUCTORS AND CABLES**

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

### **3.5 CONTROL-CIRCUIT CONDUCTORS**

- A. Minimum Conductor Sizes:
  1. Class 1 remote-control and signal circuits; No 14 AWG.
  2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
  3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

### **3.6 FIRESTOPPING**

- A. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

### **3.7 GROUNDING**

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For control-voltage wiring and cabling, comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- C. Observe installation instructions for grounding according to system manufacturer's installation instructions, where applicable.

### **3.8 IDENTIFICATION**

- A. Comply with requirements for identification specified in Division 26 Section "Electrical Identification."
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers must use label stocks, laminating adhesives, and inks complying with UL 969.

- C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.
- D. Color Coding: Provide control voltage cables with jacket color to indicate system served: Coordinate with owner's published standards or owner's network and security consultants.
  - 1. Use the following color-coding scheme, or submit project specific scheme for approval:
    - a. Temperature controls: Blue with unique striping for each sub-system
    - b. Lighting control: Green
    - c. Low voltage lighting power limited circuits: Black with grey stripe
    - d. Class 1 and Class 2 power limited circuits supplying LED lighting on the secondary of low voltage drivers or power supplies. Black with green stripe
    - e. Miscellaneous power limited cables not otherwise specified: Black.
    - f. Reserved for Enterprise Network/Telecommunications Cable: White
    - g. Reserved for Access Control: Orange

### **3.9 FIELD QUALITY CONTROL**

- A. Tests and Inspections:
  - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments and inspect cabling connections to confirm compliance with TIA-568-C.1.
  - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  - 3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
    - a. Test instruments must meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide or transfer the data from the instrument to the computer, save as text files, print, and submit.
- C. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### **END OF SECTION 26 05 23**

**SECTION 26 05 26 - GROUNDING AND BONDING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.
- B. Related Sections include the following:
  - 1. Division 26 Section "Electrical General Requirements".
  - 2. Division 26 Section "Conductors and Cables".

**1.3 REFERENCES**

- A. ASTM B 3: Specification for Soft or Annealed Copper Wire.
- B. ASTM B 8: Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.

- C. ASTM B 33: Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- D. ASTM B 187: Specification for Copper, Bus Bar, Rod, and Shapes and General Purpose Rod, Bar, and Shapes.
- E. IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
- F. IEEE 142: Grounding of Industrial and Commercial Power Systems.
- G. IEEE 1100 – 1992: Recommended Practice for Powering and Grounding Sensitive Electronic Equipment.
- H. IEEE C2: National Electrical Safety Code.
- I. NETA MTS – 2001: Maintenance Testing Specifications.
- J. NFPA 70: National Electrical Code.
- K. NFPA 70B: Recommended Practice for Electrical Equipment Maintenance.
- L. TIA/EIA 607: Commercial Building Grounding and Bonding Requirements Standard.
- M. UL 467: Grounding and Bonding Equipment.
- N. UL 486 A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Field Quality Control Test Reports: Submit written test reports to include the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
  - 4. Indicate overall system resistance to ground.
  - 5. Indicate overall Telecommunications system resistance to ground.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Project Record Documents
  - 1. Submit under provisions of Division 26 “Electrical General Requirements”.
  - 2. Accurately record actual locations of grounding electrodes and connections to building steel.

**1.6 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 1. Comply with UL 467.
- B. Comply with ANSI/IEEE 1100 -1992 "Powering and Grounding Sensitive Electronic Equipment".

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Grounding Conductors and Cables:
    - a. Refer to Division 26 Section "Conductors and Cables".
  - 2. Grounding Rods:
    - a. American Electric-Blackburn.
    - b. Apache Grounding/Erico Inc.
    - c. Chance/Hubbell.
  - 3. Mechanical Connectors:
    - a. American Electric-Blackburn.
    - b. Burndy.
    - c. Chance/Hubbell.
  - 4. Exothermic Connections:
    - a. Cadweld.
  - 5. Compression-type Connectors:
    - a. Burndy HyGround
    - b. Blackburn EZ Ground.
    - c. Panduit.

**2.2 GROUNDING CONDUCTORS**

- A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."
- B. Material: Copper.

- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Grounding Electrode Conductors: Stranded cable.
- E. Underground Conductors: Bare, stranded, copper unless otherwise indicated.
- F. Bare Copper Conductors: Comply with the following:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Assembly of Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
- G. Copper Bonding Conductors: As follows:
  - 1. Bonding Conductor: Stranded copper conductor; size per the NEC.
  - 2. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; size per the NEC.
  - 3. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; size per the NEC.
- H. Electrical Grounding Busbar
  - 1. 24" (min) x 2" x 1/4" tin plated, copper busbar with two rows of 1/4" x 20 tapped holes 1" on center.

## **2.3 CONNECTOR PRODUCTS**

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected for the specific application per manufacturer's written instructions.
- D. Compression-Type Connectors: Pure, wrought copper, per ASTM B187.

## **2.4 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad steel.
  - 1. Size: 5/8 in diameter.
  - 2. Length: 120 inches.

## **PART 3 - EXECUTION**

### **3.1 EQUIPMENT GROUNDING**

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Underground Grounding Conductors: No. 2/0 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.
- C. In raceways, use insulated equipment grounding conductors. Install equipment grounding conductors in all feeders and circuits. Terminate each end on suitable lugs, bus or bushing.
  - 1. Where existing branch circuits are using conduit as equipment grounding conductor and are extended, provide grounding bushing on existing conduit and provide new equipment grounding conductor with new branch circuit.
- D. Install equipment grounding conductors in all feeders and circuits. Terminate each end on suitable lugs, bus or bushing.
- E. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- F. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- G. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- H. Water Heater, Heat-Tracing, and Anti-frost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and anti-frost heating cable. Bond conductor to heater units, piping, connected equipment, and components.
- I. Verify specific equipment grounding requirements with the manufacturer's recommendations.

### **3.2 CONNECTIONS**

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
  - 2. Make connections with clean, bare metal at points of contact.



3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations
  1. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and larger.
  2. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Connections shall be non-reversible. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- F. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

### **3.3 INSTALLATION**

- A. Equipotential Ground: Interconnect grounding electrodes to form one, electrically continuous, equipotential grounding electrode system. Grounding electrodes to be interconnected include:
  1. Metal Underground Water Service Pipe.
  2. Metal In-Ground Support Structure.
  3. Ground Rods.
- B. Metal Underground Water Service Pipes in direct contact with the earth for 10 feet or more: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to all metal water service entrances to building including fire protection water service entrance. Connect grounding conductors to metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

- C. Metal in-ground support structure in direct contact with the earth vertically for 10 feet or more, with or without concrete encasement: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to at least one metal in-ground support structure, or as otherwise indicated. Connect grounding conductors to metal in-ground support structure by exothermic welds. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- D. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
  - 1. Verify that final backfill and compaction has been complete before driving ground rods.
  - 2. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
  - 3. Interconnect ground rods with grounding electrode conductors. Use exothermic welds or non-reversing compression-type connectors, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- E. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Install in conduit where routed above grade.
- F. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors or non-reversing compression-type connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- G. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- H. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- I. Grounding Bus:
  - 1. Install grounding bus in the locations listed below and elsewhere as indicated:
    - a. Electrical equipment rooms.
    - b. Telephone equipment rooms.
    - c. Rooms housing service equipment.
  - 2. Use insulated spacer; space 2 inch from wall and support from wall 12 inches above finished floor, unless otherwise indicated.
- J. Equipment Grounding: Provide a permanent and continuous bonding of conductor enclosures, equipment frames, power distribution equipment ground busses, cable trays, metallic raceways, and other non-current carrying metallic parts of the electrical system.

### **3.4 FIELD QUALITY CONTROL**

- A. Testing: Perform the following field quality control tests in accordance with Division 26 section "Electrical Testing"
1. Inspect grounding and bonding system conductors and connections for tightness and proper installation and for compliance with the Drawings and Specifications.
  2. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
    - a. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal.
    - b. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - c. Perform tests, by the fall-of-potential method according to IEEE 81. Instrumentation utilized shall be as defined in Section 12 of IEEE 81 and shall be specifically designed for ground impedance testing. Provide sufficient spacing so that curves flatten in the 62% area of the distance between the item under test and the current electrode.
  3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
    - a. Equipment Rated 500 kVA and Less: 10 ohms.
    - b. Equipment Rated 500 to 1000 kVA: 5 ohms.
    - c. Equipment Rated More Than 1000 kVA: 3 ohms.
    - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
  4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

### **3.5 GRADING AND PLANTING**

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

**END OF SECTION 26 05 26**

**SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.
  - 2. Construction requirements for concrete bases.

**1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

**1.5 QUALITY ASSURANCE**

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

**1.6 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

**PART 2 - PRODUCTS**

**2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS**

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit; a part of Atkore International.
    - b. B-Line, by Eaton.
    - c. GS Metals Corp.
    - d. Pentair Electrical & Fastening Solutions.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; a part of Atkore International.
    - g. Wesanco, Inc.
  - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  4. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit; a part of Atkore International.
    - b. B-Line by Eaton.
    - c. Fabco Plastics Wholesale Limited.
    - d. Seasafe, Inc.
  2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
  3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
  4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hilti Inc.
      - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 3) MKT Fastening, LLC.
      - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) B-Line by Eaton.
    - 2) Empire Tool and Manufacturing Co., Inc.
    - 3) Hilti Inc.
    - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
    - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## **2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES**

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70 or as scheduled in NECA 1. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with:

- a. Two-bolt conduit clamps
  - b. Single-bolt conduit clamps
  - c. Single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.
- E. Support single runs of MC cable using spring-steel clamps from suspended ceiling hangers, hanger wire or building structure at intervals not to exceed three feet. Do not support MC cable from ceiling grid.

### **3.2 SUPPORT INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
- 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 6. To Steel:
    - a. Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
    - b. Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69
    - c. Spring-tension clamps.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction



boxes, transformers, and other devices on slotted-channel support systems attached to substrate.

- E. Slotted support systems applications:
  - 1. Indoor dry and damp Locations: Painted Steel
  - 2. Outdoors and interior wet locations: Galvanized Steel
  - 3. Corrosive Environments, including pool equipment rooms: Nonmetallic
- F. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.
- G. Do not fasten supports to floor decks, roof decks, pipes, ducts, mechanical equipment, or conduit.
- H. Obtain permission from Architect/Engineer before using powder-actuated anchors.
- I. Obtain permission from Architect/Engineer before drilling or cutting structural members.
- J. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- K. Install surface-mounted cabinets with minimum of four anchors.
- L. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
- M. The Contractor shall replace all supports and channels that sag, twist, and/or show signs of not providing proper structural support, to the equipment, it is intended for, as determined by the Owner and Architect/Engineer. All costs associated with replacing supports and steel channels shall be incurred by the Contractor.

### **3.3 INSTALLATION OF FABRICATED METAL SUPPORTS**

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### **3.4 CONCRETE BASES**

- A. Provide concrete bases for all floor mounted electrical equipment.
- B. Provide concrete bases for all exterior, grade level electrical equipment, and where indicated.

**C. Base/Pad Construction:**

1. Construct per manufacturer's recommendations for particular equipment, including suggested piers and dowel rods.
2. Exterior concrete bases shall have a minimum depth of 8" unless other indicated or recommended by the manufacturer.
3. Construct concrete bases for primary and secondary power distribution equipment per requirements of the electrical utility, where submitted for its review.

**D. Anchor equipment to base per both supports and equipment manufacturer's instructions.**

**E. Coordinate conduit openings and sleeve locations in base with requirements of equipment to be supported.**

**3.5 PAINTING**

**A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.**

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

**B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.**

**C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.**

**END OF SECTION 26 05 29**

**SECTION 26 05 33 - RACEWAYS AND BOXES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 07 Section, "Penetration Firestopping" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
  - 2. Division 26 Section "Wiring Devices" for devices installed in boxes.
  - 3. Division 26 "Hangers and Supports for Electrical Systems" for concrete bases.

**1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.

- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. RNC: Rigid nonmetallic conduit.
- H. PVC: Polyvinyl Chloride.
- I. HDPE: High Density Polyethylene.
- J. RTRC: Reinforced Thermosetting Resin Conduit

#### **1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

#### **1.5 COORDINATION**

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

### **PART 2 - PRODUCTS**

#### **2.1 METAL CONDUIT AND TUBING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Alflex Inc.
  - 3. Allied Tube Triangle Century.
  - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 5. International Metal Hose.
  - 6. Electri-Flex Co
  - 7. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
  - 8. LTV Steel Tubular Products Company – Manhattan/CDT/Cole-Flex.
  - 9. Maverick.
  - 10. O-Z Gedney; unit of General Signal.

11. Wheatland.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
  1. Comply with NEMA RN 1.
  2. Coating Thickness: 0.040 inch, minimum.
- E. EMT: ANSI C80.3.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
  1. Fittings for EMT: Steel, set-screw or compression type.
  2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

## 2.2 NONMETALLIC CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. American International.
  2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  3. Arnco Corp.
  4. Cantex Inc.
  5. Certainteed Corp.; Pipe and Plastics Group.
  6. Condux International.
  7. ElecSys, Inc.
  8. Electri-Flex Co.
  9. Integral.
  10. Kor-Kap.
  11. Lamson and Sessions: Carlon Electrical Products.
  12. Manhattan/CDT/Cole-Flex.
  13. RACO; Division of Hubbell, Inc.
  14. Scepter.
  15. Spiraldut, Inc./AFC Cable Systems, Inc.
  16. Thomas & Betts Corporation.
- B. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.
- C. RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.
- D. HDPE: UL 651, ASTM D 3350, ASTM D 1248 Schedule 40.

## **2.3 SURFACE RACEWAYS**

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Airey-Thompson Sentinel Lighting: Wiremold Company (The).
    - b. Thomas & Betts Corporation.
    - c. Walker Systems, Inc.; Wiremold Company (The).
    - d. Wiremold Company (The); Electrical Sales Division.
    - e. Mono-Systems, Inc.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hubbell, Inc.; Wiring Device Division.
    - b. Carlon Electric Products.
    - c. Panduit Corporation.
    - d. Walker Systems, Inc.; Wiremold Company (The).
    - e. Wiremold Company (The); Electrical Sales Division.
    - f. Mono-Systems, Inc.
- C. Types, sizes, and channels as required for each application, with fittings that match and mate with raceways.

## **2.4 BOXES, ENCLOSURES, AND CABINETS**

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1. Shall be used within walls or ceiling.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover. Shall be used in all exposed, non-recessed, locations.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2. Shall be used in corrosive areas.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover. Shall be used in areas exposed to water.

**PART 3 - EXECUTION**

**3.1 RACEWAY APPLICATION**

- A. Provide raceways in interior and exterior locations in accordance with the "Raceway Application Matrix" included on the drawings.
- B. Boxes and Enclosures, Exterior Aboveground: NEMA 250, Type 3R.
- C. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- D. Minimum Raceway Size: 3/4-inch trade size.
- E. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
  - 3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
  - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

**3.2 INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Install temporary closures to prevent foreign matter from entering raceways.
- F. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
- G. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

- H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
  - 1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
- I. Support conduit within 12 inches of enclosures to which attached.
- J. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
  - 1. Run parallel or banked raceways together on common supports.
  - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- O. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- P. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- Q. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- S. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a



flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where conduits route through, to, or from a hazardous classified space (Class I or II), provide proper seal offs when exiting or entering the hazardous classified space.
  3. Where conduits pass between spaces that are maintained at two different vapor pressures.
  4. Where otherwise required by NFPA 70.
- T. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- U. Flexible Conduit Connections: Comply with NEMA RV3. Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.
- V. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals. Provide cover clips to cover space between connecting pieces.
- W. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- X. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Y. Locate boxes so that cover or plate will not span different building finishes.
- Z. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- BB. Ferrous metal conduit in natatorium/pool environments shall use compression or threaded fittings. Conduit, fittings, boxes, and supports shall be treated with corrosion resistant paint specified in Division 9.
- CC. Route conduits in finished areas with exposed ceilings at underside of structural deck or as high as possible.
- DD. Outlet boxes within hazardous locations shall be of the proper class and division as noted in the N.E.C.

### **3.3 INSTALLATION OF UNDERGROUND CONDUIT**

#### **A. Direct-Buried Conduit:**

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 2 Section "Earthwork."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
  - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
5. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

### **3.4 FIRESTOPPING**

- #### **A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-Penetration Firestop Systems."**

### **3.5 PROTECTION**

- #### **A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.**
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

**3.6 CLEANING**

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

**END OF SECTION 26 05 33**

## SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Identification for raceway and metal-clad cable.
  - 2. Identification for conductors and control cable.
  - 3. Underground-line warning tape.
  - 4. Warning labels and signs.
  - 5. Instruction signs.
  - 6. Equipment identification labels.
  - 7. Miscellaneous identification products.

#### 1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

**1.4 COORDINATION**

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

**PART 2 - PRODUCTS**

**2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
  - 1. Power Circuits: Black letters on an orange field.
  - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

**2.2 CONDUCTOR AND CONTROL CABLE IDENTIFICATION MATERIALS**

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

**2.3 UNDERGROUND-LINE WARNING TAPE**

- A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.
  - 1. Not less than 6 inches wide by 4 mils thick.
  - 2. Compounded for permanent direct-burial service.
  - 3. Embedded continuous metallic strip or core.
  - 4. Printed legend shall indicate type of underground line.

## **2.4 WARNING LABELS AND SIGNS**

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
- C. Warning label and sign shall include, but are not limited to, the following legends:
  - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
  - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

## **2.5 INSTRUCTION SIGNS**

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
  - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## **2.6 EQUIPMENT IDENTIFICATION LABELS**

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Black letters on a white background. Minimum letter height shall be 3/8 inch.
- B. Outdoor Equipment Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

## **2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength: 50 lb, minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black, except where used for color-coding.
- B. Paint: Paint materials and application requirements are specified in Division 9 painting Sections.

- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## **2.8 WIRING DEVICE IDENTIFICATION**

- A. Description: Self adhesive label with black upper case letters on clear polyester label, font size 7.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:
  - 1. Control Wiring: Green and red.
- B. Power-Circuit Conductor Identification: For conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape and marker tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use marker tape. Identify each ungrounded conductor according to source and circuit number as indicated on Drawings. Identify control circuits by control wire number as indicated on shop drawings.
- D. Branch-Circuit Conductor Identification: Mark junction box covers in indelible ink with the panel and breaker numbers of other circuits contained within.
- E. Conductor Identification: Locate at each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection or termination point.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.

- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
  - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
    - a. Controls with external control power connections.
  - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- I. Instruction Signs:
  - 1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
  - 2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.
- J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
  - 1. Labeling Instructions:
    - a. Indoor Equipment: Engraved, laminated acrylic or melamine label mechanically secured.
    - b. Outdoor Equipment: Stenciled.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
  - 2. Equipment to Be Labeled: If included on project. All items may not be on project.
    - a. Access doors and panels for concealed electrical items.
    - b. Transformers.
    - c. Emergency system boxes and enclosures.
    - d. Disconnect switches.
    - e. Contactors.
    - f. Monitoring and control equipment.
    - g. Breakers or switches at distribution panels.



### 3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location:
  - 1. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
  - 1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
  - 2. Colors for 208/120-V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
    - d. Grounded Conductor (Neutral): White.
  - 3. Colors for 480/277-V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
    - d. Ground Conductor (Neutral): Grey.
  - 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

- I. Label information arrangement for 3 lines of text.
1. Line one shall describe the panel or equipment. Line one example: "DP-XX," RP-XX," "T-XX," "EF-XX," etc.
  2. Line two shall describe the first disconnecting means feeding this panel or equipment. Line two example: "Fed from DP-XX," "Fed from RP-XX," etc.
  3. Line three indicates that location of the disconnecting means as identified in line two. Line three example: "First Floor Elect. Rm #XXX."
  4. Line four shall include "Via T-XX" when panel or equipment is fed from a transformer.
- J. Examples:

|                                                             |                                                 |                                             |
|-------------------------------------------------------------|-------------------------------------------------|---------------------------------------------|
| RP-1A<br>FED FROM DP-1A<br>ELECTRICAL ROOM A100<br>VIA T-1A | EF-1<br>FED FROM MCC-1A<br>MECHANICAL ROOM F101 | LP-1A<br>LOCATED IN<br>ELECTRICAL ROOM A100 |
|-------------------------------------------------------------|-------------------------------------------------|---------------------------------------------|

- K. Fusible Enclosed Switches and Distribution Equipment: Install self-adhesive vinyl label indicating fuse rating and type on the outside of door on each fused switch.
- L. Painted Identification: Prepare surface and apply paint according to Division 9 painting Sections.
- M. Degrease and clean surface to receive nameplates.
- N. Install nameplate and labels parallel to equipment lines.
- O. Secure nameplate to equipment front using screws.
- P. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- Q. Identify conduit using field painting where required.

**END OF SECTION 26 05 53**

**SECTION 26 09 23 - LIGHTING CONTROL DEVICES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following lighting control devices:
  - 1. Occupancy sensors.
- B. Related Sections include the following:
  - 1. Division 26 Section "Electrical General Requirements".
  - 2. Division 26 Section "Wiring Devices" for wall-box dimmers and manual light switches.

**1.3 REFERENCES**

- A. IEEE C62.41: Guide for Surge Voltages in Low-Voltage AC Power Circuits.

- B. NFPA 70: National Electrical Code.
- C. UL 486A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.
- D. UL 1449: Surge Protective Devices.
- E. UL 1598: Luminaires.
- F. NECA 130-2010: Installing and Maintaining Wiring Devices.

#### **1.4 DEFINITIONS**

- A. LED: Light-emitting diode.
- B. PIR: Passive infrared.
- C. ULTRASONIC: Active emission of at least 35 kHz sound waves, using Doppler reflectance to detect motion.
- D. MICROPHONIC: Passive reception to listen for continued occupancy, with circuitry to filter out white noise.
- E. MULTI-Tech: Using PIR and ultrasonic or microphonic technologies in one sensor.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated including physical data and electrical performance.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
  - 1. Lighting plan showing location, orientation, and coverage area of each sensor.
  - 2. Interconnection diagrams showing field-installed wiring.

#### **1.6 INFORMATIONAL SUBMITTALS**

- A. Field quality-control test reports.

#### **1.7 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. Include the following:
  - 1. Description of operation and servicing procedures.
  - 2. List of major components.
  - 3. Recommended spare parts.
  - 4. Programming instructions and system operation procedures.

**1.8 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

**1.9 COORDINATION**

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

**1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to the site under provisions of Division 26 Section "Electrical General Requirements".
- B. Store and protect products under provisions of Division 26 Section "Electrical General Requirements".

**PART 2 - PRODUCTS**

**2.1 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS**

- A. Line-Voltage Surge Protection: An integral part of the devices for 120- and 277-V solid-state equipment. For devices without integral line-voltage surge protection, field-mounting surge protection shall comply with IEEE C62.41 and with UL 1449.

**2.2 OCCUPANCY SENSORS**

- A. General
  - 1. Coordinate occupancy sensor locations, coverages and required quantities with manufacturer's recommendations. Coverage areas indicated on the Drawings are for minor motion (6 to 8 inches of hand movement). Provide additional occupancy sensors and control units as required to achieve complete minor motion coverage of the space indicated.
  - 2. Adjust occupancy sensors and test that complete minor motion coverage is obtained in accordance with Part 3. Provide written confirmation of testing to owner, architect and engineer.
  - 3. Provide occupancy sensors with a bypass switch to override the "ON" function in the event of sensor failure.
  - 4. Provide occupancy sensors with an LED indicator indicating when motion is being detected during testing and normal operation of the sensor.
  - 5. Provide occupancy sensors and occupancy sensor control units from single manufacturer.

**B. 360° Ceiling Mounted Dual Technology Occupancy Sensor**

**1. Manufacturers:**

- a. Perfect Sense CDS.
- b. Wattstopper DT 300
- c. Hubbell Building Automation "OMNI-DT" Series.
- d. Greengate OMC-DT-2000-R.
- e. Sensorswitch CM-PDT-R.
- f. Philips LRM2255.
- g. Leviton OSC10-M0W.

**2. Description: Ceiling mounted, 360° coverage, multi-tech sensing occupancy sensor.**

- a. Housing: White, thermoplastic, tamper resistant ceiling mount.
- b. Functions: Automatic ON must sense motion from both ultrasonic and infrared sensing elements. Either technology shall maintain ON, with adjustable time delays.
- c. Adjustments: User adjustable sensitivity adjustment shall be provided for each sensing technology. Time delay shall be adjustable from 30 seconds to 30 minutes.
- d. Sensor shall operate on 24V DC power through control unit which supplies DC power to the sensor and provides relay contacts to control the lighting load and auxiliary contacts.
- e. Manual override function.

**C. Occupancy Sensor Control Units:**

**1. Description: Transformer and relay combined in single unit to provide 24DC power to sensors and provide 20A contact(s) for control of lighting loads at 120 or 277V. Control unit input power shall be from unswitched leg of lighting circuit it is controlling.**

- a. Control units shall be provided as required to power ceiling mounted occupancy sensors, control lighting loads and provide a minimum of one auxiliary contact.
- b. Occupancy sensor control units shall mount external to 4" sq junction box in the ceiling space. Wiring between control unit and occupancy sensor shall be plenum rated.
- c. Locate control unit in accessible location in gyp-board ceilings, adjacent to return air grilles, or provide access panel.
- d. Additional auxiliary relay modules shall be provided as required to provide control of all lighting circuits and additional auxiliary contacts as required.
- e. It is acceptable to provide controls and auxiliary contacts as required integral to the ceiling sensor, provided all required contacts are provided.
- f. Maximum of 3 sensors per power pack. Verify exact quantities required with manufacturer.

**PART 3 - EXECUTION**

**3.1 OCCUPANCY SENSOR INSTALLATION**

- A. Install ceiling mounted sensors at approximate locations as indicated on plan. Sensor manufacturer shall provide quantity of sensors as required to provide complete coverage for rooms.
- B. Locate sensors such that motion through open doors will not falsely activate sensors.
- C. Do not locate ultrasonic sensors within six feet of supply air diffusers.
- D. Locate infrared sensors to avoid obstructions.
- E. Provide the services of a manufacturer's representative for commissioning of occupancy sensor installation. This shall include consultation on layout and location prior to installing sensors, testing of each sensor for compliance with Contract Documents and field adjustment and fine tuning after installation is complete. Provide written confirmation of testing to the Owner, Architect and Engineer.
- F. Field adjustments shall take place in the presence of the owner and the engineer. This shall include owner training on adjustment techniques for the occupancy sensors.

**3.2 WIRING INSTALLATION**

- A. Wiring Method: Comply with Division 26 Section "Conductors and Cables".
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
- E. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

**3.3 IDENTIFICATION**

- A. Identify components and power and control wiring according to Division 26 Section "Electrical Identification."

**3.4 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. After installing sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
  - 2. Operational Test: Verify actuation of each sensor and adjust time delays.
- B. Remove and replace lighting control devices where test results indicate that they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

**3.5 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose.

**END OF SECTION 26 09 23**



## SECTION 26 09 99 - ELECTRICAL TESTING

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. Related Sections include the following:
  - 1. Division 26 Section "Electrical General Requirements."
  - 2. Division 26 Section "Conductors and Cables."
  - 3. Division 26 Section "Grounding and Bonding."
  - 4. Division 26 Section "Enclosed Switches."
  - 5. Division 26 Section "Fuses."

#### 1.2 SECTION INCLUDES

- A. Perform all tests and inspections as specified herein. All references made to "testing firm" shall apply to the work of the Contractor.
- B. The testing firm shall provide all material, equipment, labor, and technical supervision to perform such tests and inspections.
- C. It is the intent of these tests to assure that all tested electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design Specifications.
- D. The test and inspections shall determine suitability for energization.
- E. Equipment to be tested and inspected shall be the equipment shown on the one line diagram and schedules as required by part three of each individual Specification Section. In addition, all equipment that is part of an emergency distribution system shall be tested.

### **1.3 REFERENCES**

- A. All inspections and tests shall be in accordance with the latest version of the following codes and standards except as provided otherwise herein.
  - 1. National Electrical Manufacturer's Association - NEMA
  - 2. American Society for Testing and Materials - ASTM
  - 3. Institute of Electrical and Electronic Engineers - IEEE
  - 4. InterNational Electrical Testing Association - NETA Acceptance Testing Specifications - ATS-2017
  - 5. InterNational Electrical Testing Association - NETA Maintenance Testing Specifications-MTS-2015
  - 6. American National Standards Institute - ANSI C2: National Electrical Safety Code
  - 7. State and Local Codes and Ordinances
  - 8. Insulated Cable Engineers Association - ICEA
  - 9. Association of Edison Illuminating Companies - AEIC
  - 10. Occupational Safety and Health Administration
  - 11. National Fire Protection Association - NFPA
    - a. ANSI/NFPA 70: National Electrical Code
    - b. ANSI/NFPA 70B: Electrical Equipment Maintenance
    - c. NFPA 70E: Electrical Safety Requirements for Employee Workplaces
    - d. ANSI/NFPA 101: Life Safety Code

### **1.4 QUALIFICATIONS**

- A. The testing firm shall be corporately independent and function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm.
- B. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.
- C. The lead, on site, technical person and at least 50% of the on site crew shall be currently certified by the InterNational Electrical Testing Association (NETA) or National Institute for Certification in Engineering Technologies in Electrical Power Distribution System Testing.
- D. The testing firm shall only utilize technicians who are regularly employed by the firm on a full-time basis for testing services.
- E. The Contractor shall submit proof of the above qualifications with bid proposal.
- F. The terms test agency, test contractor, testing laboratory, test organization, or contractor test company, shall be construed to mean the testing firm.

**1.5 PERFORMANCE REQUIREMENTS**

- A. The Electrical Contractor shall supply a suitable and stable source of electrical power to each test site. The testing firm shall specify the power requirements.
- B. The Electrical Contractor shall notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.
- C. The testing firm shall notify the Owner's Representative prior to commencement of any testing.
- D. Any system, material or workmanship, which is found defective on the basis of acceptance tests, shall be reported to the Engineer. The Electrical Contractor shall correct all defects.
- E. The testing firm shall maintain a written record of all tests and shall assemble and certify a final test report.
- F. Safety and Precautions
  - 1. Safety practices shall include, but are not limited to, the following requirements:
    - a. Occupational Safety and Health Act.
    - b. Accident Prevention Manual for Industrial Operations, National Safety Council.
    - c. Applicable state and local safety operating procedures.
    - d. NETA Safety/Accident Prevention Program.
    - e. Owner's safety practices.
    - f. National Fire Protection Association - NFPA 70E.
    - g. American National Standards for Personnel Protection.
  - 2. All tests shall be performed with apparatus de-energized except where otherwise specifically required.
  - 3. The testing firm shall have a designated safety representative on the project to supervise operations with respect to safety.

**1.6 TEST INSTRUMENT CALIBRATION**

- A. Test Instrument Calibration
  - 1. The testing firm shall have a calibration program, which assures that all applicable test instruments are maintained within rated accuracy.
  - 2. The accuracy shall be directly traceable to the National Institute of Standards and Technology.
  - 3. Instruments shall be calibrated in accordance with the following frequency schedule:
    - a. Field instruments: Analog - 6 months maximum Digital - 12 months maximum
    - b. Laboratory instruments: 12 months

- c. Leased specialty equipment: 12 months (Where accuracy is guaranteed by Lessor)
  - 4. Dated calibration labels shall be visible on all test equipment.
  - 5. Records must be kept up-to-date which show date and results of instruments calibrated or tested.
  - 6. An up-to-date instrument calibration instruction and procedures shall be maintained for each test instrument.
  - 7. Calibrating standard shall be of higher accuracy than that of the instrument tested.
- B. Field Test Instrument Standards
- 1. All equipment used for testing and calibration procedures shall exhibit the following characteristics:
    - a. Maintained in good visual and mechanical condition.
    - b. Maintained in safe, operating condition.
- C. Suitability of Test Equipment
- 1. All test equipment shall be in good mechanical and electrical condition.
  - 2. Selection of metering equipment should be based on knowledge of the waveform of the variable being measured. Digital multi-meters may be average of RMS sensing and may include or exclude the dc component. When the variable contains harmonics of dc offset and, in general, any deviation from a pure sine wave, average sensing, average measuring RMS scaled meters may be misleading. Use of RMS measuring meters is recommended.
  - 3. Field test metering used to check power system meter calibration must have any accuracy higher than that of the instrument being checked.
  - 4. Accuracy of metering in test equipment shall be appropriate for the test being performed.
  - 5. Waveshape and frequency of test equipment output waveforms shall be appropriate for the test and tested equipment.

## **1.7 TEST REPORTS**

- A. A test report shall be generated for each piece of major equipment or groups of equipment and shall include the following:
- 1. A list of visual and mechanical inspections required by Division 26 Specification Sections in a checklist or similar format.
  - 2. Test reports, including test values where applicable, for all required electrical tests. Clearly indicate where test values fall outside of the limits of recommended values.
  - 3. Summary and interpretation of test results detailing problems located and recommended corrective measures.
  - 4. Record of infrared scan and photos showing potential problem locations.
  - 5. Signed and dated by the testing firm field superintendent stating that all required tests have been completed.

- B. Test reports shall be furnished to the Architect/Engineer within 14 days of the completion each test on an ongoing basis. Original copies of the reports shall be furnished directly to the Architect/Engineer by the testing company prior to formal submittal via the Contractors.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 THERMOGRAPHIC SURVEY**

- A. Visual and Mechanical Inspection
  - 1. Remove all necessary covers prior to scanning.
  - 2. Inspect for physical, electrical, and mechanical condition.
- B. Equipment to be Scanned
  - 1. All components of the distribution system down to and including branch circuit panelboards and motor control centers. Return 3 months after equipment has been energized and loaded to do a final scan of all equipment.
- C. Provide report indicating the following:
  - 1. Problem area (location of "hot spot").
  - 2. Temperature rise between "hot spot" and normal or reference area.
  - 3. Cause of heat rise.
  - 4. Phase unbalance, if present.
  - 5. Areas scanned.
- D. Test Parameters
  - 1. Scanning distribution system with ability to detect 1°C between subject area and reference at 30°C.
  - 2. Equipment shall detect emitted radiation and convert detected radiation to visual signal.
  - 3. Infrared surveys should be performed during periods of maximum possible loading but not less than twenty percent (20%) of rated load of the electrical equipment being inspected.
- E. Test Results
  - 1. Interpretation of temperature gradients requires an experienced technician. Some general guidelines are:
    - a. Temperature gradients of 37°F to 44.6°F indicate possible deficiency and warrant investigation.

- b. Temperature gradients of 44.6°F to 59°F indicate deficiency; repair as time permits.
- c. Temperature gradients of 61°F and above indicate major deficiency; repair immediately.

**END OF SECTION 26 09 99**

**SECTION 26 27 13 - ELECTRICITY METERING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes equipment for utility company's electricity metering.

**1.3 ACTION SUBMITTALS**

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Describe electrical characteristics, features, and operating sequences, both automatic and manual. Include the following:
  - 1. Electricity-metering equipment.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control test reports.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electricity-metering equipment to include in emergency, operation, and maintenance manuals.

**1.6 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

**1.7 PROJECT CONDITIONS**

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify Owner's representative no fewer than five days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without written permission from Owner's representative.

**1.8 COORDINATION**

- A. Electrical Service Connections: Coordinate with utility companies and components they furnish as follows:
  - 1. Comply with requirements of utilities providing electrical power and communication services.
  - 2. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT FOR ELECTRICITY METERING BY UTILITY COMPANY**

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Comply with equipment installation requirements in NECA 1.



- B. Install equipment for utility company metering. Install raceways and equipment according to utility company's written requirements. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

**END OF SECTION 26 27 13**

**SECTION 26 27 26 - WIRING DEVICES**

|                                              |   |
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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Ground-fault circuit interrupter receptacles
  - 2. Single- and double-pole snap switches.
  - 3. Device wall plates.

**1.3 DEFINITIONS**

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. AFCI: Arc-fault circuit interrupter.
- D. PVC: Polyvinyl chloride.

- E. RFI: Radio-frequency interference.
- F. SPD: Surge protective devices.
- G. UTP: Unshielded twisted pair.
- H. USB: Universal serial bus.

#### **1.4 REFERENCES**

- A. DSCC W-C-596G: Federal Specification Connector, Electrical, Power, General Specification.
- B. DSCC W-C-896F: Federal Specification Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification).
- C. NEMA WD 1: General Requirements for Wiring Devices.
- D. NEMA WD 6: Wiring Device – Dimensional Requirements.
- E. UL 20: General-Use Snap Switches.
- F. UL 486A: Wire Connectors and Soldering Lugs for Use with Copper Conductors.
- G. UL 943: Ground Fault Circuit Interrupters.
- H. NECA 130-2010: Installing and Maintaining Wiring Devices.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations for each type of product indicated.

#### **1.6 INFORMATIONAL SUBMITTALS**

- A. Field quality control test reports

#### **1.7 QUALITY ASSURANCE**

- A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL WIRING DEVICE REQUIREMENTS**

- A. Comply with NFPA 70, NEMA WD 1, NEMA WD 6, Federal Specification WC-596G and UL498.
- B. Device Color:
  - 1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.
  - 2. Wall Switches: White, unless otherwise indicated.

### **2.2 GFCI RECEPTACLES**

- A. General:
  - 1. Comply with UL 943
- B. Tamper- and Weather-Resistant Duplex GFCI Receptacle, NEMA 5-20R:
  - 1. Safety mechanism to energize contacts only when both openings are simultaneously engaged.
  - 2. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Hubbell Wiring Device-Kellems: GFTWRST20
    - b. Eaton/Arrow Hart Wiring Devices: TWRSGF20
    - c. Leviton: GFWT2
    - d. Legrand, Pass & Seymour: 2097TRWR
- C. Weather-Resistant Duplex GFCI Receptacle, NEMA 5-20R:
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Hubbell Wiring Device-Kellems: GFWRST20
    - b. Eaton/Arrow Hart Wiring Devices: WRSGF20
    - c. Leviton: GFWR2
    - d. Legrand, Pass & Seymour: 2097TRWR

### **2.3 WALL SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hubbell Wiring Device-Kellems: 1220 Series
  - 2. Eaton/Arrow Hart Wiring Devices: AH1220 Series
  - 3. Leviton: 1220 Series

- 4. Legrand, Pass & Seymour: PS20AC Series
- B. Device body: Plastic handle.
- C. Single- and Double-Pole Switches: Comply with DSCC W-C-896F and UL 20.
- D. Snap Switches: Heavy Duty specification grade, quiet type; rated 20A., 120-277 V AC.
- E. Provide single-pole, two-pole, three-way and four-way switches as indicated.

## **2.4 WALL PLATES**

- A. Manufacturers:
  - 1. Provide wall plates and corresponding wiring devices from same manufacturer.
- B. Single and combination types to match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces:
    - a. 0.035-inch- thick, satin-finished stainless steel
  - 3. Material for Unfinished Spaces:
    - a. Galvanized steel
  - 4. Material for Wet Locations: Gasketed Cast aluminum with hinged cover and listed and labeled as Extra Duty Weatherproof While-In-Use.
    - a. Manufacturers:
      - 1) Hubbell: MX3200
      - 2) Red Dot Model: CKLSVU, Thomas & Betts
      - 3) Intermatic: WP3110MXD
      - 4) Leviton: IUM1V

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Prior to installation of devices, verify wall openings are neatly cut and will be completely covered by wall plates, clean debris from outlet boxes and provide extension rings to bring outlet boxes flush with finished surface.
- C. Install devices and assemblies level, plumb, and square with building lines.

**D. Arrangement of Devices:**

1. Coordinate locations of outlet boxes provided under Division 26 Section "Raceways and Boxes" to obtain mounting heights indicated on Drawings.
2. Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top.
3. Where multiple switches, dimmers, and/or occupancy sensors are adjacent to each other, provide a single cover plate. Custom fabricate, if required, for all combinations. Provide separate boxes or barriers as required for the application.
4. Install horizontally mounted receptacles with grounding pole on the left.
5. Install GFCI receptacles so that the "Push To Test" and "Reset" designations can be read correctly. If printed in both directions, install with ground pole on top.
6. Install switches with OFF position down.

E. Install cover plates on switch, receptacle, and blank outlets in finished areas.

F. Install weather-resistant type receptacles in all damp and wet locations.

G. Install weatherproof cover plates on receptacles in damp locations.

H. Install weatherproof While-In-Use cover plates on receptacles in wet locations.

I. Install tamper-resistant type receptacles in all locations as required by the NEC (406.12) and as indicated on plan.

J. Use oversized plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

L. Remove wall plates and protect devices and assemblies during painting.

M. Adjust devices and wall plates to be flush and level. Three corners of wall plates must be in contact with wall surfaces. Devices shall be solidly mounted against the box.

**3.2 IDENTIFICATION**

**A. Comply with Division 26 Section "Electrical Identification."**

1. Receptacles: Identify panelboard and circuit number from which served. Use adhesive label as specified in Division 26 Section "Electrical Identification" with black-filled lettering on back side of wall plate, and durable wire markers or tags inside outlet boxes.
2. Wall Switches: Identify panelboard and circuit number from which served. Use adhesive label as specified in Division 26 Section "Electrical Identification" with black-filled lettering on back side of wall plate, and durable wire markers or tags inside outlet boxes.

### **3.3 CONNECTIONS**

- A. Ground equipment according to Division 26 Section "Grounding and Bonding." Connect wiring device grounding terminal to outlet box with bonding jumper. Use of quick ground strap or screw is not acceptable.
- B. Connect wiring according to Division 26 Section "Conductors and Cables." Connect wiring devices by wrapping conductor around screw terminal or by using back wiring and tightening the screw securely.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.4 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Inspect each wiring device for defects.
  - 2. Operate each wall switch with circuit energized and verify proper operation.
  - 3. After installing wiring devices and after electrical circuitry has been energized, test each receptacle for proper polarity, ground continuity, and compliance with requirements.
  - 4. Test each GFCI receptacle for proper operation with both local and remote fault simulations according to manufacturer's written instructions.
- B. Remove malfunctioning units, replace with new units, and retest as specified above.

**END OF SECTION 26 27 26**

**SECTION 26 28 13 - FUSES**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
1. Cartridge fuses rated 600 V and less for use in switches.

**1.3 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Division 1 Section "Closeout Procedures," include the following:
    - a. Let-through current curves for fuses with current-limiting characteristics.
    - b. Time-current curves, coordination charts and tables, and related data.
    - c. Ambient temperature adjustment information.

**1.4 QUALITY ASSURANCE**

- A. Source Limitations: Obtain fuses from a single manufacturer.



- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with:
  - 1. NEMA FU 1 – Low Voltage Cartridge Fuses.
  - 2. NFPA 70 – National Electrical Code.
  - 3. UL 198C – High-Interrupting-Capacity Fuses, Current-Limiting Types.
  - 4. UL 198E – Class R Fuses.
  - 5. UL 512 – Fuseholders.

## 1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

## 1.6 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. [Cooper Bussmann, Inc.](#)
  - 2. [Eagle Electric Mfg. Co., Inc.](#); Cooper Industries, Inc.
  - 3. [Ferraz Shawmut, Inc.](#)
  - 4. Tracor, Inc.; [Littelfuse, Inc.](#) Subsidiary.

### 2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.
  - 1. Service Entrance: Class RK1, time delay.
  - 2. Feeders: Class RK1, time delay.
  - 3. Motor Branch Circuits: Class RK5, time delay.
  - 4. Other Branch Circuits: Class RK1, time delay.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. Fuses shall be shipped separately. Any fuses shipped installed in equipment, shall be replaced by the Electrical Contractor with new fuses as specified above prior to energization at no additional expense to Owner. All fuses shall be stored in moisture free packaging at job site and shall be installed immediately prior to energization of the circuit in which it is applied.
- B. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

**3.3 IDENTIFICATION**

- A. Install labels indicating fuse rating and type on outside of the door on each fused switch.

**END OF SECTION 26 28 13**

**SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 26 Section "Fuses".
  - 2. Division 26 Section "Hangers and Supports for Electrical Systems".

**1.2 SUMMARY**

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
  - 1. Fusible switches.
  - 2. Non-fusible switches.
  - 3. Enclosures.

**1.3 DEFINITIONS**

- A. GD: General duty.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault circuit-interrupter for equipment protection.
- D. GFLS: Ground-fault circuit-interrupter for life safety.
- E. HD: Heavy duty.
- F. RMS: Root mean square.
- G. SPDT: Single pole, double throw.

**1.4 REFERENCES**

- A. NECA 1: Practices for Good Workmanship in Electrical Contracting.
- B. NETA ATS: Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. NEMA FU 1: Low Voltage Cartridge Fuses.
- E. NEMA KS 1: Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- F. NFPA 70: National Electrical Code.
- G. UL 50: Enclosures for Electrical Equipment, Non-Environmental Considerations.
- H. UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
- I. UL 98: Enclosed and Dead-Front Switches
- J. UL 1077: Supplementary Protectors for Use in Electrical Equipment

**1.5 ACTION SUBMITTALS**

- A. Product Data:
  - 1. For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
  - 2. Enclosure types and details for types other than UL 50E, Type 1.
  - 3. Current and voltage ratings.

4. Short-circuit current rating.

## **1.6 INFORMATIONAL SUBMITTALS**

- A. Field quality-control test reports including the following:
  1. Test procedures used.
  2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

## **1.7 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures," include the following:
  1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

# **PART 2 - PRODUCTS**

## **2.1 GENERAL REQUIREMENTS**

- A. Source Limitations: Obtain products from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

## **2.2 FUSIBLE SWITCHES**

- A. Manufacturers:
  1. Eaton.
  2. ABB.
  3. Siemens Industries, Inc.
  4. Square D by Schneider Electric.
- B. Type HD, Heavy Duty, Three Pole, Single Throw, 600 V(ac), 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
  1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Service-Rated Switches: Labeled for use as service equipment.

## **2.3 NONFUSIBLE SWITCHES**

### **A. Manufacturers:**

1. Eaton.
2. ABB.
3. Siemens Industries, Inc.
4. Square D by Schneider Electric.

### **B. Type HD, Heavy Duty, Three Pole, Single Throw, 600 V(ac), 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.**

### **C. Accessories:**

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Mechanical type, suitable for number, size, and conductor material.

## **2.4 ENCLOSURES**

### **A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, UL 50E, and UL 50, to comply with environmental conditions at installed location.**

### **B. Enclosure Finish:**

1. Gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (UL 50E Type 1)
2. Gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (UL 50E Types 3R, 12)
3. A brush finish on Type 304 stainless steel (UL 50E Type 4-4X stainless steel)

### **C. Conduit Entry: UL 50E Types 4, 4X, and 12 enclosures may not contain knockouts.**

### **D. Operating Mechanism:**

1. Directly operable through front cover of enclosure (UL 50E Type 1).
2. Directly operable through dead front trim of enclosure (UL 50E Type 3R).
3. Cover interlock mechanism must have externally operated override. Override may not permanently disable interlock mechanism, which must return to locked position once override is released. Tool used to override cover interlock mechanism must not be required to enter enclosure in order to override interlock.

- E. Enclosures designated as UL 50E Type 4, 4X stainless steel, 12, or 12K must have dual cover interlock mechanism to prevent unintentional opening of enclosure cover when circuit breaker is ON and to prevent turning circuit breaker ON when enclosure cover is open.

## **2.5 TOGGLE DISCONNECT SWITCH**

### **A. Manufacturers:**

#### **1. Double Pole:**

- a. Hubbell 1372.
- b. Leviton 3032-2W.
- c. Pass & Seymour 7812.
- d. Bryant 30102.

#### **2. Three Pole:**

- a. Hubbell 1379.
- b. Leviton MS303-DSW.
- c. Pass & Seymour 7813.
- d. Bryant 30103.

- B. Description: Heavy duty, 30A, 600 volts, double or three pole as required, single throw, motor rated switch without overload protection. Provide NEMA 1 enclosure and padlock attachment.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 SELECTION OF ENCLOSURES**

- A. Indoor, Dry and Clean Locations: UL 50E, Type 1.
- B. Outdoor Locations: UL 50E, Type 3R.
- C. Other Wet or Damp, Indoor Locations: UL 50E, Type 4.
- D. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: UL 50E, Type 12.

### **3.3 INSTALLATION**

- A. Comply with manufacturer's published instructions.
- B. Special Techniques:
  - 1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
  - 2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
  - 3. Install fuses in fusible devices.
- C. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.
- D. Install switches with off position down.
- E. Install NEMA KS 1 enclosed switch for motor loads ½ HP and larger and equipment loads greater than 30A.
- F. Install toggle disconnect switch, surface mounted, for motor loads less than ½ HP and equipment loads 30A. and less.
- G. Install control wiring from early break contacts in motor disconnect switch to variable frequency controllers to shut down controller when switch is open.
- H. Install equipment on exterior foundation walls at least one inch from wall to permit vertical flow of air behind breaker and switch enclosures.
- I. Support enclosures independent of connecting conduit or raceway system.

### **3.4 IDENTIFICATION**

- A. Comply with requirements in Division 26 Section "Electrical Identification."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.
  - 3. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.

### **3.5 FIELD QUALITY CONTROL**

- A. Prepare for acceptance testing as follows:
  - 1. Inspect mechanical and electrical connections.
  - 2. Verify switch and relay type and labeling verification.
  - 3. Verify rating of installed fuses.



- B. Perform field quality control tests in accordance with Division 26 section "Electrical Testing":
- C. Tests and Inspections for Switches:
  - 1. Visual and Mechanical Inspection:
    - a. Inspect physical and mechanical condition.
    - b. Inspect anchorage, alignment, grounding, and clearances.
    - c. Verify that unit is clean.
    - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
    - e. Verify that fuse sizes and types match the Specifications and Drawings.
    - f. Verify that each fuse has adequate mechanical support and contact integrity.
    - g. Inspect bolted electrical connections for high resistance using one of the following methods:
      - 1) Use low-resistance ohmmeter.
        - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
      - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
        - a) Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS Table 100.12.
    - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on Drawings.
    - i. Verify correct phase barrier installation.
    - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
- D. Nonconforming Work:
  - 1. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
  - 2. Remove and replace defective units and retest.
- E. Collect, assemble, and submit test and inspection reports.
  - 1. Test procedures used.
  - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
  - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

**3.6 ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

**3.7 PROTECTION**

- A. After installation, protect enclosed switches and circuit breakers from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

**3.8 MAINTENANCE**

- A. Infrared Scanning of Enclosed Switches and Breakers: Two months after Substantial Completion, perform infrared scan of joints and connections. Remove covers so joints and connections are accessible to portable scanner. Take visible light photographs at same locations and orientations as infrared scans for documentation to ensure follow-on scans match same conditions for valid comparison.
  - 1. Instruments and Equipment: Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  - 2. Follow-up Infrared Scanning: Perform two follow-up infrared scans of enclosed switches and breakers, one at four months and another at 11 months after Substantial Completion.
  - 3. Instrument: Use infrared-scanning device designed to measure temperature or to detect significant deviations from normal values. Provide documentation of device calibration.
  - 4. Report: Prepare certified report that identifies units checked and that describes scanning results. Include notation of deficiencies detected, remedial actions taken, and scanning observations after remedial action.

**3.9 CLEANING**

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

**END OF SECTION 26 28 16**

**SECTION 26 51 19 - LED INTERIOR LIGHTING**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

**A. Section Includes:**

1. Interior solid-state luminaires that use LED technology.
2. Lighting fixture supports.

**B. Related Requirements:**

1. Division 26 "Lighting Control Devices."

### **1.3 DEFINITIONS**

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lamp: LED and substrate as a replaceable assembly.
- F. LED: Light-emitting diode.
- G. Lumen: Measured output of lamp and luminaire, or both.
- H. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Arrange in order of luminaire designation.
  - 2. Include data on features, accessories, and finishes.
  - 3. Include physical description and dimensions of luminaires.
  - 4. Include emergency lighting units, including batteries and chargers.
  - 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
  - 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project per IES LM-79 and IES LM-80.
    - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products or certified by a qualified independent testing agency.

### **1.5 INFORMATIONAL SUBMITTALS**

- A. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Sample warranty.

### **1.6 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

#### **1.7 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Lamps: 5% attic stock of each type and rating installed. Furnish at least one of each type.

#### **1.8 QUALITY ASSURANCE**

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with:
  1. NFPA 70 - National Electrical Code.
  2. NECA/IESNA 500-1998 – Recommended Practice for Installing Indoor Commercial Lighting Systems.
  3. NECA/IESNA 502-1999 – Recommended Practice for Installing Industrial Lighting Systems.
  4. Code of Federal Regulations (47 CFR 37342).

#### **1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

#### **1.10 COORDINATION**

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

**1.11 WARRANTY**

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) or manufacturer's standard warranty length (whichever is longer) from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 LUMINAIRES (LIGHTING FIXTURES)**

- A. Provide Luminaires as included in specification 26 5700 "Luminaire Product Data." This section contains product data sheets from the basis of design manufacturer with annotations.
- B. Alternate manufacturer products shall be equal in all respects including materials, finishes, photometric performance and energy performance and shall include all options, features, and accessories identified.

**2.2 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Driver
  - 1. Provided as an integrated component of the luminaire or as an external component of an assembly of luminaries.
  - 2. Nominal Input Voltage: All drivers shall be rated for use on either 120V or 277V systems.

**2.3 EMERGENCY LIGHTING UNITS**

- A. General: Self-contained units complying with UL 924.
  - 1. Battery: Sealed, maintenance-free, with minimum 10-year nominal life and special warranty.
  - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
  - 3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

## **2.4 MATERIALS**

### **A. Metal Parts:**

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

### **B. Doors, Frames, and Other Internal Access:** Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

### **C. Diffusers and Globes:**

1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

### **D. Factory-Applied Labels:** Comply with UL 1598 Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
  - a. "USE ONLY" and include specific lamp type.
  - b. Lamp diameter, shape, size, wattage, and coating.
  - c. CCT and CRI for all luminaires.

## **2.5 METAL FINISHES**

### **A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.**

## **2.6 LUMINAIRE FIXTURE SUPPORT COMPONENTS**

### **A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.**

### **B. Single-Stem Hangers:** Unless otherwise specified in Luminaire product data, provide products with a minimum 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

### **C. Wires:** Unless otherwise specified in Luminaire product data, provide products with a minimum ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

- D. Rod Hangers: Unless otherwise specified in Luminaire product data, provide products with a minimum 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 TEMPORARY LIGHTING**

- A. Do not use permanent luminaires for temporary lighting.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and N.E.C.A./I.E.S.N.A. 500-2006 and 502-2006.
- B. Locate ceiling luminaires as indicated on reflected ceiling plan.
- C. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- D. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- E. Install fixture with no gaps between adjacent fixtures or between fixtures and surrounding surfaces. Trims of fixtures shall be properly and uniformly aligned.
- F. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Provide support for luminaire without causing deflection of ceiling or wall.
  - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- G. Wall-Mounted Luminaire Support:



1. Attached using through bolts and backing plates on either side of wall] <Insert means of attachment.
2. Do not attach luminaires directly to gypsum board.

H. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
  2. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
  3. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- I. Comply with requirements in Section 26 05 19 "Conductors and Cables" for wiring connections.
- J. Fixtures shall have their exterior labels removed and shall be thoroughly cleaned.
- K. Locate the remote test/monitor modules identically so that they are visible and they form a straight line when viewed from the end of the corridor or room. Where a suspended ceiling exists, center the modules in adjacent ceiling tiles.

**3.4 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- C. Bond products and metal accessories to branch circuit equipment grounding conductor.
- D. Connect luminaires to branch circuit outlet boxes provided under Division 26 Section "Raceways and Boxes" using 1/2" flexible conduit.

**3.5 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

**3.6 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.
- D. A visual inspection shall be performed to verify cleanliness and alignment of the fixtures, misalignment and light leaks shall be corrected, and rattles due to ventilation system vibration shall be eliminated.

### **3.7 CLEANING**

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures and lenses.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

**END OF SECTION 26 51 19**



|               |                    |
|---------------|--------------------|
| Project Name: | Approved By:       |
| Catalog No:   | Type No: <b>E1</b> |

## DÉCOR DESIGNER DP

Recessed LED Emergency Light

The Decor Designer DP series provides a fully recessed, self-contained emergency lighting fixture suitable for ceiling or wall installation. By recessing the main housing the DP series provides a clean and unobtrusive emergency light to blend with your chosen Decor.



### CONSTRUCTION

- The Decor Designer DP series provides a fully recessed, self-contained emergency lighting fixture suitable for ceiling or wall installation. By recessing the main housing the DP series provides a clean and unobtrusive emergency light to blend with your chosen Decor
- One-piece, steel housing recesses into wall or ceiling. The lamp head plate is secured by torsion spring clips eliminating the need for fixing screws while allowing for ease of installation and maintenance
- Sturdy 20 gauge steel cabinet with multiple knockout entries. Lamp head plate is finished in a durable white powder coat (other colors available to order)

### ELECTRICAL

- Higher capacity units provide for additional remote lighting loads
- Choice of maintenance free sealed Lead Calcium or Nickel Cadmium batteries, minimum 90 minute operation
- Brown out sensing assures emergency operation during periods of low line voltage
- Premium, fully automatic current limited "Pulse Switching" charger provides ideal charge conditions for optimum battery performance and life
- Short Circuit battery protection

- Field selectable 120 or 277 VAC input
- Momentary test switch and dual diagnostic LED indicator displays AC presence and Hi-Charge status
- Line-latch prevents unnecessary discharge of battery during installation, loads will not illuminate until after application of utility power
- Low voltage cut-off prevents battery damage and ensures positive charge acceptance following an extended discharge
- Self-Test / Self-Diagnostic monitoring available

### ILLUMINATION

- Available with two fully adjustable PAR 36 or the smaller PAR 18 lighthoods, which are now available with MR16 LED lamps. Standard lamp is 9 watt.

### CERTIFICATION

- Listed to UL 924, meets NFPA 101 Life Safety Code, NFPA 70-NEC and OSHA requirements
- Buy American Act compliant

### WARRANTY

- 3 year limited warranty- view complete warranty terms online at [www.evenlite.com/terms-warranty](http://www.evenlite.com/terms-warranty).

### ORDERING GUIDE

DP2E18-2-L65-SD

| MODEL | OPERATING VOLTAGE / WATTAGE                |                                                          | NO. OF LIGHTHEADS   | LAMP OPTIONS                         | OPTIONS                                      |
|-------|--------------------------------------------|----------------------------------------------------------|---------------------|--------------------------------------|----------------------------------------------|
| DP    | LEAD CALCIUM BATTERY<br>90 MINUTE CAPACITY | <del>NICKEL CADMIUM BATTERY<br/>90 MINUTE CAPACITY</del> | 0 No Lighthoods     | W69 6V 9W Tungsten Standard          | SD Self-Test / Self-diagnostic               |
|       |                                            |                                                          | 2 Double Lighthoods | W129 12V 9W Tungsten Standard        | TD 15 Minute Time Delay (Specify AC Voltage) |
|       | 2E18 6 Volt - 18 Watts                     | 2N22 6 Volt - 22 Watts                                   |                     | L65 6V 5W LED PAR 18 Thermoplastic   | B Black Housing and Heads                    |
|       | 2E27 6 Volt - 27 Watts                     | 2N42 6 Volt - 42 Watts                                   |                     | L67 6V 7W LED PAR 18 Thermoplastic   |                                              |
|       | 2E36 6 Volt - 36 Watts                     | 4N42 12 Volt - 42 Watts                                  |                     | L125 12V 5V LED PAR 18 Thermoplastic |                                              |
|       | 4E36 12 Volt - 36 Watts                    |                                                          |                     | L127 12V 7W LED PAR 18 Thermoplastic |                                              |
| DP    |                                            |                                                          |                     |                                      |                                              |

Fill in fields from categories above and complete type and part number.

Type No:

Full Part No:



EVENLITE.COM | 2575 METROPOLITAN DRIVE TREVISO, PA 19053 | O: 1.800.872.0879 | F: 215.244.4208  
SPECIFICATIONS AND DETAILS ARE SUBJECT TO CHANGE WITHOUT NOTIFICATION. CONTACT EVENLITE FOR UP TO DATE DETAILS.

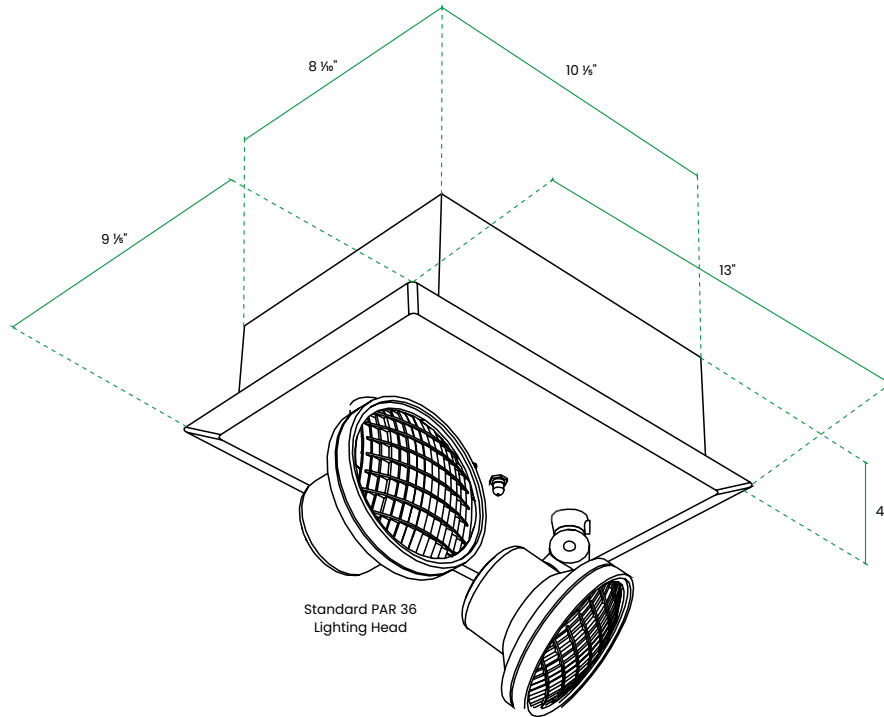
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## DÉCOR DESIGNER DP

Recessed LED Emergency Light

### DIMENSIONS

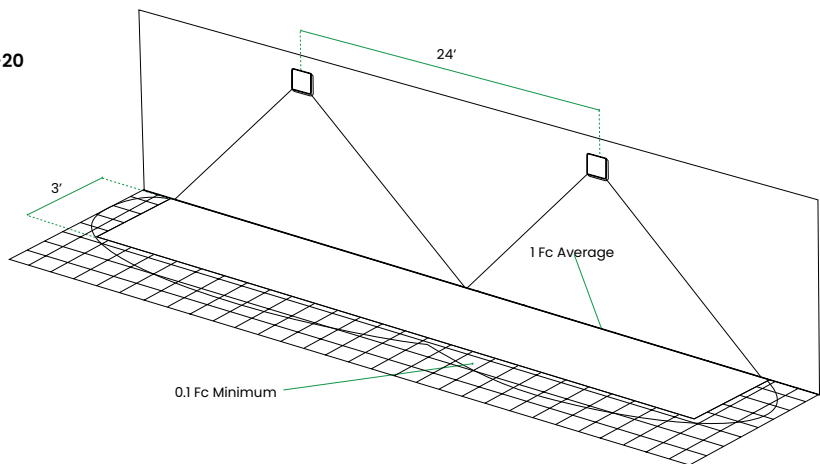


### COMPATIBLE MR16 LIGHTHEADS

| VOLTAGE / WATTAGE | LUMENS |
|-------------------|--------|
| 6 OR 12 V 5W LED  | 300    |
| 6 OR 12 V 7W LED  | 382    |

### SPACING DIAGRAM

MOUNTING HEIGHT IS 8' REFLECTANCE OF 80-50-20





## FEATURES & SPECIFICATIONS

**INTENDED USE** — Built on the compact, low-profile Z strip channel, this LED strip offers long maintenance-free life, several color temperatures, lumen outputs and lengths. Ideal for new construction and retrofit applications in T8 lengths. Ideal for use in commercial, retail, manufacturing, warehouse, and display applications. **Certain airborne contaminants can diminish the integrity of acrylic and/or polycarbonate. Click here for Acrylic-Polycarbonate Compatibility table for suitable uses.**

**CONSTRUCTION** — Compact-design channel and cover are formed from code-gauge cold-rolled steel. Easy to install six-point row aligner included for continuous row mounting.

**Finish:** Paint options include high-gloss, baked white enamel (WH), or matte black (MB). After fabrication, five-stage iron phosphate pre-treatment ensures superior paint adhesion and rust resistance.

**OPTICS** — Standard diffuse snap on/snap off lens eliminates pixels, improves uniformity and minimizes glare.

**ELECTRICAL** — Utilizes high-output LEDs integrated on a two-layer circuit board, ensuring cool-running operation. Optional internal pluggable wiring harness for reduced labor cost in row mounting applications (see PLR ordering information on page 5). Electronic LED driver is rated for 75 input watts maximum (see Operational Data on page 4 for actual wattage consumption), **multi-volt input and 0-10V dimming standard**. This fixture is designed to withstand a maximum line surge of 2.5kV at 0.75kA combination wave for indoor locations, for applications requiring higher level of protection additional surge protection must be provided.

LEDs provide 80CRI or 90 CRI at 3000 K, 3500 K, 4000 K or 5000 K.

Lumen output up to 1,500 lumens per foot. Luminaire should be installed in applications where ambient temperatures do not exceed 86°F (30°C).

**INSTALLATION** — Fixture may be surface mounted (with or without ZSPRG hanger), pendant or stem mounted with appropriate mounting options. Six-point aligner locks in place for easy continuous row mounting.

**LISTINGS** — CSA certified to US and Canadian safety standards. For use in damp locations between -40°F (-40°C) and 86°F (30°C).

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at [www.designlights.org/QPL](http://www.designlights.org/QPL) to confirm which versions are qualified.

**GOVERNMENT PROCUREMENT** — BAA — Product with the BAA option qualifies as a domestic end product under the Buy American Act as implemented in the FAR and DFARS. Product with the BAA option also qualifies as manufactured in the United States under DOT Buy America regulations. BABA — Build America Buy America: Product with the BAA option also qualifies as produced in the United States under the definitions of the Build America, Buy America Act.

Please refer to [www.acuitybrands.com/buy-american](http://www.acuitybrands.com/buy-american) for additional information.

**WARRANTY** — 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at:

[www.acuitybrands.com/support/warranty/terms-and-conditions](http://www.acuitybrands.com/support/warranty/terms-and-conditions)

**Note:** Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

|                |
|----------------|
| Catalog Number |
| Notes          |
| Type           |

L1



LED Striplight

ZL1D

24", 48" and 96" Lengths



### Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® or control networks marked by a **shaded background**\*

To learn more about A+, visit [www.acuitybrands.com/aplus](http://www.acuitybrands.com/aplus).

\*See ordering tree for details

## ZL1D LED Striplight

A+ Capable options indicated  
by this color background.

## ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: ZL1D L48 3000LM FST MVOLT 40K 80CRI WH

| Series                 | Length    | Reflectors†            | Nominal lumens†       | Diffuser      | Voltage        | Color temperature | Color rendering index |
|------------------------|-----------|------------------------|-----------------------|---------------|----------------|-------------------|-----------------------|
| ZL1D LED striplight    | L24 24" ‡ | (blank) Less reflector | 1500LM 1,500 lumens   | FST Drop lens | MVOLT 120-277V | 27K 2700 K        | 80CRI 80 CRI          |
|                        |           | SMR Symmetric          | 2500LM 2,500 lumens   |               | 120 120V       | 30K 3000 K        | 90CRI 90 CRI          |
|                        |           |                        | 3500LM 3,500 lumens   |               | 208 208V       | 35K 3500 K        |                       |
|                        | L48 48" ‡ | (blank) Less reflector | 3000LM 3,000 lumens   |               | 240 240V       | 40K 4000 K        |                       |
|                        |           | ASR Asymmetric         | 5000LM 5,000 lumens   |               | 277 277V       | 50K 5000 K        |                       |
|                        |           | SMR Symmetric          | 7000LM 7,000 lumens   |               | 347 347V ‡     |                   |                       |
| TZL1D LED striplight ‡ | L96 96" ‡ | (blank) Less reflector | 6000LM 6,000 lumens   |               | 480 480V ‡     |                   |                       |
|                        |           | SMR Symmetric          | 10000LM 10,000 lumens |               |                |                   |                       |
|                        |           |                        | 14000LM 14,000 lumens |               |                |                   |                       |

| Options                 |                                                                                                                                                                                   |                      |                                                                                                                       | Paint finish                                             |  |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--|
| PLR___                  | Plug-in wiring ‡                                                                                                                                                                  | For EM fixtures only | <b>Individual Controls ‡</b>                                                                                          | WH White                                                 |  |
| PLR1LVG                 | Plug-in wiring-low voltage ‡                                                                                                                                                      |                      | LBOZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), ON/OFF occupancy, pre-wired (LINK) ‡                  | MB Matte black                                           |  |
| E7W                     | Emergency battery pack, 7W                                                                                                                                                        |                      | LBHOSZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), high/low occupancy dimming, pre-wired (LINK) ‡      | GALVB Galvanized fixture with black plastic lens endcaps |  |
| 2E7W                    | Two Emergency battery packs, 7W                                                                                                                                                   |                      | LBPZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), ON/OFF photocell, pre-wired (LINK) ‡                  | GALVW Galvanized fixture with white plastic lens endcaps |  |
| E10WLCP                 | Emergency battery pack, 10W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                              |                      | LBMOSZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), dimming and switching photocell, pre-wired (LINK) ‡ |                                                          |  |
| 2E10WLCP                | Two Emergency battery packs, 10W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                         |                      | <b>Cord sets: ‡</b>                                                                                                   |                                                          |  |
| E15WLCP                 | Emergency battery pack, 15W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                              |                      | CS1W Cord with NEMA 5-15P, 120V straight blade plug, 18 gauge, 3 conductors, white, 6ft                               |                                                          |  |
| OUTEND                  | Cord set to exit endplate of fixture                                                                                                                                              |                      | CS3W Cord with NEMA L5-15P, 120V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                  |                                                          |  |
| BAA                     | Buy America(n) Act and/or Build America Buy America Qualified                                                                                                                     |                      | CS7W Cord with NEMA 7-15P, 277V straight blade plug, 18 gauge, 3 conductors, white, 6ft                               |                                                          |  |
| <b>nLight® Wireless</b> |                                                                                                                                                                                   |                      | CS11W Cord with NEMA L7-15P, 277V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                 |                                                          |  |
| NLTAIR2 RLSXR10         | nLight® Air Generation 2 enabled, 360° low mount sensor, (7 to 15' heights) (LINK)                                                                                                |                      | CS25W Cord with NEMA L24-20P, 347V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                |                                                          |  |
| NLTAIR2 RLSXR10EM       | nLight® Air Generation 2 enabled, 360° low mount sensor, (7 to 15' heights), UL 924 Emergency Operation, via power interrupt detection (not available with battery pack) (LINK) ‡ |                      | CS97W Cord with NEMA L8-20P, 480V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                 |                                                          |  |
|                         |                                                                                                                                                                                   |                      | CS93W Cord only (no plug), 18 gauge, 3 conductors, white, 6ft                                                         |                                                          |  |

| Accessories: Order as separate catalog number. |                                                                                       |                        |                                                    |
|------------------------------------------------|---------------------------------------------------------------------------------------|------------------------|----------------------------------------------------|
| HC36 M12                                       | Hanger chain, 36" (1 pair)                                                            | ZLR L24 SYM UPL WH     | 24" symmetric reflector with uplight, white finish |
| ZACVH M100                                     | Adjustable 10' aircraft cable with Y hanger (1 pair)                                  | ZLR L24 SYM WH         | 24" symmetric reflector, white finish              |
| ZLANGBKT                                       | Luma-tilt™ angle bracket for shelf or ledge mounting only                             | ZLR L46 SYM UPL WH     | 46" symmetric reflector with uplight, white finish |
| SQ___                                          | Swivel stem hanger (specify length in 2" increments up to 48")                        | ZLR L46 SYM WH         | 46" symmetric reflector, white finish              |
| NPP16D                                         | nLight® wired power/relay pack, 0-10VDC dimming output (LINK)                         | ZLR L48 ASY WH         | 48" asymmetric reflector, white finish             |
| RPP20D                                         | nLight® air Generation 2 enabled, power/relay pack, 0-10V dimming output (LINK)       | ZLR L48 SYM UPL WH     | 48" symmetric reflector with uplight, white finish |
| LSXR                                           | Sensor Switch® LSXR occupancy sensor (LINK)                                           | ZLR L48 SYM WH         | 48" symmetric reflector, white finish              |
| ZSPRG J2                                       | Tong and T-grid hanger, for 15/16" T-grid (Order quantity required in multiples of 2) | ZLR L92 SYM UPL WH     | 92" symmetric reflector with uplight, white finish |
| WGZ24                                          | 24" wireguard, white ‡                                                                | ZLR L92 SYM WH         | 92" symmetric reflector, white finish              |
| WGZ48                                          | 48" wireguard, white ‡                                                                | ZLR L96 SYM UPL WH     | 96" symmetric reflector with uplight, white finish |
|                                                |                                                                                       | ZLR L96 SYM WH         | 96" symmetric reflector, white finish              |
|                                                |                                                                                       | UNIVERSAL REFL ALIGNER | Universal reflector aligners, quantity 1           |

## ZL1D LED Striplight

| ‡ Option Value Ordering Restrictions |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option value                         | Restriction                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2E7W                                 | Utilizes (2) Power Sentry PS750L emergency drivers. MVOLT required. Available with L96 only. Not available with L24, L48, L96 6000LM or any cordset that includes a plug.                                                                                                                                                                                                                                                   |
| 2E10WLCP                             | Utilizes (2) Power Sentry PS1055LCP emergency drivers. MVOLT required. Available with L96 10,000LM or 14000LM only. Not available with L24, L48, L96 6000LM or any cordset that includes a plug.                                                                                                                                                                                                                            |
| 347, 480                             | Utilizes step down transformer.                                                                                                                                                                                                                                                                                                                                                                                             |
| Cordsets                             | Must specify voltage when plug is included. CS93W available with MVOLT. Cordsets exit back of fixture unless OUTEND option is specified.                                                                                                                                                                                                                                                                                    |
| E7W                                  | Utilizes Power Sentry PS750L emergency driver. MVOLT required. Not available with L24 or any cordset that includes a plug.                                                                                                                                                                                                                                                                                                  |
| E10WLCP                              | Utilizes Power Sentry PS1055LCP emergency driver. MVOLT required. Available with L48 or L96 only. Not available with L24 or any cordset that includes a plug.                                                                                                                                                                                                                                                               |
| E15WLCP                              | Utilizes Power Sentry PS1555LCP emergency driver. MVOLT required. Available with L96 only. Not available with L24, L48 or any cordset that includes a plug.                                                                                                                                                                                                                                                                 |
| Individual Controls                  | Available with MVOLT, 347 or 480 only. See ordering information on page 6 for more configurations. This sensor configuration is suitable for minimum ambient temperature of 14°F (-10°C). See page 6 for low temperature option providing -4°F (-20°C) minimum ambient. When choosing Sensor and PLR for same fixture, consult the factory. Sensors come prewired, they must be snapped into place at time of installation. |
| L24                                  | Not available with 347V, 480V or Batteries                                                                                                                                                                                                                                                                                                                                                                                  |
| nLight® Wireless                     | See (LINK) in sensor description to RLSXR specification sheet for more configurations. When choosing a sensor and PLR for same fixture, consult the factory. Sensors come prewired, they must be snapped into place at time of installation.                                                                                                                                                                                |
| NLTAIR2 RLSXR10EM                    | MVOLT only.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Nominal Lumens                       | See Operational Data on page 4 for actual lumens.                                                                                                                                                                                                                                                                                                                                                                           |
| PLR __                               | Not available with cordset options. See ordering information on page 5. When choosing a sensor and PLR for the same fixture, consult the factory.                                                                                                                                                                                                                                                                           |
| PLR1LVG                              | Not available with cordset options.                                                                                                                                                                                                                                                                                                                                                                                         |
| Reflectors                           | Optional. Reflectors ship separately.                                                                                                                                                                                                                                                                                                                                                                                       |
| TZL1D                                | Tandem fixture comes as two L48 fixtures                                                                                                                                                                                                                                                                                                                                                                                    |
| WGZ24                                | Not available with ASR or SMR reflector options.                                                                                                                                                                                                                                                                                                                                                                            |
| WGZ48                                | Not available with ASR or SMR reflector options. Order a Qty of 2 for L96 tandem fixtures.                                                                                                                                                                                                                                                                                                                                  |

ZL1D LED Striplight

| OPERATIONAL DATA |                       |                 |                                                              |        |                                                              |        |                                                              |        |                                                              |        |                     |                                          |
|------------------|-----------------------|-----------------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|---------------------|------------------------------------------|
|                  | Nominal lumen package | Length (inches) | Delivered Lumens 3000K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 3500K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 4000K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 5000K CCT @ 77°F (25°C) ambient temperature |        | Wattage @ 120V/277V | Comparable Light Source                  |
|                  |                       |                 | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI |                     |                                          |
| Lensed           | 1500LM                | 24              | 1985                                                         | 1619   | 2030                                                         | 1675   | 2061                                                         | 1707   | 2137                                                         | 1745   | 17                  | 1-lamp 17W T8                            |
|                  | 2500LM                | 24              | 2682                                                         | 2187   | 2742                                                         | 2264   | 2785                                                         | 2307   | 2887                                                         | 2358   | 22                  | 1-lamp 17W T8                            |
|                  | 3500LM                | 24              | 4099                                                         | 3341   | 4190                                                         | 3459   | 4255                                                         | 3524   | 4412                                                         | 3603   | 36                  | 1-lamp 32W T8, 1-lamp 54W T5H0, 50W HID  |
|                  | 3000LM                | 48              | 3880                                                         | 3163   | 3966                                                         | 3274   | 4028                                                         | 3336   | 4176                                                         | 3410   | 30                  | 1-lamp 32W T8, 1-lamp 54W T5H0, 50W HID  |
|                  | 5000LM                | 48              | 5337                                                         | 4351   | 5456                                                         | 4504   | 5541                                                         | 4589   | 5745                                                         | 4691   | 41                  | 2-lamp 32W T8, 1-lamp 54W T5H0, 70W HID  |
|                  | 7000LM                | 48              | 7317                                                         | 5965   | 7480                                                         | 6175   | 7596                                                         | 6291   | 7876                                                         | 6431   | 59                  | 3-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 6000LM                | 96              | 8077                                                         | 6585   | 8257                                                         | 6816   | 8386                                                         | 6945   | 8694                                                         | 7099   | 60                  | 3-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 10000LM               | 96              | 11021                                                        | 8985   | 11267                                                        | 9301   | 11442                                                        | 9477   | 11864                                                        | 9687   | 81                  | 4-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 14000LM               | 96              | 15397                                                        | 12553  | 15741                                                        | 12995  | 15986                                                        | 13240  | 16574                                                        | 13534  | 121                 | 4-lamp 32W T8, 3-lamp 54W T5H0, 150W HID |

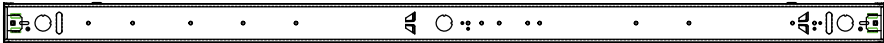
PROJECTED LUMEN MAINTENANCE

| Operating Hours          | 0 | 15,000 | 30,000 | 45,000 | 60,000 | 100,000 |
|--------------------------|---|--------|--------|--------|--------|---------|
| Lumen Maintenance Factor | 1 | 0.94   | 0.89   | 0.83   | 0.79   | 0.67    |

DIMENSIONS

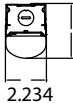
All dimensions are shown in inches (centimeters) unless otherwise noted.  
Specifications subject to change without notice.

| PALLET DIMENSIONS |                    |                     |                                           |
|-------------------|--------------------|---------------------|-------------------------------------------|
| Length            | Approximate weight | Fixtures per pallet | Approximate pallet dimensions (L x W x H) |
| L24               | 7 lbs.             | 176                 | 46" X 51" X 31 5/8"                       |
| L48               | 13 lbs.            | 176                 | 46" X 51" X 31 5/8"                       |
| L96               | 26 lbs.            | 63                  | 46" X 98 1/2" X 31 3/8"                   |



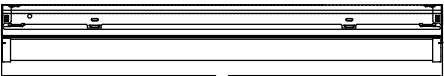
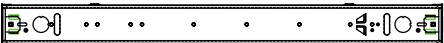
48.028

ZL1D L48



2.9882

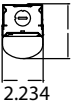
2.234



24.028

ZL1D L24

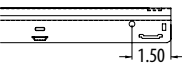
Knockout hole is .86in in diameter.



2.9882

2.234

Mounting Hole Location - All Lengths

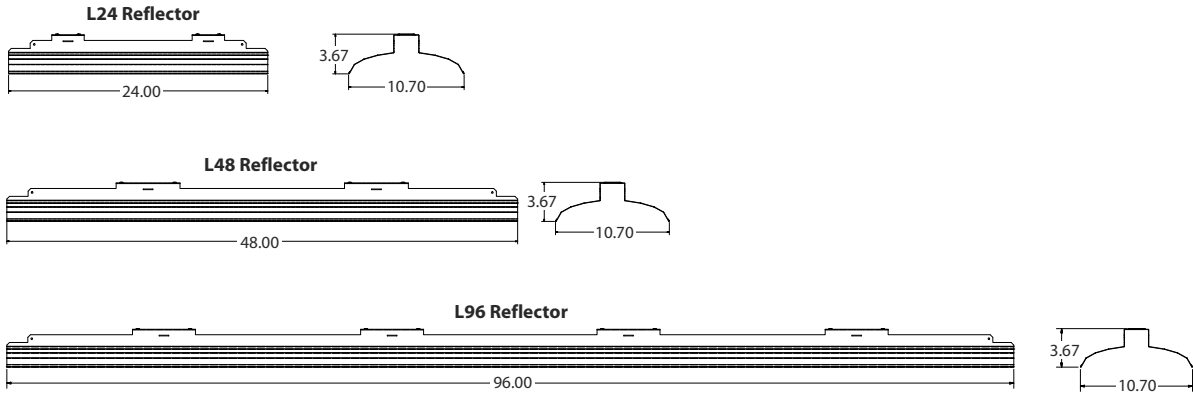


ZL1D



ZL1D LED Striplight

REFLECTORS (Optional)



PHOTOMETRICS

Please see [www.lithonia.com](http://www.lithonia.com)

PLUG-IN WIRING INFORMATION

Advanced plug-in system with two-circuit capability. Available on industrial and strip products and a variety of architectural products mounted in continuous rows. PLR22 (2-circuit) and crossover harness switches hot circuit serving next fixture in row. Reduces fixture types on job for alternating circuit applications (see example below.)

Easy one-step installation, saves up to 35% on labor costs. Expanded switching flexibility helps save energy.

Rows can be 50% longer with two-circuit systems. Polarized, lock-together nylon connectors prevent miswiring in the field. #12 THHN conductor, rated 600V, 90°C. White neutral wire included. Grounding accomplished by fixture in-row connectors.

CSA certified systems available with up to 2 circuits. G ground required.

Not for use with dedicated emergency circuits.

Note: Specifications subject to change without notice.



Wiring

PLR

Advanced 1 or 2-Circuit Plug-In

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

| Series | Number of hot wires            | Branch circuits                               | Dimming                | Ground              |
|--------|--------------------------------|-----------------------------------------------|------------------------|---------------------|
| PLR    | (blank) Not required for PLR22 | Circuits to which driver is connected         | LV Low-voltage dimming | G Ground (required) |
| PLR22  | 1 Black                        | (blank) Not required for PLR22 or PLR1        |                        |                     |
|        | 2 Black and red                | A Black wire                                  |                        |                     |
|        |                                | B Red wire                                    |                        |                     |
|        |                                | Battery charging circuit (must be unswitched) |                        |                     |
|        |                                | (blank) No battery charging circuit           |                        |                     |
|        |                                | ELA Battery pack circuit wired to black wire  |                        |                     |
|        |                                | ELB Battery pack circuit wired to red wire    |                        |                     |

Typical Applications

- Multiple-circuit and single-circuit for longer continuous rows
- Multiple-circuit with alternating fixtures on separate circuits and 2-circuit PLR22
- Multiple circuit with night-lights located along row as desired

ZL1D LED Striplight

LSXR — Fixture Mount Occupancy Sensor (see [www.AcuityControls.com](http://www.AcuityControls.com) for additional information)

- Three interchangeable lens options to satisfy multiple mounting heights and coverage pattern requirements.
- Integrated mounting bracket drops lens down 3" from chase nipple.
- Single or dual relay versions — designed with robust protection from the harsh switching requirements of T5 and LED loads.
- Photocell and 0-10VDC dimming options.
- No PIR field calibration or sensitivity adjustments required.
- Sensor ambient temperature rating of 14°F (-10°C) to 131°F (55°C).

| LSXR configuration                                                   | Comparable CMRB sensor | Old style sensor nomenclature |
|----------------------------------------------------------------------|------------------------|-------------------------------|
| For shortest lead times use one of the following LSXR configurations |                        |                               |
| LCOZU                                                                | CMRB 50                | MSI                           |
| LCHOSZU                                                              | CMRB 50 D              | MSID                          |
| LCPZU                                                                | CMRB 50 P              | MSIPED                        |
| LAOZU                                                                | CMRB 6                 | MSI360                        |
| LAHOSZU                                                              | CMRB 6 D               | MSI360D                       |
| LAPZU                                                                | CMRB 6 P               | MSI360PED                     |

SELECTIONS BELOW WILL EXTEND ORDER LEAD TIME. CONSULT YOUR SALES REPRESENTATIVE FOR DETAILS.

SINGLE RELAY

ORDERING INFORMATION

Example: LAHOSZU

| Series                                          | Lens option           | Dimming/Photocell                                                   | Max. dim level | Min. dim level                 | Temp/Humidity                  | Default occupancy time delay                |
|-------------------------------------------------|-----------------------|---------------------------------------------------------------------|----------------|--------------------------------|--------------------------------|---------------------------------------------|
| L LSXR passive infrared indoor occupancy sensor | A High mount, 360°    | O None <sup>1</sup>                                                 | 0 10 VDC       | S Minimum dim level of ballast | Z None                         | I 30 sec                                    |
|                                                 | B Low mount, 360°     | H High/low occupancy operation                                      | 9 9 VDC        | 1 1 VDC                        | T Low temperature <sup>2</sup> | D 2.5 min                                   |
|                                                 | C High mount aisleway | P Switching photocell (on/off) <sup>1</sup>                         | 8 8 VDC        | 2 2 VDC                        |                                | X 5.0 min                                   |
|                                                 |                       | M Dimming and switching photocell                                   | 7 7 VDC        | 3 3 VDC                        |                                | R 7.5 min                                   |
|                                                 |                       | G Dimming and switching photocell with high/low occupancy operation |                | 4 4 VDC                        |                                | U 10.0 min (with minimum 15 minute on time) |
|                                                 |                       |                                                                     |                | 5 5 VDC                        |                                | V 15.0 min                                  |
|                                                 |                       |                                                                     |                | 6 6 VDC                        |                                | W 20.0 min                                  |
|                                                 |                       |                                                                     |                |                                |                                | Y 30.0 min                                  |

- Notes
- 1 Max and min dim levels not applicable with this option.
  - 2 Ambient temperature rating of -4°F (-20°C) to 131°F (55°C).

DUAL RELAY (Available with 120, 277, and 347V only)

ORDERING INFORMATION

Example: LA2KZU

| Series                                          | Lens option           | Poles        | Operating mode                                     | Temp/Humidity           | Default occupancy time delay                   |
|-------------------------------------------------|-----------------------|--------------|----------------------------------------------------|-------------------------|------------------------------------------------|
| L LSXR passive infrared indoor occupancy sensor | A High mount, 360°    | 2 Dual relay | J None                                             | Z None                  | I 30 sec                                       |
|                                                 | B Low mount, 360°     |              | K Alternating off relays (promotes even lamp wear) | T Low tempera-<br>ture¹ | D 2.5 min                                      |
|                                                 | C High mount aisleway |              | O Alternating off relays w/photocell               |                         | X 5.0 min                                      |
|                                                 |                       |              | P Switching photocell(on/off)                      |                         | R 7.5 min                                      |
|                                                 |                       |              | E Photocell on/off (pole 1 only)                   |                         | U 10.0 min (with minimum<br>15 minute on time) |
|                                                 |                       |              | F Photocell on/off - both poles (dual set-point)   |                         | V 15.0 min                                     |
|                                                 |                       |              |                                                    |                         | W 20.0 min                                     |
|                                                 |                       | Y 30.0 min   |                                                    |                         |                                                |

- Notes
- 1 Ambient temperature rating of -4°F (-20°C) to 131°F (55°C).

Example: LENS 50 J100

| Replacement lenses: Order as separate catalog number. |                        |                     |
|-------------------------------------------------------|------------------------|---------------------|
| Series                                                | Lens type              | Package quantity    |
| LENS                                                  | 6 High mount 360°      | [blank] Single Lens |
|                                                       | 10 Low mount 360°      | J10 10-pack         |
|                                                       | 50 High mount aisleway | J100 100-pack       |

ZL1D LED Striplight

OPTIONS AND ACCESSORIES

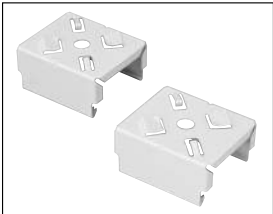
The Z Series fixture offers numerous options for almost every electrical and optical component, including a long list of field-installable accessories.



HANGER CHAIN

36" chain with Y hanger.

Order as:  
HC36



ZSPRING HANGER

Snap 'n' lock design requires no fasteners and can be used on T-grid ceiling or universal mounting systems.

Order as:  
ZSPRG



ZACVH HANGER

10' Aircraft cable with Y hanger.

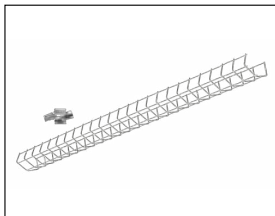
Order as:  
ZACVH



ANGLE MOUNTING BRACKET

Luma-tilt™ angle bracket ships as a pair

Order as:  
ZLANGBKT



WIRE GUARD

Order as:  
WGZ24  
WGZ48



## FEATURES & SPECIFICATIONS

**INTENDED USE** — Built on the compact, low-profile Z strip channel, this LED strip offers long maintenance-free life, several color temperatures, lumen outputs and lengths. Ideal for new construction and retrofit applications in T8 lengths. Ideal for use in commercial, retail, manufacturing, warehouse, and display applications. **Certain airborne contaminants can diminish the integrity of acrylic and/or polycarbonate. Click here for Acrylic-Polycarbonate Compatibility table for suitable uses.**

**CONSTRUCTION** — Compact-design channel and cover are formed from code-gauge cold-rolled steel. Easy to install six-point row aligner included for continuous row mounting.

**Finish:** Paint options include high-gloss, baked white enamel (WH), or matte black (MB). After fabrication, five-stage iron phosphate pre-treatment ensures superior paint adhesion and rust resistance.

**OPTICS** — Standard diffuse snap on/snap off lens eliminates pixels, improves uniformity and minimizes glare.

**ELECTRICAL** — Utilizes high-output LEDs integrated on a two-layer circuit board, ensuring cool-running operation. Optional internal pluggable wiring harness for reduced labor cost in row mounting applications (see PLR ordering information on page 5). Electronic LED driver is rated for 75 input watts maximum (see Operational Data on page 4 for actual wattage consumption), **multi-volt input and 0-10V dimming standard**. This fixture is designed to withstand a maximum line surge of 2.5kV at 0.75kA combination wave for indoor locations, for applications requiring higher level of protection additional surge protection must be provided.

LEDs provide 80CRI or 90 CRI at 3000 K, 3500 K, 4000 K or 5000 K.

Lumen output up to 1,500 lumens per foot. Luminaire should be installed in applications where ambient temperatures do not exceed 86°F (30°C).

**INSTALLATION** — Fixture may be surface mounted (with or without ZSPRG hanger), pendant or stem mounted with appropriate mounting options. Six-point aligner locks in place for easy continuous row mounting.

**LISTINGS** — CSA certified to US and Canadian safety standards. For use in damp locations between -40°F (-40°C) and 86°F (30°C).

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at [www.designlights.org/QPL](http://www.designlights.org/QPL) to confirm which versions are qualified.

**GOVERNMENT PROCUREMENT** — BAA — Product with the BAA option qualifies as a domestic end product under the Buy American Act as implemented in the FAR and DFARS. Product with the BAA option also qualifies as manufactured in the United States under DOT Buy America regulations. BABA — Build America Buy America: Product with the BAA option also qualifies as produced in the United States under the definitions of the Build America, Buy America Act.

Please refer to [www.acuitybrands.com/buy-american](http://www.acuitybrands.com/buy-american) for additional information.

**WARRANTY** — 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at:

[www.acuitybrands.com/support/warranty/terms-and-conditions](http://www.acuitybrands.com/support/warranty/terms-and-conditions)

**Note:** Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

|                |     |
|----------------|-----|
| Catalog Number |     |
| Notes          |     |
| Type           | L1S |



LED Striplight

# ZL1D

24", 48" and 96" Lengths



### Capable Luminaire

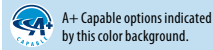
This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® or control networks marked by a **shaded background**\*

To learn more about A+, visit [www.acuitybrands.com/aplus](http://www.acuitybrands.com/aplus).

\*See ordering tree for details

## ZL1D LED Striplight



### ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: ZL1D L48 3000LM FST MVOLT 40K 80CRI WH

| Series                 | Length    | Reflectors†            | Nominal lumens†       | Diffuser      | Voltage        | Color temperature | Color rendering index |
|------------------------|-----------|------------------------|-----------------------|---------------|----------------|-------------------|-----------------------|
| ZL1D LED striplight    | L24 24" ‡ | (blank) Less reflector | 1500LM 1,500 lumens   | FST Drop lens | MVOLT 120-277V | 27K 2700 K        | 80CRI 80 CRI          |
|                        |           | SMR Symmetric          | 2500LM 2,500 lumens   |               | 120 120V       | 30K 3000 K        | 90CRI 90 CRI          |
|                        |           |                        | 3500LM 3,500 lumens   |               | 208 208V       | 35K 3500 K        |                       |
|                        | L48 48" ‡ | (blank) Less reflector | 3000LM 3,000 lumens   |               | 240 240V       | 40K 4000 K        |                       |
|                        |           | ASR Asymmetric         | 5000LM 5,000 lumens   |               | 277 277V       | 50K 5000 K        |                       |
|                        |           | SMR Symmetric          | 7000LM 7,000 lumens   |               | 347 347V ‡     |                   |                       |
| TZL1D LED striplight ‡ | L96 96" ‡ | (blank) Less reflector | 6000LM 6,000 lumens   |               | 480 480V ‡     |                   |                       |
|                        |           | SMR Symmetric          | 10000LM 10,000 lumens |               |                |                   |                       |
|                        |           |                        | 14000LM 14,000 lumens |               |                |                   |                       |

| Options           |                                                                                                                                                                                   |                       |                                                                                                                       | Paint finish |                                                    |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------|
| PLR__             | Plug-in wiring ‡                                                                                                                                                                  | Individual Controls ‡ | LBOZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), ON/OFF occupancy, pre-wired (LINK) ‡                  | WH           | White                                              |
| PLR1LVG           | Plug-in wiring-low voltage ‡                                                                                                                                                      |                       |                                                                                                                       | MB           | Matte black                                        |
| E7W               | Emergency battery pack, 7W                                                                                                                                                        |                       |                                                                                                                       | GALVB        | Galvanized fixture with black plastic lens endcaps |
|                   | CA Title 20 Noncompliant ‡                                                                                                                                                        |                       |                                                                                                                       | GALVW        | Galvanized fixture with white plastic lens endcaps |
| 2E7W              | Two Emergency battery packs, 7W                                                                                                                                                   |                       | LBH0SZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), high/low occupancy dimming, pre-wired (LINK) ‡      |              |                                                    |
|                   | CA Title 20 Noncompliant ‡                                                                                                                                                        |                       | LBPZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), ON/OFF photocell, pre-wired (LINK) ‡                  |              |                                                    |
| E10WLCP           | Emergency battery pack, 10W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                              |                       | LBM0SZU 360° low mount LSXR PIR sensor, (7-15' mounting heights), dimming and switching photocell, pre-wired (LINK) ‡ |              |                                                    |
| 2E10WLCP          | Two Emergency battery packs, 10W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                         | Cord sets: ‡          |                                                                                                                       |              |                                                    |
| E15WLCP           | Emergency battery pack, 15W Linear Constant Power, Certified in CA Title 20 MAEDBS ‡                                                                                              | CS1W                  | Cord with NEMA 5-15P, 120V straight blade plug, 18 gauge, 3 conductors, white, 6ft                                    |              |                                                    |
| OUTEND            | Cord set to exit endplate of fixture                                                                                                                                              | CS3W                  | Cord with NEMA 15-15P, 120V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                       |              |                                                    |
| BAA               | Buy America(n) Act and/or Build America Buy America Qualified                                                                                                                     | CS7W                  | Cord with NEMA 7-15P, 277V straight blade plug, 18 gauge, 3 conductors, white, 6ft                                    |              |                                                    |
| nLight® Wireless  |                                                                                                                                                                                   | CS11W                 | Cord with NEMA L7-15P, 277V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                       |              |                                                    |
| NLTAIR2 RLSXR10   | nLight® Air Generation 2 enabled, 360° low mount sensor, (7 to 15' heights) (LINK)                                                                                                | CS25W                 | Cord with NEMA L24-20P, 347V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                      |              |                                                    |
| NLTAIR2 RLSXR10EM | nLight® Air Generation 2 enabled, 360° low mount sensor, (7 to 15' heights), UL 924 Emergency Operation, via power interrupt detection (not available with battery pack) (LINK) ‡ | CS97W                 | Cord with NEMA L8-20P, 480V twist lock plug, 18 gauge, 3 conductors, white, 6ft                                       |              |                                                    |
|                   |                                                                                                                                                                                   | CS93W                 | Cord only (no plug), 18 gauge, 3 conductors, white, 6ft                                                               |              |                                                    |

| Accessories: Order as separate catalog number. |                                                                                       |                        |                                                    |
|------------------------------------------------|---------------------------------------------------------------------------------------|------------------------|----------------------------------------------------|
| HC36 M12                                       | Hanger chain, 36" (1 pair)                                                            | ZLR L24 SYM UPL WH     | 24" symmetric reflector with uplight, white finish |
| ZACVH M100                                     | Adjustable 10' aircraft cable with Y hanger (1 pair)                                  | ZLR L24 SYM WH         | 24" symmetric reflector, white finish              |
| ZLANGBKT                                       | Luma-tilt™ angle bracket for shelf or ledge mounting only                             | ZLR L46 SYM UPL WH     | 46" symmetric reflector with uplight, white finish |
| SQ__                                           | Swivel stem hanger (specify length in 2" increments up to 48")                        | ZLR L46 SYM WH         | 46" symmetric reflector, white finish              |
| NPP16D                                         | nLight® wired power/relay pack, 0-10VDC dimming output (LINK)                         | ZLR L48 ASY WH         | 48" asymmetric reflector, white finish             |
| RPP20D                                         | nLight® air Generation 2 enabled, power/relay pack, 0-10V dimming output (LINK)       | ZLR L48 SYM UPL WH     | 48" symmetric reflector with uplight, white finish |
| LSXR                                           | Sensor Switch® LSXR occupancy sensor (LINK)                                           | ZLR L48 SYM WH         | 48" symmetric reflector, white finish              |
| ZSPRG J2                                       | Tong and T-grid hanger, for 15/16" T-grid (Order quantity required in multiples of 2) | ZLR L92 SYM UPL WH     | 92" symmetric reflector with uplight, white finish |
| WGZ24                                          | 24" wireguard, white ‡                                                                | ZLR L92 SYM WH         | 92" symmetric reflector, white finish              |
| WGZ48                                          | 48" wireguard, white ‡                                                                | ZLR L96 SYM UPL WH     | 96" symmetric reflector with uplight, white finish |
|                                                |                                                                                       | ZLR L96 SYM WH         | 96" symmetric reflector, white finish              |
|                                                |                                                                                       | UNIVERSAL REFL ALIGNER | Universal reflector aligners, quantity 1           |

## ZL1D LED Striplight

| ‡ Option Value Ordering Restrictions |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option value                         | Restriction                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2E7W                                 | Utilizes (2) Power Sentry PS750L emergency drivers. MVOLT required. Available with L96 only. Not available with L24, L48, L96 6000LM or any cordset that includes a plug.                                                                                                                                                                                                                                                   |
| 2E10WLCP                             | Utilizes (2) Power Sentry PS1055LCP emergency drivers. MVOLT required. Available with L96 10,000LM or 14000LM only. Not available with L24, L48, L96 6000LM or any cordset that includes a plug.                                                                                                                                                                                                                            |
| 347, 480                             | Utilizes step down transformer.                                                                                                                                                                                                                                                                                                                                                                                             |
| Cordsets                             | Must specify voltage when plug is included. CS93W available with MVOLT. Cordsets exit back of fixture unless OUTEND option is specified.                                                                                                                                                                                                                                                                                    |
| E7W                                  | Utilizes Power Sentry PS750L emergency driver. MVOLT required. Not available with L24 or any cordset that includes a plug.                                                                                                                                                                                                                                                                                                  |
| E10WLCP                              | Utilizes Power Sentry PS1055LCP emergency driver. MVOLT required. Available with L48 or L96 only. Not available with L24 or any cordset that includes a plug.                                                                                                                                                                                                                                                               |
| E15WLCP                              | Utilizes Power Sentry PS1555LCP emergency driver. MVOLT required. Available with L96 only. Not available with L24, L48 or any cordset that includes a plug.                                                                                                                                                                                                                                                                 |
| Individual Controls                  | Available with MVOLT, 347 or 480 only. See ordering information on page 6 for more configurations. This sensor configuration is suitable for minimum ambient temperature of 14°F (-10°C). See page 6 for low temperature option providing -4°F (-20°C) minimum ambient. When choosing Sensor and PLR for same fixture, consult the factory. Sensors come prewired, they must be snapped into place at time of installation. |
| L24                                  | Not available with 347V, 480V or Batteries                                                                                                                                                                                                                                                                                                                                                                                  |
| nLight® Wireless                     | See (LINK) in sensor description to RLSXR specification sheet for more configurations. When choosing a sensor and PLR for same fixture, consult the factory. Sensors come prewired, they must be snapped into place at time of installation.                                                                                                                                                                                |
| NLTAIR2 RLSXR10EM                    | MVOLT only.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Nominal Lumens                       | See Operational Data on page 4 for actual lumens.                                                                                                                                                                                                                                                                                                                                                                           |
| PLR __                               | Not available with cordset options. See ordering information on page 5. When choosing a sensor and PLR for the same fixture, consult the factory.                                                                                                                                                                                                                                                                           |
| PLR1LVG                              | Not available with cordset options.                                                                                                                                                                                                                                                                                                                                                                                         |
| Reflectors                           | Optional. Reflectors ship separately.                                                                                                                                                                                                                                                                                                                                                                                       |
| TZL1D                                | Tandem fixture comes as two L48 fixtures                                                                                                                                                                                                                                                                                                                                                                                    |
| WGZ24                                | Not available with ASR or SMR reflector options.                                                                                                                                                                                                                                                                                                                                                                            |
| WGZ48                                | Not available with ASR or SMR reflector options. Order a Qty of 2 for L96 tandem fixtures.                                                                                                                                                                                                                                                                                                                                  |

ZL1D LED Striplight

| OPERATIONAL DATA |                       |                 |                                                              |        |                                                              |        |                                                              |        |                                                              |        |                     |                                          |
|------------------|-----------------------|-----------------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|--------------------------------------------------------------|--------|---------------------|------------------------------------------|
|                  | Nominal lumen package | Length (inches) | Delivered Lumens 3000K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 3500K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 4000K CCT @ 77°F (25°C) ambient temperature |        | Delivered Lumens 5000K CCT @ 77°F (25°C) ambient temperature |        | Wattage @ 120V/277V | Comparable Light Source                  |
|                  |                       |                 | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI | 80 CRI                                                       | 90 CRI |                     |                                          |
| Lensed           | 1500LM                | 24              | 1985                                                         | 1619   | 2030                                                         | 1675   | 2061                                                         | 1707   | 2137                                                         | 1745   | 17                  | 1-lamp 17W T8                            |
|                  | 2500LM                | 24              | 2682                                                         | 2187   | 2742                                                         | 2264   | 2785                                                         | 2307   | 2887                                                         | 2358   | 22                  | 1-lamp 17W T8                            |
|                  | 3500LM                | 24              | 4099                                                         | 3341   | 4190                                                         | 3459   | 4255                                                         | 3524   | 4412                                                         | 3603   | 36                  | 1-lamp 32W T8, 1-lamp 54W T5H0, 50W HID  |
|                  | 3000LM                | 48              | 3880                                                         | 3163   | 3966                                                         | 3274   | 4028                                                         | 3336   | 4176                                                         | 3410   | 30                  | 1-lamp 32W T8, 1-lamp 54W T5H0, 50W HID  |
|                  | 5000LM                | 48              | 5337                                                         | 4351   | 5456                                                         | 4504   | 5541                                                         | 4589   | 5745                                                         | 4691   | 41                  | 2-lamp 32W T8, 1-lamp 54W T5H0, 70W HID  |
|                  | 7000LM                | 48              | 7317                                                         | 5965   | 7480                                                         | 6175   | 7596                                                         | 6291   | 7876                                                         | 6431   | 59                  | 3-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 6000LM                | 96              | 8077                                                         | 6585   | 8257                                                         | 6816   | 8386                                                         | 6945   | 8694                                                         | 7099   | 60                  | 3-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 10000LM               | 96              | 11021                                                        | 8985   | 11267                                                        | 9301   | 11442                                                        | 9477   | 11864                                                        | 9687   | 81                  | 4-lamp 32W T8, 2-lamp 54W T5H0, 100W HID |
|                  | 14000LM               | 96              | 15397                                                        | 12553  | 15741                                                        | 12995  | 15986                                                        | 13240  | 16574                                                        | 13534  | 121                 | 4-lamp 32W T8, 3-lamp 54W T5H0, 150W HID |

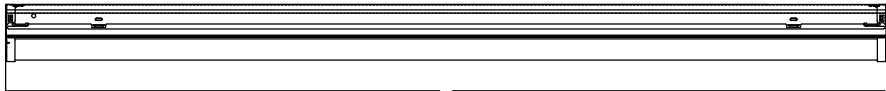
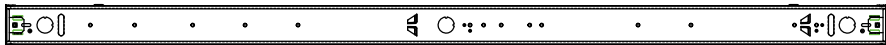
PROJECTED LUMEN MAINTENANCE

| Operating Hours          | 0 | 15,000 | 30,000 | 45,000 | 60,000 | 100,000 |
|--------------------------|---|--------|--------|--------|--------|---------|
| Lumen Maintenance Factor | 1 | 0.94   | 0.89   | 0.83   | 0.79   | 0.67    |

DIMENSIONS

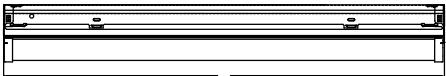
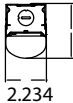
All dimensions are shown in inches (centimeters) unless otherwise noted.  
Specifications subject to change without notice.

| PALLET DIMENSIONS |                    |                     |                                           |
|-------------------|--------------------|---------------------|-------------------------------------------|
| Length            | Approximate weight | Fixtures per pallet | Approximate pallet dimensions (L x W x H) |
| L24               | 7 lbs.             | 176                 | 46" X 51" X 31 5/8"                       |
| L48               | 13 lbs.            | 176                 | 46" X 51" X 31 5/8"                       |
| L96               | 26 lbs.            | 63                  | 46" X 98 1/2" X 31 3/8"                   |



48.028

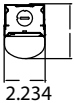
ZL1D L48



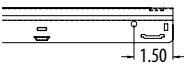
24.028

ZL1D L24

Knockout hole is .86in in diameter.



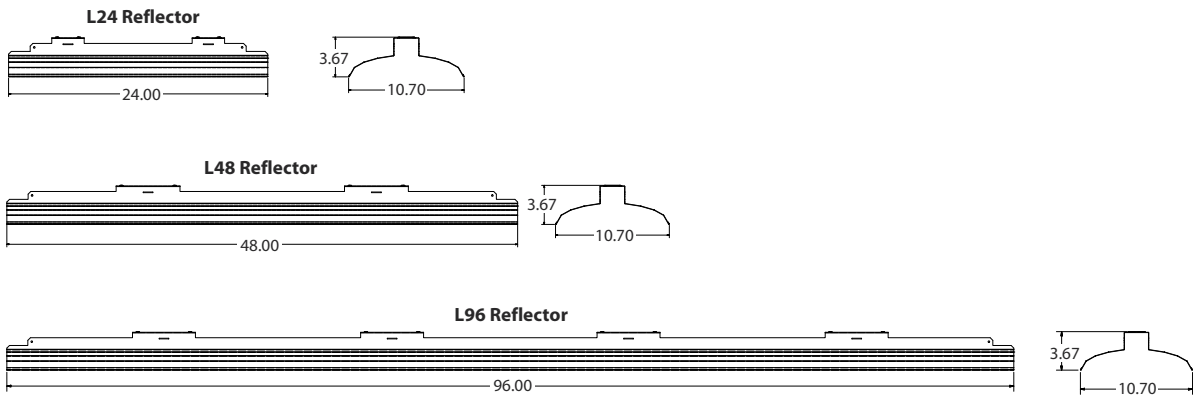
Mounting Hole Location - All Lengths



ZL1D

ZL1D LED Striplight

REFLECTORS (Optional)



PHOTOMETRICS

Please see [www.lithonia.com](http://www.lithonia.com)

PLUG-IN WIRING INFORMATION

Advanced plug-in system with two-circuit capability. Available on industrial and strip products and a variety of architectural products mounted in continuous rows. PLR22 (2-circuit) and crossover harness switches hot circuit serving next fixture in row. Reduces fixture types on job for alternating circuit applications (see example below.)

Easy one-step installation, saves up to 35% on labor costs. Expanded switching flexibility helps save energy.

Rows can be 50% longer with two-circuit systems. Polarized, lock-together nylon connectors prevent miswiring in the field. #12 THHN conductor, rated 600V, 90°C. White neutral wire included. Grounding accomplished by fixture in-row connectors.

CSA certified systems available with up to 2 circuits. G ground required.

Not for use with dedicated emergency circuits.

Note: Specifications subject to change without notice.



Wiring

PLR

Advanced 1 or 2-Circuit Plug-In

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

| Series | Number of hot wires            | Branch circuits                               | Dimming                | Ground              |
|--------|--------------------------------|-----------------------------------------------|------------------------|---------------------|
| PLR    | (blank) Not required for PLR22 | Circuits to which driver is connected         | LV Low-voltage dimming | G Ground (required) |
| PLR22  | 1 Black                        | (blank) Not required for PLR22 or PLR1        |                        |                     |
|        | 2 Black and red                | A Black wire                                  |                        |                     |
|        |                                | B Red wire                                    |                        |                     |
|        |                                | Battery charging circuit (must be unswitched) |                        |                     |
|        |                                | (blank) No battery charging circuit           |                        |                     |
|        |                                | ELA Battery pack circuit wired to black wire  |                        |                     |
|        |                                | ELB Battery pack circuit wired to red wire    |                        |                     |

Typical Applications

- Multiple-circuit and single-circuit for longer continuous rows
- Multiple-circuit with alternating fixtures on separate circuits and 2-circuit PLR22
- Multiple circuit with night-lights located along row as desired



ZL1D LED Striplight

LSXR — Fixture Mount Occupancy Sensor (see [www.AcuityControls.com](http://www.AcuityControls.com) for additional information)

- Three interchangeable lens options to satisfy multiple mounting heights and coverage pattern requirements.
- Integrated mounting bracket drops lens down 3" from chase nipple.
- Single or dual relay versions — designed with robust protection from the harsh switching requirements of T5 and LED loads.
- Photocell and 0-10VDC dimming options.
- No PIR field calibration or sensitivity adjustments required.
- Sensor ambient temperature rating of 14°F (-10°C) to 131°F (55°C).

| LSXR configuration                                                   | Comparable CMRB sensor | Old style sensor nomenclature |
|----------------------------------------------------------------------|------------------------|-------------------------------|
| For shortest lead times use one of the following LSXR configurations |                        |                               |
| LCOZU                                                                | CMRB 50                | MSI                           |
| LCHOSZU                                                              | CMRB 50 D              | MSID                          |
| LCPZU                                                                | CMRB 50 P              | MSIPED                        |
| LAOZU                                                                | CMRB 6                 | MSI360                        |
| LAHOSZU                                                              | CMRB 6 D               | MSI360D                       |
| LAPZU                                                                | CMRB 6 P               | MSI360PED                     |

SELECTIONS BELOW WILL EXTEND ORDER LEAD TIME. CONSULT YOUR SALES REPRESENTATIVE FOR DETAILS.

SINGLE RELAY

ORDERING INFORMATION

Example: LAHOSZU

| Series                                          | Lens option                                                      | Dimming/Photocell                                                                                                                                                                        | Max. dim level                            | Min. dim level                                                                                   | Temp/Humidity                | Default occupancy time delay                                                                                                             |
|-------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| L LSXR passive infrared indoor occupancy sensor | A High mount, 360°<br>B Low mount, 360°<br>C High mount aisleway | O None¹<br>H High/low occupancy operation<br>P Switching photocell (on/off)¹<br>M Dimming and switching photocell<br>G Dimming and switching photocell with high/low occupancy operation | 0 10 VDC<br>9 9 VDC<br>8 8 VDC<br>7 7 VDC | S Minimum dim level of ballast<br>1 1 VDC<br>2 2 VDC<br>3 3 VDC<br>4 4 VDC<br>5 5 VDC<br>6 6 VDC | Z None<br>T Low temperature² | I 30 sec<br>D 2.5 min<br>X 5.0 min<br>R 7.5 min<br>U 10.0 min (with minimum 15 minute on time)<br>V 15.0 min<br>W 20.0 min<br>Y 30.0 min |

- Notes
- 1 Max and min dim levels not applicable with this option.
  - 2 Ambient temperature rating of -4°F (-20°C) to 131°F (55°C).

DUAL RELAY (Available with 120, 277, and 347V only)

ORDERING INFORMATION

Example: LA2KZU

| Series                                          | Lens option                                                      | Poles        | Operating mode                                                                                                                                                                                                                | Temp/Humidity                | Default occupancy time delay                                                                                                             |
|-------------------------------------------------|------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| L LSXR passive infrared indoor occupancy sensor | A High mount, 360°<br>B Low mount, 360°<br>C High mount aisleway | 2 Dual relay | J None<br>K Alternating off relays (promotes even lamp wear)<br>O Alternating off relays w/photocell<br>P Switching photocell(on/off)<br>E Photocell on/off (pole 1 only)<br>F Photocell on/off - both poles (dual set-point) | Z None<br>T Low temperature¹ | I 30 sec<br>D 2.5 min<br>X 5.0 min<br>R 7.5 min<br>U 10.0 min (with minimum 15 minute on time)<br>V 15.0 min<br>W 20.0 min<br>Y 30.0 min |

- Notes
- 1 Ambient temperature rating of -4°F (-20°C) to 131°F (55°C).

Example: LENS 50 J100

| Replacement lenses: Order as separate catalog number. |                        |                     |
|-------------------------------------------------------|------------------------|---------------------|
| Series                                                | Lens type              | Package quantity    |
| LENS                                                  | 6 High mount 360°      | [blank] Single Lens |
|                                                       | 10 Low mount 360°      | J10 10-pack         |
|                                                       | 50 High mount aisleway | J100 100-pack       |



ZL1D

ZL1D LED Striplight

OPTIONS AND ACCESSORIES

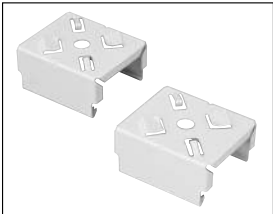
The Z Series fixture offers numerous options for almost every electrical and optical component, including a long list of field-installable accessories.



HANGER CHAIN

36" chain with Y hanger.

Order as:  
HC36



ZSPRING HANGER

Snap 'n' lock design requires no fasteners and can be used on T-grid ceiling or universal mounting systems.

Order as:  
ZSPRG



ZACVH HANGER

10' Aircraft cable with Y hanger.

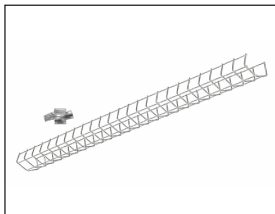
Order as:  
ZACVH



ANGLE MOUNTING BRACKET

Luma-tilt™ angle bracket ships as a pair

Order as:  
ZLANGBKT



WIRE GUARD

Order as:  
WGZ24  
WGZ48



L2 lamp

## KT-LED35A25-O-E26-8XX-DIM /G2

### 300W REPLACEMENT LAMP

#### DESCRIPTION

36W Commercial A25/PS30 Lamp | 3000–5000K | >80 CRI | Omni-Directional



RoHS  
Compliant



5 YEAR  
WARRANTY

LAMP TYPE: A25/PS30

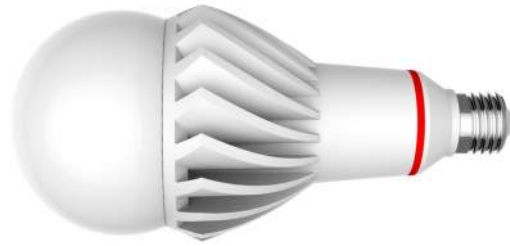
BASE TYPE: E26 (Medium)

WATTAGE: 36W

COLOR TEMPERATURE: 3000–5000K

COLOR RENDERING INDEX (CRI): >80

WARRANTY: 5 Years



#### PRODUCT FEATURES

- Up to 75% energy saving compared to legacy equivalent lamps
- Can be used in base-up, base-down, or base-horizontal position
- Large metal heatsink for optimal heat dissipation
- THD <20%
- PF >0.90
- Operating temperature range –4°F/–20°C to 113°F/45°C; 95°F/35°C max for fully enclosed fixture
- Ideal for post top, bollards, and outdoor corridor lighting
- Suitable for dry and damp location
- Rated for open and enclosed fixtures
- Meets UL 1993 standards

#### PERFORMANCE SPECIFICATIONS

| Keystone Catalog Number       | Lamp Wattage | CCT   | Lumens | Efficacy | Input Voltage | Legacy Equivalent Wattage | Base Type | Dimmable* | Light Distribution | CRI |
|-------------------------------|--------------|-------|--------|----------|---------------|---------------------------|-----------|-----------|--------------------|-----|
| KT-LED35A25-O-E26-830-DIM /G2 | 36W          | 3000K | 5000   | 139 lm/W | 120-277V      | 300W incand./ 150W HID    | E26       | Yes       | 330°               | >80 |
| KT-LED35A25-O-E26-840-DIM /G2 | 36W          | 4000K | 5000   | 139 lm/W | 120-277V      | 300W incand./ 150W HID    | E26       | Yes       | 330°               | >80 |
| KT-LED35A25-O-E26-850-DIM /G2 | 36W          | 5000K | 5000   | 139 lm/W | 120-277V      | 300W incand./ 150W HID    | E26       | Yes       | 330°               | >80 |

\*Note: Lamp is TRIAC dimmable only at 120v.

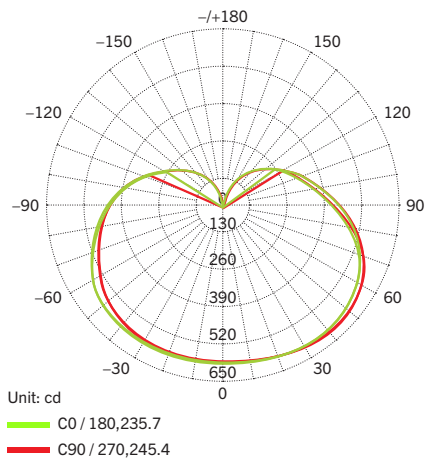


## KT-LED35A25-O-E26-8XX-DIM /G2

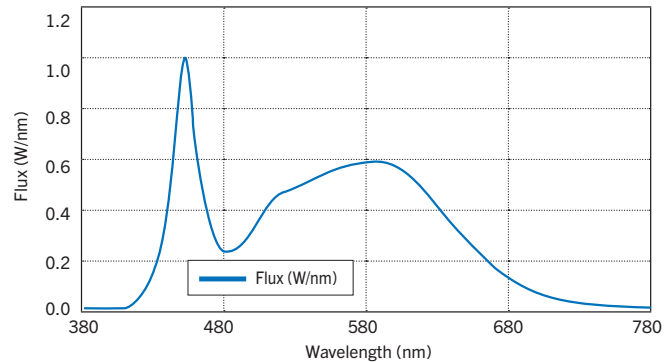
### 300W REPLACEMENT LAMP

#### PHOTOMETRIC SPECIFICATIONS

##### POLAR CANDELA DISTRIBUTION



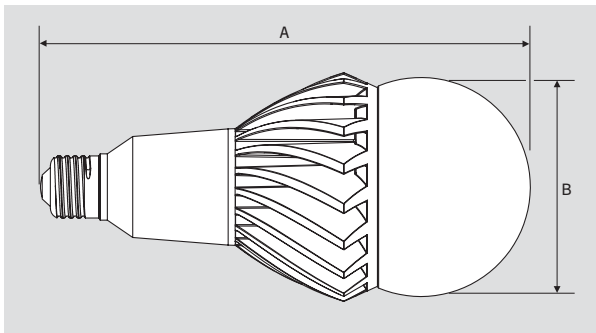
##### SPECTRAL DISTRIBUTION



##### RATED LIFE

|             |        |
|-------------|--------|
| L70 (Hours) | 50,000 |
|-------------|--------|

#### PHYSICAL SPECIFICATIONS



##### LAMP DIMENSIONS

|              |       |
|--------------|-------|
| A (Length)   | 7.99" |
| B (Diameter) | 3.74" |

BASE TYPE: E26 (Medium) or EX39 (Mogul)

#### PACKAGING

|                   |                         |
|-------------------|-------------------------|
| Carton Quantity   | 12 pcs                  |
| Carton Dimensions | 16.22" x 12.17" x 8.74" |
| Carton Weight     | 17 lbs                  |



## KT-LED35A25-O-E26-8XX-DIM /G2

300W REPLACEMENT LAMP

### ORDERING INFORMATION

| ORDER CODE                    | PACK QTY. | UPC          | EASY CODE |
|-------------------------------|-----------|--------------|-----------|
| KT-LED35A25-O-E26-830-DIM /G2 | 6 pcs     | 843654149561 | MHC-80    |
| KT-LED35A25-O-E26-840-DIM /G2 | 6 pcs     | 843654149578 | FVQ-80    |
| KT-LED35A25-O-E26-850-DIM /G2 | 6 pcs     | 843654149585 | OHY-46    |

### CATALOG NUMBER BREAKDOWN

## KT-LED35A25-O-E26-8XX-DIM /G2

1

2

3

4

5

6

7

8

9

10

- 1 Keystone Technologies
- 2 LED Lamp
- 3 Wattage
- 4 Lamp Style
- 5 Omnidirectional
- 6 Base Type
- 7 80 CRI
- 8 CCT
- 9 Dimming
- 10 Second Generation



JOB NAME:

CAT#:

TYPE: **O1**



## APPLICATIONS

DSST's DSST is the most advanced Integrated Solar Street Light as an all-in-one solar powered solution that is well suited for road and pathways, parking areas, large façades, campuses, sports fields, tennis courts, wildlife sanctuaries and many other areas where dependable and efficient light levels are required and NetZero energy costs are desired.

The DSST features high efficiency mono-silicone solar panel and a replaceable lithium ion battery pack, all built into the fixture. Coupled with a motion sensor with daylight harvesting, 3 different types of controllers, and an option for Smart City IoT Controls, the DSST has multiple programmable settings that enable the DSST to operate for up to 12 hours on one full charge.

With 14 different optics options, rotatable LED modules, efficacy of 195lpw and an output range of 30W to 200W, the DSST is the most versatile integrated street light on the market.

## FEATURES AND BENEFITS

- Wattage Range: 30W to 200W
- Lumens Range: 4,819 to 42,322
- Efficacy: 195 Lumens Per Watt
- Operating Temperature: -40°F to 148°F
- Chips: Philips Lumileds
- Standard CRI: 70
- IP66 Rated
- Motion Sensor + Photocell Standard
- Up to 12 Hour Operating Time (Based on Settings)
- Rated Life 100,000 Hours
- 5 Year Limited Warranty Standard / 10-Year Optional

## ORDERING GUIDE

EXAMPLE: DSST120-50K-SLV-T3M-SCA

| DSST    | Wattage | Color Temp        | Finish                | Distribution                                                                                                                                           | Options                                                                                                                                   |
|---------|---------|-------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| DSST30  | 30W     | 27K 2700K         | SLV SILVER (STANDARD) | <b>SPOT &amp; FLOOD</b><br>22°<br>30°<br>45°<br>60°<br>90°<br>110°<br>150°                                                                             | <b>CONTROLS</b><br>SCA SOLAR CONTROLLER A (STANDARD)<br>SCB SOLAR CONTROLLER B<br>SCC SOLAR CONTROLLER C<br>IoT SMART CITY IoT CONTROLLER |
| DSST40  | 40W     | 30K 3000K         | BLK BLACK             |                                                                                                                                                        |                                                                                                                                           |
| DSST50  | 50W     | 40K 4000K         | BNZ BRONZE            |                                                                                                                                                        |                                                                                                                                           |
| DSST60  | 60W     | 50K 5000K         | CST CUSTOM            |                                                                                                                                                        |                                                                                                                                           |
| DSST80  | 80W     | 57K 5700K         |                       |                                                                                                                                                        |                                                                                                                                           |
| DSST90  | 90W     | 65K 6500K         |                       |                                                                                                                                                        |                                                                                                                                           |
| DSST120 | 120W    |                   | (DESIRED COLOR)       |                                                                                                                                                        | <b>MOUNTING BRACKETS</b><br>(BLANK) ADJUSTABLE SLIP FITTER FOR 2.36" POLE<br>PS POLE STRAP (UP TO 3 1/2" POLES)                           |
| DSST150 | 150W    | WILDLIFE FRIENDLY |                       |                                                                                                                                                        | <b>MANUFACTURING</b><br>USPOM US POINT OF MANUFACTURE<br>10Y 10-YEAR WARRANTY                                                             |
| DSST180 | 180W    | AMB TRUE AMBER    |                       |                                                                                                                                                        |                                                                                                                                           |
| DSST200 | 200W    |                   |                       |                                                                                                                                                        |                                                                                                                                           |
|         |         |                   |                       | <b>AREA &amp; ROADWAY</b><br>T1S TYPE I SHORT<br>T1 TYPE I<br>T2 TYPE II SHORT<br>T2 TYPE II<br>T3S TYPE III SHORT<br>T3M TYPE III MEDIUM<br>T5 TYPE V |                                                                                                                                           |

NOTE: TO ORDER REPLACEMENT BATTERY PACKS, PLEASE SEE PART NUMBERS IN SOLAR PANEL AND BATTERY SPECIFICATION TABLE ON NEXT PAGE.

Phone: 888-886-DSSL (3775)

DSSLLIGHTING.COM



## PANELS AND BATTERIES

| CATALOG NUMBER | SOLAR PANEL | BATTERY TYPE | REPLACEMENT BATTERY P/N |
|----------------|-------------|--------------|-------------------------|
| DSST30         | 65W / 18V   | 12.8V / 24AH | BAT30                   |
| DSST40         | 65W / 18V   | 12.8V / 24AH | BAT40                   |
| DSST50         | 65W / 18V   | 12.8V / 30AH | BAT50                   |
| DSST60         | 65W / 18V   | 12.8V / 30AH | BAT60                   |
| DSST80         | 100W / 36V  | 12.8V / 42AH | BAT80                   |
| DSST90         | 100W / 36V  | 12.8V / 42AH | BAT90                   |
| DSST120        | 160W / 36V  | 25.6V / 36AH | BAT120                  |
| DSST150        | 175W / 36V  | 25.6V / 42AH | BAT150                  |
| DSST180        | 200W / 36V  | 25.6V / 42AH | BAT180                  |
| DSST200        | 220W / 36V  | 25.6V / 48AH | BAT200                  |

### SOLAR PANEL SPECS:

**TYPE:** 18V (HIGH EFFICIENCY MONOCRYSTALLINE-SILICONE)  
**LIFE TIME:** 25 YEARS



### BATTERY SPECS:

**BATTERY TYPE:** LiFeP04  
**LIFE TIME:** 5 YEARS  
**CHARGE TIME:** 6-8 HOURS (FULL SUN)  
**OPERATING TIME:** 12 HOURS WITH FULL CHARGE AND MOTION SENSOR SETTING ENABLED



### SIMPLE BATTERY PACK REPLACEMENT

## SOLAR CONTROLLER OPTIONS

### SCA – SOLAR CONTROLLER A (STANDARD OPTION)

SCA features 3 different non-programmable modes with default settings power programmed at the factory. Though the settings cannot be programmed in the field, they are the most simple and easiest set choices to meet simple operation needs while maximizing the battery's capacity.



#### CONSTANT POWER MODE

The fixture operates at 45% brightness from dusk to dawn.



#### DUSK TO DAWN MODE

The fixture operates at @ 100% first 4 hours then dims to 30% thereafter.



Set to this mode



#### MOTION SENSING MODE

The fixture operates at @ 30% and brightens to 100% when motion is detected. After 30 seconds of no motion detection the fixture dims back to 30%.





## SOLAR CONTROLLER OPTIONS CONTINUED

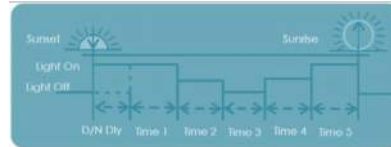
### SCB – SOLAR CONTROLLER B / MPPT CONTROLLER

SCB features 2 different modes, one programmable, the other not. This controller option gives end-users the ability to customize fixture operation in areas that need special settings, and still maintain a simple default option with pre-set motion sensing ability when they don't.



#### FIVE-STAGE PROGRAMMABLE MODE

Fixture operation settings can be programmed and divided into 5 different time intervals as necessary.



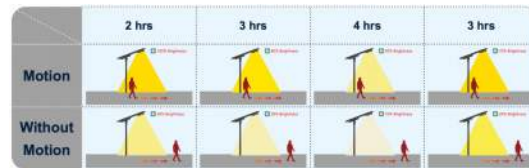
#### DEFAULT MOTION SENSOR MODE

When motion is sensed:

- 1<sup>st</sup> 2 hours @ 100% brightness
- Next 3 hours @ 60%
- Following 4 hours @ 30%
- Last 3 hours @ 70%

When no motion is sensed:

- 1<sup>st</sup> 2 hours @ 30% brightness
- Next 3 hours @ 20%
- Following 4 hours @ 10%
- Last 3 hours @ 20%



### SCC – SOLAR CONTROLLER C / HYBRID MPPT CONTROLLER

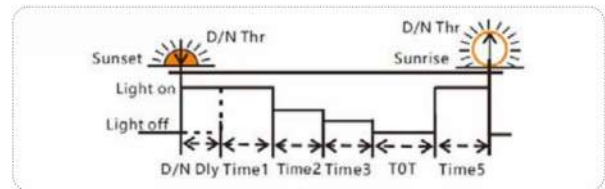
SCC combines modes from SCA and SCB, by offering DUSK TO DAWN MODE and FIVE-STAGE MODE while also featuring one additional setting; TOT SMART MODE.



#### TOT SMART MODE

This smart mode utilizes the data programmed from FIVE-STAGE MODE to automatically calculate the most efficient setting for the 4<sup>th</sup> time interval (when foot-traffic is the lowest) so you can maximize time interval 5 (highest early morning foot-traffic) while taking the time of sunrise into consideration.

FOR EXAMPLE: If you set time interval 1 (sunset) at 100% for 3 hours, then time 2 at 20%, time 3 at 20% and want time 5 to be at 70% before sunrise, the controller will automatically determine time 4's setting (when you need the least light) to enable 70% at time 5.



### IoT – SMART CITY CONTROLLER

This revolutionary smart technology utilizes a solar powered controller that connects the DSST to the Cloud, giving you full control and monitoring the life-cycle of the units in real time. Manage the DSST from your desk enabling you to adjust it's brightness, time of operation, program it to operate based on traffic flow, adjust settings based on a unit's operating environment, and other advanced features that enable full control over a single head, or an entire section of heads, all through the internet. For mor information, please contact your rep.



#### ON/OFF & DIMMING CONTROL

Programmed by schedule, motion, or photocell



#### REAL-TIME MONITORING

Monitor operating status, identify failures by exact location, estimate life-cycle of batteries and PVs



#### ADD-ON TECHNOLOGY PORTS

Additional I/O ports for controller sensor upgrades like traffic monitors, seismic activity monitors, environment sensors, security cameras and more



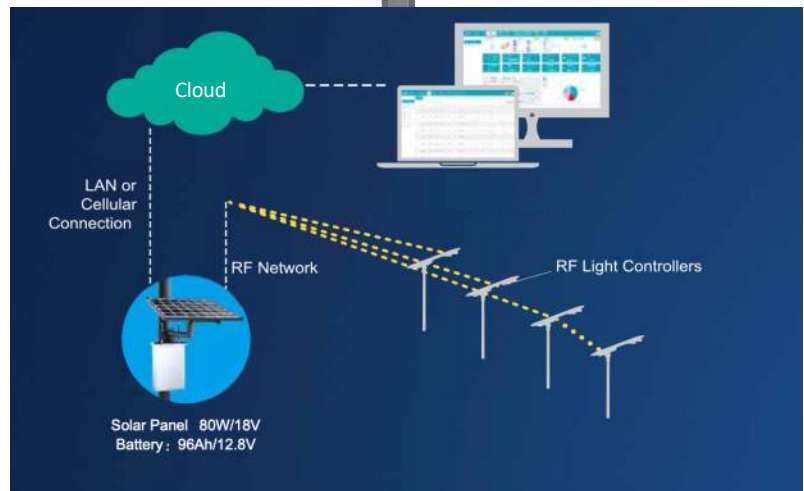
#### RELIABLE MESH NETWORK

Implement up to 1000 control nodes per network and experience the most reliable node to node and node to gateway communication giving you peace of mind



#### USER FRIENDLY SOFTWARE

Whether monitoring fixtures or programming operation settings, our software platform is easy and simple to use offering both desktop and mobile versions

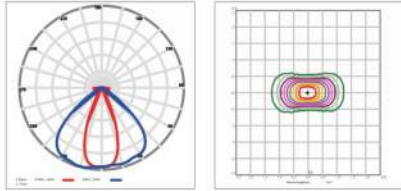




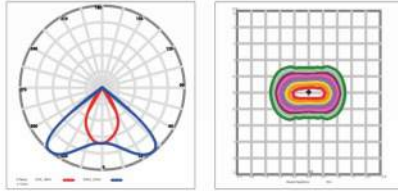


## AREA AND ROADWAY PHOTOMETRICS

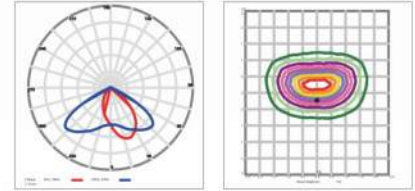
TYPE I SHORT  
40×100°



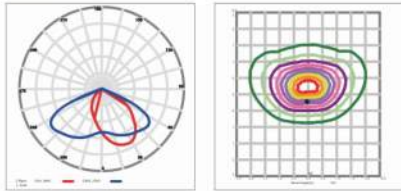
TYPE I  
60×100°



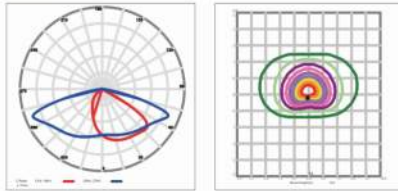
TYPE II SHORT  
60×120°



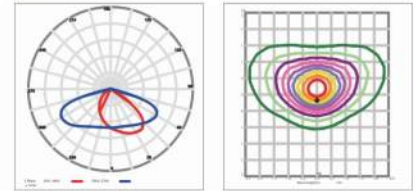
TYPE II  
70×135°



TYPE III SHORT  
75×150°

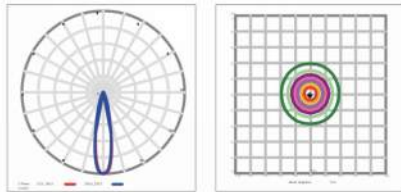


TYPE III MEDIUM  
80×150°

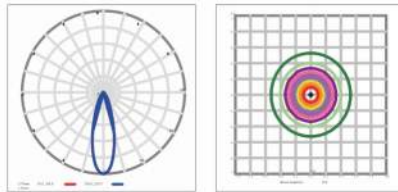


## SPOT AND FLOOD PHOTOMETRICS

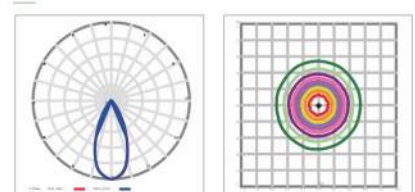
22°



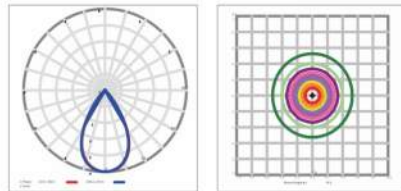
30°



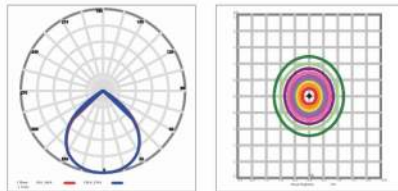
45°



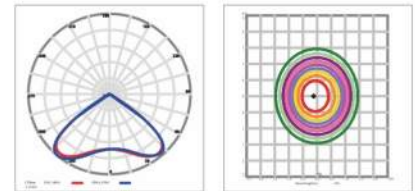
60°



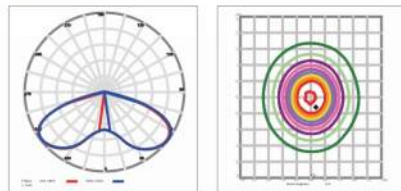
90°



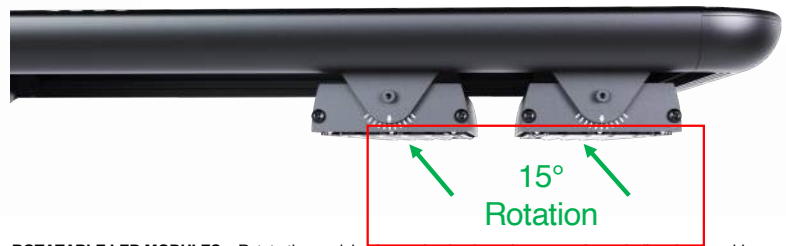
110°



TYPE V  
150°



Adjust to get full illumination of handball courts

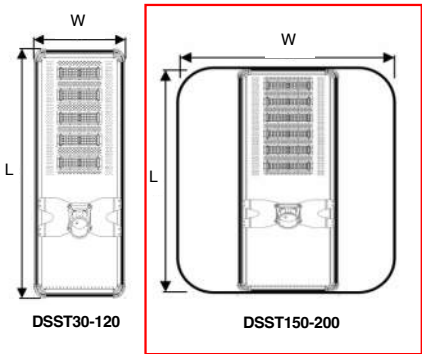


**ROTATABLE LED MODULES** – Rotate the modules forward or backward up to 15° in each direction to achieve different results such as Type IV distribution.



DIMENSIONS / WEIGHT / EPA

| CATALOG NUMBER | LENGTH | WIDTH | WEIGHT (LBS) | EPA FT² RATING BY INSTALLATION ANGLE |         |         |         |
|----------------|--------|-------|--------------|--------------------------------------|---------|---------|---------|
|                |        |       |              | 0°                                   | 10°     | 20°     | 30°     |
| DSST30-60      | 42"    | 15"   | 35 LBS       | 0.68ft²                              | 1.05ft² | 2.15ft² | 3.25ft² |
| DSST80-90      | 65"    | 15"   | 52 LBS       | 0.73ft²                              | 1.16ft² | 2.29ft² | 3.34ft² |
| DSST120        | 65"    | 22"   | 56 LBS       | 0.87ft²                              | 1.50ft² | 2.96ft² | 4.33ft² |
| DSST150        | 39"    | 32"   | 66 LBS       | 0.95ft²                              | 1.90ft² | 3.74ft² | 5.46ft² |
| DSST180        | 45"    | 40"   | 71 LBS       | 1.09ft²                              | 2.18ft² | 4.29ft² | 6.27ft² |
| DSST200        | 45"    | 43"   | 80 LBS       | 1.19ft²                              | 2.37ft² | 4.67ft² | 6.8.ft² |



SLIP FITTER INSIDE DIMENISIONS: 2.50"

PERFORMANCE

| CATALOG NUMBER | WATTS | LUMEN OUTPUT (2700K) | LUMEN OUTPUT (3000K) | LUMEN OUTPUT (4000K) | LUMEN OUTPUT (5000K) | LUMEN OUTPUT (5700K) | LUMEN OUTPUT (6500K) | LUMEN OUTPUT AMBER |
|----------------|-------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| DSST30         | 30W   | 4819                 | 4968                 | 5280                 | 5558                 | 5370                 | 6031                 | 4337               |
| DSST40         | 40W   | 6763                 | 6972                 | 7188                 | 7800                 | 8041                 | 8464                 | 6086               |
| DSST50         | 50W   | 8454                 | 8715                 | 9263                 | 9750                 | 10,052               | 10,581               | 7608               |
| DSST60         | 60W   | 10,144               | 10,458               | 11,115               | 11,700               | 12,062               | 12,697               | 9129               |
| DSST80         | 80W   | 13,526               | 13,944               | 14,820               | 15,600               | 16,082               | 16,929               | 12,173             |
| DSST120        | 120W  | 20,289               | 20,916               | 22,230               | 23,400               | 24,124               | 25,393               | 18,260             |
| DSST150        | 150W  | 25,361               | 26,145               | 27,788               | 29,250               | 30,155               | 31,742               | 22,824             |
| DSST180        | 180W  | 30,433               | 31,374               | 33,345               | 35,100               | 36,186               | 38,090               | 27,389             |
| DSST200        | 200W  | 33,815               | 34,860               | 37,050               | 39,000               | 40,206               | 42,322               | 30,433             |

MATERIALS SPECIFICATIONS

INTENDED USE

The DSST Integrated Solar Street Light family is designed to be a highly efficient, long-lasting choice in exterior lighting applications as a one for one replacement of existing metal halide or high pressure sodium lighting. With output ranging from 4,819 to 42,322 lumens it is ideal for replacing 150W to 1200W HID pole-mounted luminaires in area and roadway, flood, and wildlife applications and especially in areas where no energy infrastructure is present. It's sleek design makes it aesthetically pleasing in any installation.

CONSTRUCTION

The DSST is constructed of high-grade die-cast aluminum and an IP66 rating for superior heat dissipation and endurance against the elements.

OPTICS

The DSST features precision PC lenses rivaled by none. Unparalleled attention has been given to the engineering of each optic type ensuring the DSST's distribution is unbeatable with the most precise coverage in its class.

FINISH

Exterior parts are coated with a 3-5 mils thick thermoset powder coat finish providing superior resistance to corrosion and weathering.

BUY AMERICAN

Our product can be fully assembled in America, qualifying for any BAA government procurement requirements under FAR, DFARS and DOT.

WARRANTY

5-Year standard limited warranty, optional extended warranties available on request. Complete warranty and terms & conditions published at:

<https://dsslighting.com/warranty-docs/>

DSSLIGHTING.COM  
Phone: 888-886-DSSL (3775)

## SECTION 28 31 00 – FIRE ALARM SYSTEM REPLACEMENT

### PART 1 – GENERAL

#### 1.1 GENERAL AND SPECIAL CONDITIONS

- A. General Requirements of these specifications shall apply to the Work in this section.
- B. The Contractor shall furnish all equipment, materials, tools, labor, engineering, drawings, etc. necessary to replace the existing fire alarm system, with said system being made ready for operation in accordance with the requirements of the authorities having jurisdiction. The purpose of the furnished specifications and drawings is to convey to the Contractor the scope of work required, all of which the Contractor is responsible for furnishing, installing, adjusting, and making operable.
- C. The omission by the Engineer of any necessary system component, as required by the authorities having jurisdiction, from the specifications and drawings shall not relieve the Contractor of the responsibility for providing such necessity, without additional cost to the Owner.
- D. The Contractor shall visit the site before submitting their bid and shall examine all existing physical conditions that may be material to the performance of their work. No extra payments will be allowed to the Contractor because of extra work made necessary by their failure to do so.
- E. Any case of error, omission, discrepancy or lack of clarity shall be promptly identified to the Engineer for clarification prior to the bid due date.
- F. The Contractor shall provide all devices and equipment required by these specifications and drawings. Under no circumstances shall the Contractor delete any equipment or devices without the written directive of the Owner.

#### 1.2 PERFORMANCE GUIDELINES

- A. Provide labor, materials, and equipment to replace the existing Sonitrol fire alarm system as outlined in these specifications and described on the contract drawings.
- B. The Contractor shall be responsible for compliance with the entire project specifications as well as the following guidelines. These guidelines are not intended to be all-inclusive and do not limit or define the Contractor's Scope of Work. The work includes the following:
  - 1. Replacement of the existing Sonitrol fire alarm system.
  - 2. Provision of new manual pull stations, smoke detectors, duct smoke detectors, and occupant notification appliances.
  - 3. All fire alarm system software.
  - 4. Conduit, wiring, and system installation.
  - 5. Core drilling and firestopping.
  - 6. Cutting and patching.

7. Detailed shop drawings and submittal information.
8. Coordination of the work with other trades for this project.
9. On-site project supervision.
10. Permits, fees, and other charges required for the work.
11. Record documents.
12. Operating and maintenance instructions.
13. System pre-testing and final testing.
14. Warranty of equipment and labor.

### **1.3 SYSTEM ABBREVIATIONS AND DEFINITIONS**

|    |            |                                                                                                                                                   |
|----|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| A. | AFF:       | Above Finished Floor.                                                                                                                             |
| B. | AHJ:       | Authorities Having Jurisdiction                                                                                                                   |
| C. | Approved:  | Unless otherwise stated, materials, equipment or submittals approved by the Engineer and AHJ.                                                     |
| D. | Circuit:   | Wire path from a group of devices or appliances to a control panel.                                                                               |
| E. | Engineer:  | Jensen Hughes                                                                                                                                     |
| F. | FACU:      | Fire Alarm Control Unit.                                                                                                                          |
| G. | IDC:       | Initiating Device Circuit.                                                                                                                        |
| H. | NAC:       | Notification Appliance Circuit                                                                                                                    |
| I. | NFPA:      | National Fire Protection Association.                                                                                                             |
| J. | Owner:     | State of Michigan, Department of Natural Resources                                                                                                |
| K. | RPS:       | Remote Power Supply                                                                                                                               |
| L. | SLC:       | Signaling Line Circuit.                                                                                                                           |
| M. | Style 4:   | As defined by NFPA 72, 2019 Edition. Also known as Class B.                                                                                       |
| N. | Style 7:   | As defined by NFPA 72, 2019 Edition. Also known as Class A.                                                                                       |
| O. | UL:        | Underwriters Laboratories Inc.                                                                                                                    |
| P. | UL Listed: | Materials or equipment listed by Underwriters Laboratories and included in the most recent edition of the UL Fire Protection Equipment Directory. |

**1.4 RELATED WORK**

- A. Materials furnished and installed by others but wired by this Contractor:
  - 1. Sprinkler waterflow devices, valve supervisory devices, and other sprinkler system supervisory devices shall be provided by the Fire Protection Contractor. The Fire Alarm Contractor shall wire these devices to the fire alarm system.

**1.5 PERFORMANCE REQUIREMENTS**

- A. Provide a new UL listed fire alarm system. The system shall monitor waterflow devices, smoke detectors, duct smoke detectors, manual pull stations, and sprinkler system supervisory devices.
- B. Provide all required software for the fire alarm control panel.
- C. All fire alarm initiating device circuits shall be NFPA 72, Style 4, Class B, electrically supervised circuits from the zone modules to the devices.

**1.6 SYSTEM OPERATION**

- A. The fire alarm system shall perform the following functions:
- B. Continuous monitoring of the status of all fire alarm and supervisory initiating devices.
- C. Visible annunciation of all fire alarm, supervisory, and trouble conditions at the FACU.
- D. Operation of indicated control functions.
- E. Activation of a waterflow device, smoke detector, or manual pull station shall cause the following functions to occur:
  - 1. Activate audible and visible status change indicators and display the system point description and message associated with the device at the FACU.
  - 2. Activate the audible and visual notification appliances throughout the building.
- F. Activation of any sprinkler valve supervisory device shall:
  - 1. Activate audible and visible status change indicators and display the system point description and message associated with the device at the FACU.
- G. Removal of any device, wiring disarrangement, or system component failure shall display a trouble signal at the FACU.
- H. When any point in the system returns to normal, the FACU shall:
  - 1. Activate audible and visible status change indicators and display the system point description and message associated with the device at the FACU.
  - 2. Acknowledgment of "system return to normal" will silence all audible indicators associated with the device at the FACU.

## **1.7 APPLICABLE CODES AND STANDARDS**

The following codes, standards, and guides (of the issue indicated) are hereby made a part of this work by reference thereto:

- A. Michigan Building Code, 2021 edition.
- B. Michigan Electrical Code, 2023 edition.
- C. NFPA 72 - National Fire Alarm and Signaling Code, 2019 edition.
- D. UL Standard 346, Waterflow Indicators for Fire Protective Signaling Systems, latest edition.
- E. UL Standard 1424, Cables for Power-Limited Fire Protective Signaling Systems, latest edition.
- F. UL Standard 1481, Power Supplies for Fire Protective Signaling Systems, latest edition.
- G. UL Standard 2196, Standard for Tests of Fire Resistive Cables, latest edition.

## **1.8 SUBMITTALS**

- A. Submit the following equipment information:
  - 1. Manufacturer's data sheets with equipment to be used highlighted,
  - 2. Wiring diagrams for all equipment,
  - 3. Installation instructions for all equipment,
  - 4. Equipment dimensions,
  - 5. Equipment maintenance manuals,
  - 6. Wire data sheets.
- B. Submit the following shop drawing information:
  - 1. Complete panel layout showing all field terminations, modules, power supplies, and batteries,
  - 2. Complete system riser diagram,
  - 3. Complete floor plans showing all new devices and appliances, and all wire between devices.
- C. Submit the following system calculations:
  - 1. Standby battery capacity for fire alarm panel (identifying both the non-alarm and alarm load associated with each and demonstrate conformance to the requirements of these specifications).
  - 2. Voltage drop calculations for each type of circuit (identifying all mathematical formulas, variables, constants, and sources of the mathematical constants).
- D. Prior to start of construction, submit the information outlined in A, B, and C above to the following:
  - 1. To all authorities having jurisdiction in the quantities required.

2. Three (3) complete submittal packages to the Engineer for review.
3. One (1) complete submittal package bearing the review stamp of all applicable state and local authorities to the Owner.
4. PARTIAL SUBMITTALS ARE UNACCEPTABLE.

#### **1.9 WARRANTY**

- A. The Contractor shall provide a one-year written warranty against defects in material and workmanship furnished under this Contract. The costs of such warranty shall be part of the purchase price. The warranty commences when the system and installation are accepted by the Owner.
- B. The warranty shall include all necessary material, travel, labor, and parts to replace defective components or materials at the job site. This Contractor shall commence repair of any "in warranty" defects within 8 hours of notification of such defects. The warranty shall include all after-hours labor.
- C. The warranty shall include all necessary factory and field software required to perform the specified tasks. This item does not include software installed after system acceptance unless the defective software was installed at the direction of the system manufacturer.
- D. The Contractor shall make allowances in the warranty to cover diagnosis of system defects that may ultimately be the responsibility of others to correct. When this occurs, the Owner and other affected trades shall be notified.
- E. If the Owner experiences more than two spurious or unexplained false alarms or troubles in any 48-hour period while the system is under warranty, the Contractor shall provide the necessary labor, materials, and technical expertise to promptly correct the problem(s) without additional cost.

#### **1.10 DELIVERY, STORAGE AND HANDLING OF MATERIALS**

- A. Contractor will deliver all materials to area of project designated by Owner's representative. Vehicles shall not block fire lanes during delivery of materials.
- B. The Owner's representative will designate an area within the facility for storage of all materials. At the end of each working day, all materials shall be returned to the designated area. Material, equipment, tools, etc. will not be left outside the storage area without the consent of the Owner's representative.
- C. The cost of all material handling, delivery, and freight is the Contractor's responsibility. The Owner or their representatives will not be responsible for materials delivered to the site.
- D. Maintain premises free from accumulation of waste materials or rubbish caused by this work. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises clean to the Owner's satisfaction.

#### **1.11 QUALITY ASSURANCE**

- A. All supplied equipment shall be standard products of the manufacturer and regularly stocked within the manufacturer's branch office.
- B. All technical service personnel shall be regularly employed by the fire alarm system manufacturer.

- C. All electrical installation of the fire alarm system, including wire installation and terminations, shall be performed by electricians in the employ of the Electrical Contractor.

#### **1.12 EXISTING CONDITIONS**

- A. The existing Sonitrol fire alarm system shall be replaced.
- B. All existing fire alarm devices and appliances, including but not limited to pull stations, horns, smoke and duct smoke detectors shall be removed. No existing devices or appliances shall be reused.
- C. The existing fire alarm system conduits can be reused.

### **PART 2 – PRODUCTS**

#### **2.1 GENERAL**

- A. All fire alarm devices and equipment shall be compatible with the new fire alarm system.
- B. Products for this project shall be of the latest design. Obsolete or discontinued models are not acceptable.
- C. All equipment supplied shall be UL Listed for the required function.

#### **2.2 FIRE ALARM CONTROL UNIT (FACU)**

- A. Provide a field-programmable, microprocessor-based, modular, power-limited, complying with UL 864, FACU in the location shown. Units shall be of modular construction, engineered, configured, and sized to accommodate the area served. Units may consist of multiple equipment cabinets sized according to the vendor's shop drawings and the requirements stated herein. Equipment panels shall include spare capacities and expansion capabilities to allow future additions without the need to replace an entire control unit.
- B. All fire alarm control equipment shall be served from dedicated primary 120v power circuits, fed from red, lockable circuit breaker in accordance with NEC requirements. The equipment supplier shall provide equipment load calculations and coordinate circuit quantities and assignments with the Installing contractor. Provide electrical panel circuit breaker identification on the outside of the FACU.
- C. The FACU shall be designated as the data gathering panel which will include all required modules such as CPU/addressable loop interface, power supplies, and standby batteries to support the system operation specified herein, and will include the following as a minimum:
  - 1. Addressable Loop - Signaling Line Circuit (SLC) interface module to support a minimum of 150 module and 150 detector addresses.
  - 2. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
  - 3. Include a real-time clock for time annotation of events on the event recorder.



4. Provide communication between the FACU and remote LCD annunciator.
  5. Provide non-volatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACU shall provide a minimum 500-event history log.
- D. The FACU shall include a complete Operator's Interface and common control switches with all primary controls that are essential to the system operation during an event, including:
1. 80-character alphanumeric display (minimum).
  2. Common Alarm, Trouble, Supervisory and Power On indicators.
  3. Related system status indicators.
  4. Event acknowledgement switches.
  5. Alarm silence switch.
  6. System Reset switch.
  7. Off-premises reporting bypass switch.
  8. Local manual evacuation (drill).
  9. Audible/Visual evacuation signal bypass switch.
  10. The ability to enable and disable each monitor and control point individually.
  11. Walk Test enable.
- E. The FACU shall transmit signals utilizing a NAPCO radio unit, Model Number SLE-LTEV-FIRE cell. For any questions regarding fire alarm monitoring, contact Controllor Security Systems at 586-772-6100.
- F. Equipment Enclosures
1. Provide cabinets of sufficient size to accommodate all equipment, constructed of code gauge steel and equipped with locks keyed like all other fire alarm equipment. Units that include an Operator's Display shall have a transparent door panel allowing full view of the various lights and controls. Secondary cabinets that do not include operator controls shall be solid construction. Color of cabinets shall be Red.
- G. Accessories:
1. Instructions: Computer printout or typewritten instruction card mounted behind plastic or glass cover in stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe functional operation of system under normal, alarm, and trouble conditions.
- H. Standby Batteries
1. Standby batteries shall be sized to operate the system upon loss of normal power for a period of twenty-four (24) hours of supervisory operation, followed by five (5) minutes of alarm.

2. Cable size and distance between the batteries to the control panels shall be determined and included in the shop drawings to demonstrate acceptable voltage drop calculations.
  3. Provide rechargeable, sealed lead-acid batteries.
  4. Batteries shall be of identical voltage, model number, and appearance to allow connections in series to produce a system voltage of 24 volts DC. Batteries shall be permanently marked with the date of manufacture and installation.
- I. Battery Charger
1. The battery charger shall automatically charge and monitor the condition of the batteries. The charger shall be dual-rate type with a combination high rate/float maintenance rate which is capable of recharging fully discharged batteries up to 70% charge within 12 hours.
  2. The charger shall include a green "Charger On" LED, a yellow Charger Trouble" LED and a red "High Rate" LED. The charger shall also include battery voltage test points and a fuse for over-current protection.

## 2.3 MANUAL PULL STATIONS

- A. Manual pull stations shall be addressable, double-action type devices. The device shall be red with the words "FIRE ALARM" in white, raised letters. The station shall mechanically latch upon operation and remain so until manually reset. Only authorized individuals will have the tools/keys to reset the device.
- B. Where ambient conditions preclude the use of addressable devices, conventional pull stations shall be used, and a dedicated addressable module shall be installed in an appropriately heated and ventilated location.
- C. For surface mounted manual pull station, the contractor shall use manufacturers smooth sided, red back-box. The use of a standard electrical box is forbidden.
- D. The operable part of the manual pull station initiating device shall be not less than 42 inches and not more than 48 inches from the finished floor. Devices must be mounted at same height unless otherwise indicated. Manual pull stations shall be located within 5 feet (60 inches) of each exit doorway on each floor.

## 2.4 SYSTEM SMOKE DETECTORS

- A. Photoelectric Smoke Detectors:
  1. General Characteristics:
    - a. Detectors must be two-wire type.
    - b. Smoke detectors shall be addressable sensors that utilize photoelectric-type sensing principles to detect particles of combustion.
    - c. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACU.
      - 1) The control panel shall continually analyze the addressable signal from each sensor to determine calibration, sensitivity and

environmental changes that may affect sensor operation. The analog values from each device shall be displayed (in terms of percent of obscuration) at the control unit upon command.

- d. Each detector's sensitivity shall be individually adjustable within a listed range from .2% to 3.7% obscuration per foot and have the ability to define multiple set points within the range. Should a sensor reach a predetermined alarm or pre-alarm level, a discrete signal will be annunciated as directed.
  - e. Each detector shall include an LED that will flash periodically to indicate an active polling cycle. When the sensor reaches a predetermined alarm threshold (2% relative obscuration unless otherwise directed), the detector shall latch in LED shall flash continuously until reset at the control panel
  - f. Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
  - g. Operator at FACU, having designated access level, must be able to manually access the following for each detector:
    - 1) Primary status.
    - 2) Device type.
    - 3) Present average value.
    - 4) Present sensitivity selected.
    - 5) Sensor range (normal, dirty, etc.).
  - h. The detector must have functional humidity range within 10 to 90 percent relative humidity.
  - i. Color: White.
- 2. Provide photoelectric smoke detectors utilizing the photoelectric light scattering principle for operation in accordance with UL 268. Smoke detectors shall be listed for use with the fire alarm control panel.
  - 3. Provide self-restoring type detectors that do not require any readjustment after actuation to restore them to normal operation. Detectors shall be UL listed as Smoke-Automatic Fire Detectors.
  - 4. All components shall be rust and corrosion resistant. Vibration shall have no effect on the detector's operation. The detection chamber shall have a fine mesh metallic screen that prevents the entrance of insects or airborne materials. The screen shall not inhibit the movement of smoke particles into the chamber.
  - 5. Provide twist lock bases for the detectors. The detectors shall maintain contact with their bases without the use of springs. Provide companion-mounting base with fixed wiring terminals. Terminate field wiring on the

fixed terminals. The detector shall have a visual indicator to show actuation.

6. Detectors shall be equipped with screw terminals for each conductor.
7. Detectors shall be of the low voltage type rated for use on a 24 VDC system.
8. HVAC: Locate detectors no closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.
9. Lighting Fixtures: Locate detectors no closer than 12 inches (300 mm) from lighting fixture and not directly above pendant mounted or indirect lighting.
10. Install a cover on each smoke detector that is not placed in service during construction. Cover must remain in place except during system testing. Remove cover prior to system turnover.

## **2.5 SPRINKLER SYSTEM WATERFLOW DEVICE**

- A. Vane type waterflow devices shall be provided by the Fire Sprinkler Contractor where indicated on the sprinkler system drawings. The devices shall be initially adjusted to actuate between 30 and 60 seconds after the inspector's test valve is opened.

## **2.6 SUPERVISORY INITIATING DEVICES**

- A. Valve supervisory devices shall be provided by the Fire Protection Contractor for all indicated sprinkler control valves. Wiring the sprinkler valve supervisory devices on the same initiating device circuit with the waterflow switch is forbidden.

## **2.7 CONTROL RELAYS**

- A. Power supplies used for operation of control relays, contacts, step-down relays or similar applications shall be supervised by the fire alarm system for trouble conditions.
- B. Control relays connected to unsupervised circuits shall be located within 3 feet of the controlled device.
- C. Control relays will be provided to shutdown HVAC unit upon the activation of a duct smoke detector or return air smoke detector.

## **2.8 NOTIFICATION APPLIANCES**

- A. Provide semi-flush mounted audible, visual, and combination notification appliances as shown. All appliances shall be direct wired.
- B. All appliances shall be Red and labeled "FIRE" in white lettering. The contractor shall provide OEM-approved, color coordinated surface mount backboxes and outdoor-rated appliances where site conditions dictate.
- C. Visual Appliances:
  1. Furnish and install multi-candela, synchronized LED strobes in compliance with NFPA 72 and rated per ANSI/UL 1971.

2. As a minimum, strobes shall have an adjustable candela rating of 15, 30, 75, or 110cd to accommodate field modification, and shall clearly display the current setting of the device when installed. Candela settings shall be as directed by NFPA 72, based on final (installed) locations of each device.
- D. Audible Appliances:
1. Provide horns, where indicated on plans. Devices shall have high and low output settings, produce a minimum sound output of 84dbA at 10'-0" from the horn, and comply with UL 464 requirements
  2. Provide appliances with appropriate weatherproof listings in outdoor areas or non-conditioned spaces.

## 2.9 REMOTE LCD ANNUNCIATOR

- A. Performance Criteria:
1. General Characteristics:
    - a. Annunciator functions shall match those of the FACU for alarm, supervisory, and trouble indications. Manual switching functions must match those of FACU, including acknowledging, silencing, resetting, and testing.
    - b. Display Type and Functional Performance: Alphanumeric display must match those of FACU. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.
    - c. Annunciator shall indicate the type of alarm received by device and floor level.

## 2.10 INSTALLATION MATERIAL

- A. Wire shall be UL Listed for use in fire alarm signaling systems or as required by NFPA 70, Article 760. All wire shall be solid conductors of copper, minimum size No. 18 AWG and insulation rated at 150 volts and labeled for non-power limited use.
- B. All conduits, junction boxes, pull boxes and fittings shall be UL Listed.
- C. Terminal Cabinets:
1. Manufactured with 16-gauge cold roll steel with red textured finish.
  2. UL Listed.
  3. Equipped with factory mounted terminal strips designed to accept 12-gauge wires and rated at 20 amps maximum.
  4. Provided with lift away hinge and key lock.
  5. White lettering "FIRE ALARM TERMINAL CABINET."

**PART 3 – EXECUTION**

**3.1 INSTALLATION**

- A. The Fire Alarm System Supplier shall furnish on-the-job supervision for the proper installation of their devices in cooperation with, or as may be required by, other trades. This supervision shall include, but not be limited to, the following:
  - 1. Provide specific on-site instructions to others on mounting and installation of each type of device by physically observing the mounting of one or more of each type of device, as required, to assure that the installer is properly instructed in the work.
  - 2. Provide other supervision as required by the trades to properly perform fire alarm installation work.
  - 3. Perform a complete test of the system, certifying that all devices have been activated and that the devices and systems perform in accordance with the requirements of these specifications and local codes.
  - 4. Install, test, trouble-shoot, and correct all system software provided or modified under these specifications.
- B. The Fire Alarm Contractor shall furnish all material and labor to provide a complete and functional system that operates in accordance with the requirements of these specifications. This shall include, but not be limited to, the following:
  - 1. Conduit, raceway, and wiring systems as indicated herein.
    - a. Install all fire alarm system wiring in conduit or approved raceway, parallel to existing building structure.
    - b. All wire installed for this project shall be new and be UL Listed for use in fire alarm systems.
    - c. Strap or bundle all cables and wires inside equipment enclosures and terminal cabinets, parallel to the enclosure sides.
    - d. Wire:
      - 1) Wire used for 120 VAC power circuits shall be minimum size of 12 AWG stranded copper conductors, with THHN insulation.
      - 2) Wire used for initiating device circuits shall be minimum size of 16 AWG solid copper conductors, UL Listed for fire alarm system use and labeled NPLFA.
      - 3) Wire shall be UL Listed for use in fire alarm signaling systems or as required by NFPA 70, Article 760.
      - 4) All wire shall meet the requirements and recommendations of the system manufacturer.
  - 2. Conduit:
    - a. Conduit shall be 3/4-inch minimum size and be EMT type, except where otherwise required by local code or these specifications.

- b. All EMT conduit fittings shall be the compression type. All rigid conduit fittings shall be threaded with plastic inserts.
    - c. Flexible conduit and associated junction boxes connecting sprinkler waterflow and supervisory switches shall be water resistant.
  - 3. Junction Boxes:
    - a. Sectional boxes shall not be used.
    - b. Each box shall be large enough to accommodate required splices and conduit in accordance with the National Electrical Code.
    - c. All box covers shall be painted red.
  - 4. Field Terminal Cabinets (FTC):
    - a. FTC shall be UL Listed for use in electrical wiring systems.
    - b. FTC minimum size shall be 12 inches by 12 inches by 4 inches with hinged lockable cover or plate cover attached with tamper resistant screws.
    - c. FTC shall be painted red with label "Fire Alarm Equipment" stenciled on cover.
    - d. UL Listed terminal strips shall be provided for all wiring splices in terminal boxes. All terminals shall be permanently labeled. **The use of wire nuts to make wiring splices is strictly prohibited.**
- C. Smoke Detectors: Locate smoke detectors as shown on the drawings on a 4-inch mounting box. Detectors located on the ceiling shall be installed not less than 4 inches from a sidewall to the near edge. Those located on the wall shall have the top of the detector at least 4 inches and not more than 12 inches below the ceiling. Install smoke detectors no closer than 5 feet from air handling supply outlets.
- D. All fire alarm devices shall be mounted in accordance with the manufacturer's installation instructions and shall be installed using the manufacturer's suggested mounting box.

### 3.2 SYSTEM ACCESSORIES

- A. Document Storage Cabinet:
  - 1. Description: Enclosure to accommodate standard 8-1/2-by-11-inch manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
  - 2. Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
  - 3. Color: Red powder-coat epoxy finish
  - 4. Labeling: Permanently screened with 1-inch high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.

5. Security: Locked with 3/4-inch barrel lock. Provide solid 12-inch stainless steel piano hinge.

### **3.3 PAINTING, PATCHING AND FIRESTOPPING**

- A. Repair and patch surfaces to match existing finish.
- B. Painted surfaces shall be painted under Specification Section 09 91 00 to the nearest angled surface. The painted surface shall not be readily apparent to the casual viewer.
- C. Firestopping shall be installed wherever the conduits penetrate floors and fire walls. The firestopping material shall meet the requirements of UL 1479.
- D. Installation of firestopping:
  1. Install firestopping in accordance with the manufacturer's recommendations and as necessary to meet the specified fire rating requirements.
  2. Where firestopping is used to seal around penetration through waterproof membranes, install to maintain integrity of waterproof barrier.
- E. Patching of all walls, floors, and ceilings that are penetrated or damaged during construction and returning the surface to a condition matching existing adjacent surfaces.
  1. All slab penetrations shall be completely sealed and made watertight.
  2. Restore all fire rated walls to rated conditions.

### **3.4 TESTS/FIELD QUALITY CONTROL**

- A. The final alarm acceptance test shall be coordinated with the Engineer. Prior to the acceptance test, the Contractor shall conduct a full pre-test of the system to verify proper operation. A letter certifying that the installation is complete and operational shall be forwarded to the Owner and the Engineer.
- B. The Owner, Fire Alarm Contractor, Fire Alarm System Supplier, and Engineer shall be in attendance at the final acceptance test to make necessary adjustments. A final test shall be conducted in accordance with NFPA 72 requirements. The test shall include, but not be limited to, the following:
  1. A test of the complete system for grounded, open, and short circuits.
  2. A test of each alarm-initiating device for specified functions and for the required alarm actions.
  3. A test of the system for electrical supervision.
  4. A test to verify that alarm signals will operate under specified trouble conditions.
  5. A test to verify that the system will operate under specified trouble conditions.
  6. A test to verify that the system will perform all specified tasks.



- C. The Contractor shall provide all materials, equipment, coordination, and personnel necessary to perform and document all required tests. All test equipment shall be subject to approval by the Engineer.
- D. If the system requires a retest by the Engineer or the authorities having jurisdiction, all costs of the retest shall be the responsibility of the Fire Alarm Contractor.

**3.5 OPERATING MANUALS**

- A. Provide three (3) operating manuals containing illustrations and descriptions of each fire alarm device.

**3.6 RECORD DOCUMENTS**

- A. Provide one (1) reproducible print, two (2) blackline prints, and a CD-Rom in AutoCAD 2016 of drawings, floor plans with device locations, device addresses, wire routing, and wiring diagrams reflecting "as-built" conditions to the Owner.
- B. Provide two (2) complete sets of "as-built" data sheets for all system-connected equipment to the Owner.
- C. Provide two (2) sets of the complete "as-built" software listing of all data files, event programs, print statements, points lists, etc. to the Owner.
- D. Provide one (1) complete set of blackline prints of "as-built" drawings and wiring diagrams to the Engineer.
- E. Provide a completed test form which complies with NFPA 72, signed and dated by the fire alarm system manufacturer or his agent.
- F. All items of this section shall be provided prior to final payment request.

**3.7 SPARE PARTS**

- A. The Fire Alarm Contractor shall furnish a listing, in duplicate, of all spare parts and accessories that the manufacturer recommends to be stocked for proper maintenance of the system.

**END OF SECTION 28 31 00**



# BELLE ISLE HAZARDOUS MATERIAL AND STRUCTURAL STUDY MASTER DOCUMENT

## BELLE ISLE PARK

99 Pleasure Drive  
Detroit, MI 48207

### Prepared for:

Department of Natural Resources  
525 W. Allegan Street  
PO Box 30028  
Lansing Michigan 48909  
Client Reference: 751/22133.MNB

### Prepared by:

Beam, Longest, and Neff  
51151 West Pontiac Trail  
Wixom, MI 48393  
BLN Project ID: 230022  
September 8, 2023

| PSIS Structural Repair Summary |                              |                                                                                                     |
|--------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------|
| Priority                       | Structure/Building           | Comments                                                                                            |
| 3                              | Pullman Bridge               | The condition of the structure does not warrant repairs to stabilize the structure for safe access. |
| 3                              | Shady Nook                   | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |
| 3                              | Shelter No. 8                | The condition of the structure does not warrant repairs to stabilize the structure for safe access. |
| 3                              | Shelter No. 9                | The condition of the structure does not warrant repairs to stabilize the structure for safe access. |
| 3                              | Stables                      | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |
| 3                              | Stone Comfort Station        | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |
| 3                              | Sunset Point Comfort Station | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |
| 3                              | White House                  | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |
| 3                              | Woodside Comfort Station     | The condition of the structure does not warrant repairs to stabilize the building for safe access.  |

Below is a table that summarizes hazardous materials abatement needs for structure included in the HRM Survey scope of work and prioritizes abatement.

| HRM Abatement Summary |                        |               |                                |            |                           |
|-----------------------|------------------------|---------------|--------------------------------|------------|---------------------------|
| No.                   | Structure/<br>Building | ACM Abatement | LCP<br>Abatement/Encapsulation | ORM        | Structure Total           |
| 1                     | Athletic Shelter       | \$138,779.32  | \$100,500.00-\$301,500.00      | \$4,744.04 | \$244,023.36-\$445,023.36 |
| 2                     | Aquarium               | \$130,695.39  | \$66,300.00-\$198,900.00       | \$619.55   | \$66,919.55-\$199,519.55  |
| 3                     | Bear Pit Restroom      | \$5,940.84    | \$9,230.00-\$29,190.00         | \$731.94   | \$15,902.78-\$35,862.78   |
| 4                     | Bus Stop Shelter No. 7 | \$0.00        | \$41,800.00-\$125,400.00       | \$0.00     | \$41,800.00-\$125,400.00  |
| 5                     | Central Power Plant    | \$72,434.74   | \$42,990.00-\$128,970.00       | \$479.26   | \$115,904.00-\$201,884.00 |
| 6                     | Flynn Pavilion         | \$91,522.76   | \$14,420.00-\$43,260.00        | \$3,606.63 | \$109,549.39-\$138,389.39 |
| 7                     | Garage                 | \$42,276.80   | \$11,120.00-\$33,360.00        | \$1,457.88 | \$54,854.68-\$77,094.68   |
| 8                     | Giant Slide            | \$15,150.00   | \$1,080.00-\$3,240.00          | \$149.51   | \$16,379.51-\$18,539.51   |

| Athletic Structure                               |                                                                                     |     |       |            |                     |
|--------------------------------------------------|-------------------------------------------------------------------------------------|-----|-------|------------|---------------------|
| Sample ID                                        | Item Description                                                                    | Qty | Units | Unit Price | Total Price         |
| <b>Asbestos Containing Materials</b>             |                                                                                     |     |       |            |                     |
| 27A-C                                            | Exterior caulk, gray beige, residual on brick at northeast window area              | 6   | SF    | \$50.72    | \$304.32            |
| 39A-C                                            | Roofing material, black residual mastic on brick around flashing (near boiler room) | 56  | SF    | \$25.00    | \$1,400.00          |
| ASSUMED                                          | Pipe flange gaskets                                                                 | 11  | SF    | \$25.00    | \$275.00            |
| ASSUMED                                          | Pipe valve packing                                                                  | 16  | SF    | \$50.00    | \$800.00            |
| ASSUMED                                          | Vibration dampener                                                                  | 4   | SF    | \$50.00    | \$200.00            |
| ASSUMED                                          | Internal furnace insulation                                                         | 200 | SF    | \$100.00   | \$20,000.00         |
| ASSUMED                                          | Internal boiler insulation                                                          | 46  | SF    | \$100.00   | \$4,600.00          |
| ASSUMED                                          | Mechanical exhaust flue/stack system                                                | 713 | SF    | \$150.00   | \$106,950.00        |
| ASSUMED                                          | Generator insulation and gaskets                                                    | 170 | SF    | \$25.00    | \$4,250.00          |
| <b>ACM TOTAL</b>                                 |                                                                                     |     |       |            | <b>\$138,779.32</b> |
| <b>Other Hazardous &amp; Regulated Materials</b> |                                                                                     |     |       |            |                     |
|                                                  | Fire Suppression System                                                             | 1   | UNIT  | \$100.00   | \$100.00            |
|                                                  | Smoke Detectors                                                                     | 2   | UNITS | \$22.77    | \$45.54             |
|                                                  | Fluorescent light fixtures                                                          | 28  | UNITS | \$5.49     | \$153.72            |
|                                                  | 4' fluorescent tubes                                                                | 79  | UNITS | \$2.09     | \$165.11            |
|                                                  | 6' fluorescent tubes                                                                | 3   | UNITS | \$2.01     | \$6.03              |
|                                                  | 5 gallon paint                                                                      | 3   | UNITS | \$3.89     | \$11.67             |
|                                                  | Emergency Lights                                                                    | 7   | UNITS | \$20.00    | \$140.00            |
|                                                  | Mercury Thermostats                                                                 | 4   | UNITS | \$37.21    | \$148.84            |
|                                                  | 1-gallon Thompson Seal                                                              | 2   | UNITS | \$1.97     | \$3.94              |
|                                                  | 22oz stainless steel cleaner                                                        | 1   | UNIT  | \$1.97     | \$1.97              |
|                                                  | 1-gallon bleach                                                                     | 2   | UNITS | \$1.97     | \$3.94              |
|                                                  | 32oz detergent                                                                      | 2   | UNITS | \$1.97     | \$3.94              |
|                                                  | 16oz spray paint                                                                    | 3   | UNITS | \$3.89     | \$11.67             |
|                                                  | 1-gallon paint                                                                      | 23  | UNITS | \$3.89     | \$89.47             |
|                                                  | Power steering fluid                                                                | 1   | UNIT  | \$1.97     | \$1.97              |
|                                                  | 1qt paint                                                                           | 3   | UNITS | \$3.89     | \$11.67             |
|                                                  | Large Freezer Unit                                                                  | 1   | UNIT  | \$103.63   | \$103.63            |
|                                                  | Mechanical door closer                                                              | 17  | UNITS | \$85.96    | \$1,461.32          |
|                                                  | Exit sign                                                                           | 7   | UNITS | \$20.00    | \$140.00            |
|                                                  | 22oz spray paint                                                                    | 1   | UNIT  | \$3.89     | \$3.89              |
|                                                  | 5-gallon bucket black tar                                                           | 1   | UNIT  | \$5.00     | \$5.00              |
|                                                  | 30-gallon drum oil                                                                  | 1   | UNIT  | \$710.24   | \$710.24            |
|                                                  | Large Transformers                                                                  | 2   | UNITS | \$710.24   | \$1,420.48          |
| <b>ORM TOTAL</b>                                 |                                                                                     |     |       |            | <b>\$4,744.04</b>   |
| <b>GRAND TOTAL</b>                               |                                                                                     |     |       |            | <b>\$143,523.36</b> |

| Athletic Shelter |                                                                      |                  |                  |                                            |      |                |                 |
|------------------|----------------------------------------------------------------------|------------------|------------------|--------------------------------------------|------|----------------|-----------------|
| Lead-Based Paint |                                                                      |                  |                  |                                            |      |                |                 |
| Sample ID        | Sample Description                                                   | Location (FS/EA) | Lead Content (%) | Unit Pricing                               | SF   | Estimate (Low) | Estimate (High) |
| PC5              | Black on metal, fence/gate railing                                   | EA1              | 0.03             | Paint Scrape & Encapsulation \$5-15 per SF | 180  | \$900.00       | \$2,700.00      |
| PC7              | Brown on metal, lower-level window framing                           | EA3              | 11               | Paint Scrape & Encapsulation \$5-15 per SF | 168  | \$840.00       | \$2,520.00      |
| PC8              | Brown on wood, upper-level window framing                            | EA1              | 5.1              | Paint Scrape & Encapsulation \$5-15 per SF | 85   | \$425.00       | \$1,275.00      |
| PC9              | Light cream on wood, veranda ceilings/roof eaves                     | EA3              | 5.1              | Paint Scrape & Encapsulation \$5-15 per SF | 5320 | \$26,600.00    | \$79,800.00     |
| PC10             | White on wood, upper-level windows                                   | FS28             | 20               | Paint Scrape & Encapsulation \$5-15 per SF | 168  | \$840.00       | \$2,520.00      |
| PC11             | White on wood, upper-level ceiling/wood walls                        | FS28             | 16               | Paint Scrape & Encapsulation \$5-15 per SF | 6980 | \$34,900.00    | \$104,700.00    |
| PC13             | White on metal, upper-level structural members                       | FS28             | 14               | Paint Scrape & Encapsulation \$5-15 per SF | 375  | \$1,875.00     | \$5,625.00      |
| PC14             | Gray on concrete, upper-level coating to floor                       | FS28             | 0.016            | Paint Scrape & Encapsulation \$5-15 per SF | 3900 | \$19,500.00    | \$58,500.00     |
| PC16             | Gray on wood, wood floors at upper level                             | FS26             | 0.73             | Paint Scrape & Encapsulation \$5-15 per SF | 72   | \$360.00       | \$1,080.00      |
| PC18             | Light green on wood, transom above door to veranda                   | FS27             | 3                | Paint Scrape & Encapsulation \$5-15 per SF | 10   | \$50.00        | \$150.00        |
| PC20             | White on wood, door framing at upper-level stairway                  | FS25             | 5.5              | Paint Scrape & Encapsulation \$5-15 per SF | 8    | \$40.00        | \$120.00        |
| PC21             | White on metal, central stairs components                            | FS25             | 7.9              | Paint Scrape & Encapsulation \$5-15 per SF | 20   | \$100.00       | \$300.00        |
| PC22             | White on plaster, plaster wall at upper central stairs               | FS25             | 0.25             | Paint Scrape & Encapsulation \$5-15 per SF | 50   | \$250.00       | \$750.00        |
| PC23             | White on wood, wood walls at central stairs                          | FS9              | 0.41             | Paint Scrape & Encapsulation \$5-15 per SF | 384  | \$1,920.00     | \$5,760.00      |
| PC24             | Gray on concrete, lower level, coating to concrete floor             | FS2              | 0.011            | Paint Scrape & Encapsulation \$5-15 per SF | 1080 | \$5,400.00     | \$16,200.00     |
| PC30             | Gray on concrete, lower-level, coating (no flecks) to concrete floor | FS2              | 0.0097           | Paint Scrape & Encapsulation \$5-15 per SF | 1080 | \$5,400.00     | \$16,200.00     |
| PC35             | Dark red on metal stair railing                                      | FS31             | <0.018           | Paint Scrape & Encapsulation \$5-15 per SF | 20   | \$100.00       | \$300.00        |
| PC36             | Dark red on metal, plumbing control valves                           | FS31             | <0.037           | Paint Scrape & Encapsulation \$5-15 per SF | 10   | \$50.00        | \$150.00        |
| PC37             | Dark red orange on metal, furnace housing                            | FS31             | <0.039           | Paint Scrape & Encapsulation \$5-15 per SF | 24   | \$120.00       | \$360.00        |
| PC38             | Light gray on metal, various mechanical/electrical equipment housin  | FS31             | 0.023            | Paint Scrape & Encapsulation \$5-15 per SF | 10   | \$50.00        | \$150.00        |
| PC39             | Blue on metal, gas burner equipment                                  | FS31             | <0.020           | Paint Scrape & Encapsulation \$5-15 per SF | 2    | \$10.00        | \$30.00         |
| PC40             | Light green on brick, brick wall                                     | FS20             | 0.25             | Paint Scrape & Encapsulation \$5-15 per SF | 96   | \$480.00       | \$1,440.00      |
| PC41             | Black on wood, loose doors stored in kitchen                         | FS3              | 30               | Paint Scrape & Encapsulation \$5-15 per SF | 48   | \$240.00       | \$720.00        |
| PC42             | Gray on metal, bench posts in locker rooms                           | FS17             | 0.038            | Paint Scrape & Encapsulation \$5-15 per SF | 10   | \$50.00        | \$150.00        |
| TOTAL            |                                                                      |                  |                  |                                            |      | \$100,500.00   | \$301,500.00    |

## ATTACHMENT 3- ATHLETIC SHELTER HRMS REPORT





# HAZARDOUS AND REGULATED MATERIALS SURVEY REPORT

## ATHLETIC SHELTER

Belle Isle Park  
Detroit, MI 48207

---

### Prepared for:

Department of Natural Resources  
525 W. Allegan Street  
PO Box 30028  
Lansing Michigan 48909  
DTMB File No.: 751\_22133.MNB

### Prepared by:

Beam, Longest, and Neff  
51151 West Pontiac Trail  
Wixom, MI 48393  
BLN Project ID: 230022  
August 31, 2023

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## ATTACHMENTS

Attachment 1 – Laboratory Analytical Reports

Attachment 2 – Exhibit

Attachment 3 – Photographic Log



## EXECUTIVE SUMMARY

Beam, Longest and Neff, LLC certified asbestos inspector completed the hazardous and regulated materials (HRM) survey of the Athletic Shelter located at the central portion of Belle Isle on June 06, 2023. The HRM survey was performed consistent with non-destructive methods. Suspect building materials that were visible and accessible at the surface were cataloged and sampled as part of this HRM survey. Building materials that could not be sampled without compromising the building system or were inaccessible were assumed to be asbestos containing materials (ACM).

Three hundred and three (303) asbestos bulk samples, taken from eighty-four (84) homogenous areas, were collected and submitted for analysis by Polarized Light Microscopy (PLM). The results of laboratory testing from the HRM survey conducted at the property indicate that two (2) of the materials sampled were identified as ACM, meaning that asbestos was identified at a concentration greater than 1%. In addition, seven (7) materials (pipe flange gaskets, pipe valve packings, vibration dampener, internal furnace insulation, internal boiler insulation, mechanical exhaust flue/stack system, and generator insulation and gaskets) were assumed to contain asbestos.

It should be noted, if additional suspect asbestos materials are discovered during renovation/demolition activities, such materials must be assumed to contain asbestos and treated as ACM until proper sampling and analysis can prove otherwise.

Forty-two (42) composite samples of paint and associated sub-layers (where applicable) taken from representative interior and exterior areas of the building, were collected and submitted for analysis by Flame Atomic Absorption Spectroscopy (AAS). The results of laboratory testing during the limited lead-containing paint sampling conducted at the property indicate that Thirty (30) samples contained levels of lead greater than the method detection limits.

The HRM survey also identified regulated materials and universal wastes are present in the subject building, including, but not limited to electric lamps (fluorescent light fixtures, high intensity discharge light fixtures and/or cathode ray tubes), light fixture ballasts (potential PCBs), batteries, fire extinguisher, mechanical door closures (oils), disinfectants, and various chemical cleaners. Prior to renovation/demolition activities these materials should be assessed and disposed of properly.

Universal wastes have alternative management requirements identified in Rule 228 of the Part 111 hazardous waste rules from Michigan Dept. EGLE – Materials Management Division. Certain designations of hazardous waste may be managed to meet the streamlined universal waste standards instead of following the more stringent hazardous waste generator accumulation requirements. Two primary benefits of managing hazardous waste as a universal waste is that the weight of the waste is not included when determining a site's monthly hazardous waste generator status and the waste can be stored for up to one year. If the generator does not handle these materials as universal waste, they must manage them under the hazardous waste regulations when they are listed hazardous waste or exhibit hazardous waste characteristics.

Observations for conditions relative to potential mold growth associated with the property were conducted during the site evaluation. In addition to isolated areas of apparent historical moisture impact to building materials that were noted, areas of readily visible presence of accumulated mold growth were also observed at the time of the limited visual mold assessment. It is recommended that a comprehensive mold/microbial inspection be conducted to evaluate potential mold/microbial conditions that may be present and affect indoor air quality.

# 1.0 INTRODUCTION

Beam, Longest, and Neff, LLC (BLN) has been contracted by the Department of Technology, Management and Budget (DTMB) on behalf of the Michigan Department of Natural Resources (DNR) to perform hazardous and regulated materials (HRM) surveys on 37 structures located at Belle Isle State Park. The purpose of conducting the HRM surveys is to identify asbestos containing materials (ACM) and other hazardous and regulated materials (ORM) in connection to each structure and prepare a cost estimate for abatement of the material so that DNR may prioritize abatement activities in consideration of funding earmarked for abatement.

## 1.1 HAZARDOUS & REGULATED MATERIALS SURVEY SCOPE OF SERVICES

The scope of the HRM and lead survey included the following:

- Review of existing asbestos reports for the building, if available;
- Survey of the property building(s);
- Identification of accessible suspect asbestos-containing materials (ACMs) and lead-containing paint;
- Collection and analysis of bulk samples of suspect friable and non-friable materials and paint chip samples;
- Identification of accessible regulated materials/universal wastes;
- Describing types, locations and estimated quantities of identified regulated materials/universal wastes;
- Visual evaluation of mold; and
- Report preparation.

## 1.2 CERTIFICATION

The asbestos inspection was conducted by State of Michigan (SOM) Accredited Asbestos Inspectors identified below. The HRM inspection was conducted on June 6, 2023. During the inspection bulk material samples were collected, and quantities of suspect asbestos-containing materials were estimated, where applicable. This inspection also included identification and quantification of other hazardous and/or regulated materials (ORM) within the building structure and in exterior portions of the Site.

| TABLE 1.2.1 – Asbestos Inspectors           |                                  |
|---------------------------------------------|----------------------------------|
| Inspector Name and SOM Accreditation Number | Contact Information              |
| Tony Rich - A11987                          | trich@b-l-n.com / (248) 270-0267 |

## 2.0 DESCRIPTION OF STRUCTURE

The structure was built in 1898 and is approximately 12,500 square feet in size. It is a wood framed structure situated on a concrete slab. The roof is covered with asphalt shingles. The exterior walls are brick. The windows in the house are a combination of wood framed, and metal. The doors are metal.

Property information and a description of the structure(s) and other improvements are provided below. Information was gathered from the site reconnaissance, records provided by the client and review of readily available municipal records.

| TABLE 2.1 – Property Information |                                                                                                                                                                                                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Year Built                       | 1898                                                                                                                                                                                                       |
| Square Footage                   | 12,500 square feet                                                                                                                                                                                         |
| Foundation Type                  | Slab On-Grade                                                                                                                                                                                              |
| Building Type                    | Historic/Recreational Structure                                                                                                                                                                            |
| Exterior Description             | Wood framed with exterior brick walls, two story building with new roof.                                                                                                                                   |
| Interior Description             | <ul style="list-style-type: none"><li>• Several rooms (utility room, restroom, locker room, etc.)</li><li>• Wood paneling, wallboard system</li><li>• Concrete, ceramic, and vinyl tile flooring</li></ul> |

## 3.0 GENERAL INSPECTION METHODOLOGY

BLN asbestos inspector Mr. Tony Rich conducted the asbestos inspection of the property building on June 6, 2023. The building was visually inspected for the presence of building materials that are suspected to contain asbestos. Bulk samples of suspect ACMs were collected and placed into individual containers for transport to a National Voluntary Lab Accreditation Program (NVLAP)-accredited laboratory for analysis. Materials typically known as non-asbestos items (i.e., fibrous glass, foam rubber, wood) were not sampled. The asbestos inspection consisted of the following three basic procedures:

- Conducting a visual and physical inspection of the structure;
- Identifying homogeneous areas (HAs) of suspect surfacing, thermal system insulation, and miscellaneous materials; and
- Sampling accessible, friable, and non-friable suspect materials.

### 3.1 HOMOGENOUS AREAS

Prior to collecting any samples, homogenous areas (HAs) were identified. A homogeneous sampling area can be described as one or more areas of material that are similar in appearance and texture and that have the same apparent installation date, appearance, and function. The number of samples collected from each homogeneous sampling area may vary, based on the type of material and professional opinion of the inspector.

### 3.2 HAZARD ASSESSMENT FACTORS

From the list of suspect homogeneous areas, a physical assessment was performed for each material on the list. A physical assessment includes evaluating the condition, assessing the potential for disturbance, and determining the friability of each material. By definition, "friable" materials are those that can be crumbled or reduced to powder by hand pressure when dry. Each material identified was further classified into one of three categories: surfacing materials, thermal systems insulation (TSI) and miscellaneous materials. Each of the three categories have specific sampling requirements, outlined below.

- **Surfacing Materials:** Refers to spray-applied, troweled-on surfaces or otherwise applied; including but not limited to materials such as plaster ceilings and walls, fireproofing, textured paints, textured plasters, and spray-applied acoustical surfaces, etc.
- **Thermal System Insulation:** Refers to insulation used to inhibit heat/cold gain or loss on pipes, boilers, tanks, ducts, and various other building components.
- **Miscellaneous Materials:** Refers to friable and non-friable products and materials that do not fit in any of the above two categories such as resilient floor covering, baseboards, mastics, adhesives, roofing material, sealants, caulking, glazing, and siding. This category also contains wallboard, joint-compound, gaskets, ceiling tile, etc.

ACM and assumed ACM materials were assessed related to their observed condition in the following categories: good (intact), fair (damaged) or poor (significantly damaged) per Title 40 Code of Federal Regulations Part 763. Material with localized, significant damage was also assessed as poor.

### 3.3 LABORATORY ANALYTICAL METHODOLOGY

Bulk samples were analyzed by EMSL Analytical, Inc. (EMSL) using polarized-light microscopy (PLM) via EPA Method 600/R-93/116. This laboratory participates in the National Voluntary Laboratory Accreditation Program, a quality assurance program for the identification of asbestos presence in bulk materials via PLM analysis.

## 4.0 LABORATORY ANALYTICAL RESULTS

Three hundred and three (303) bulk samples representing eighty-four (84) suspect materials were collected for laboratory analysis; two (2) materials tested positive for the presence of asbestos fibers. Bulk materials were analyzed for asbestos pursuant to EPA Method 600/R-93/116 using PLM, unless otherwise indicated. Bulk material samples that tested between a “trace” amount and one percent (1%) asbestos were point counted (400-point counts; EPA 600/R-93/116) to confirm the result. **Table 4.1** provides information for material identified as ACM, including a condition classification and a recommendation for managing the ACM. Friable ACMs classified as being in poor condition should be viewed as the priority and should be abated immediately. Non-friable materials classified as being in poor condition should be considered the next priority for abatement. A cost estimate is provided for abating materials classified as being in poor and fair condition. For materials in fair to good condition, it is recommended that a qualified professional perform periodic inspections (biannually) to monitor changes in condition. ACMs in good condition do not require maintenance in the near term but would still need to be managed appropriately during renovation activities. **Table 4.2** provides summary results information regarding all bulk sampling at the site.

Copies of the laboratory analytical report and chain-of-custody forms are provided as *Attachment 1, Laboratory Analytical Report*. Positive sample results are reported in percent asbestos by volume of the sample and the type of asbestos material within the sample. Other common non-asbestos constituents may also be noted on the analytical reports. A figure depicting the building layout and positive ACM sample and assumed ACM locations are included as *Attachment 2, Exhibit*. A photographic log documenting identified ACM, assumed ACM and lead-containing paint (LCP) during the inspection is provided as *Attachment 3, Photographic Log*.

**TABLE 4.1 – Asbestos Containing Materials**

| Sample ID | Location(s)<br>(FS/EA) | Material Description                                                   | Condition | Friable <sup>1</sup> | Est. Quantity | Asbestos Content | Recommendations                                                                                   | Cost Est.                                                                                      |
|-----------|------------------------|------------------------------------------------------------------------|-----------|----------------------|---------------|------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 27A-C     | EA4                    | Exterior caulk, gray beige, residual on brick at northeast window area | Poor      | No                   | 6-SF          | 3% Chrysotile    | Abate loose Caulk-Clean Up Debris Encapsulate w/New Caulk - Abate if future renovation/demolition | \$50.72/SF – Doors/Windows<br>\$92.00/SF from Block and Brick<br>\$3-6.00/LF for encapsulation |

**TABLE 4.1 – Asbestos Containing Materials**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                         | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Est. Quantity</b> | <b>Asbestos Content</b> | <b>Recommendations</b>                                                          | <b>Cost Est.</b>                                 |
|------------------|--------------------------------|-------------------------------------------------------------------------------------|------------------|----------------------------|----------------------|-------------------------|---------------------------------------------------------------------------------|--------------------------------------------------|
| 39A-C            | EA3                            | Roofing material, black residual mastic on brick around flashing (near boiler room) | Fair             | No                         | 56-SF                | 22% Chrysotile          | Periodic Inspections to check condition- Abate if future renovation/ demolition | Encapsulate with NON-ACM Mastic- \$65-100 per SF |
| NA               | FS31                           | Pipe flange gaskets                                                                 | Good             | NA                         | NA                   | ASSUMED                 | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA                                               |
| NA               | FS31                           | Pipe valve packing                                                                  | Good             | NA                         | NA                   | ASSUMED                 | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA                                               |
| NA               | FS31                           | Vibration dampener                                                                  | Good             | NA                         | NA                   | ASSUMED                 | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA                                               |
| NA               | FS31                           | Internal furnace insulation                                                         | Good             | NA                         | NA                   | ASSUMED                 | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA                                               |
| NA               | FS31                           | Internal boiler insulation                                                          | Good             | NA                         | NA                   | ASSUMED                 | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA                                               |

| TABLE 4.1 – Asbestos Containing Materials |                        |                                      |           |                      |               |                  |                                                                                       |           |
|-------------------------------------------|------------------------|--------------------------------------|-----------|----------------------|---------------|------------------|---------------------------------------------------------------------------------------|-----------|
| Sample ID                                 | Location(s)<br>(FS/EA) | Material Description                 | Condition | Friable <sup>1</sup> | Est. Quantity | Asbestos Content | Recommendations                                                                       | Cost Est. |
| NA                                        | EA3                    | Mechanical exhaust flue/stack system | Good      | NA                   | NA            | ASSUMED          | Periodic Inspections to check condition-<br>Abate if future renovation/<br>demolition | NA        |
| NA                                        | FS31                   | Generator insulation and gaskets     | Good      | NA                   | NA            | ASSUMED          | Periodic Inspections to check condition-<br>Abate if future renovation/<br>demolition | NA        |

The following table provides a summary of building materials sampled and the result of analytical testing.

| TABLE 4.2 – Summary of Building Materials Sampling Results |                        |                                                                       |           |                      |                    |                  |
|------------------------------------------------------------|------------------------|-----------------------------------------------------------------------|-----------|----------------------|--------------------|------------------|
| Sample ID                                                  | Location(s)<br>(FS/EA) | Material Description                                                  | Condition | Friable <sup>1</sup> | Estimated Quantity | Asbestos Content |
| 1A-C                                                       | EA1-4                  | Concrete exterior walkways                                            | NA        | NA                   | NA                 | ND               |
| 2A-C                                                       | EA3                    | Asphalt paving parking areas                                          | NA        | NA                   | NA                 | ND               |
| 3A-C                                                       | EA1-4                  | Brick, main exterior walls                                            | NA        | NA                   | NA                 | ND               |
| 4A-C                                                       | EA1-4                  | Brick mortar, cementitious associated with HA-03                      | NA        | NA                   | NA                 | ND               |
| 5A-C                                                       | EA1-4                  | Exterior caulk, gray, on brick/sill seams at main lower windows areas | NA        | NA                   | NA                 | ND               |
| 6A-C                                                       | EA1-4                  | Concrete, sill base, block, under brick exterior walls                | NA        | NA                   | NA                 | ND               |
| 7A-C                                                       | EA1-4                  | Exterior caulk, black sealant, along seams at                         | NA        | NA                   | NA                 | ND               |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                                          | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|------------------------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
|                  |                                | brick/concrete base below window areas                                                               |                  |                            |                           |                         |
| 8A-C             | EA1-4                          | Concrete windowsills (block form)                                                                    | NA               | NA                         | NA                        | ND                      |
| 9A-C             | EA1-4                          | Exterior caulk, black/dark brown (layers), to main level windows (with dark brown metal framing)     | NA               | NA                         | NA                        | ND                      |
| 10A-C            | EA2                            | Exterior caulk, light gray, on metal storefront door/window system                                   | NA               | NA                         | NA                        | ND                      |
| 11A-C            | EA1-4                          | Expansion joint, light gray, black, fibrous, on exterior walkway concrete seams                      | NA               | NA                         | NA                        | ND                      |
| 12A-C            | EA1-4                          | Exterior caulk, light gray, on concrete windowsill joints                                            | NA               | NA                         | NA                        | ND                      |
| 13A-C            | EA1-4                          | Brick, beveled edges, at some main level lower window areas                                          | NA               | NA                         | NA                        | ND                      |
| 14A-C            | EA1-4                          | Brick mortar, cementitious, associated with HA-13                                                    | NA               | NA                         | NA                        | ND                      |
| 15A-C            | EA1-4                          | Window glaze, black, thin bead, sticky, pliable, to main level windows with dark brown metal framing | NA               | NA                         | NA                        | ND                      |
| 16A-C            | EA1-4                          | Exterior caulk, brown to roof flashing and fascia boards (near boiler room)                          | NA               | NA                         | NA                        | ND                      |
| 17A-C            | EA1-4                          | Exterior caulk, off-white to various door frames                                                     | NA               | NA                         | NA                        | ND                      |



**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                             | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|-----------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
| 18A-C            | EA3                            | Brick, coarse, to mechanical exhaust stack                                              | NA               | NA                         | NA                        | ND                      |
| 19A-C            | EA3                            | Brick mortar, cementitious, associated with HA-18                                       | NA               | NA                         | NA                        | ND                      |
| 20A-C            | EA3                            | Brick, smaller dimension, wall fill-in at FS21 area                                     | NA               | NA                         | NA                        | ND                      |
| 21A-C            | EA3                            | Brick mortar, cementitious, associated with HA-21                                       | NA               | NA                         | NA                        | ND                      |
| 22A-C            | EA3                            | Exterior caulk, dark brown, on metal louvers at FS-21 area                              | NA               | NA                         | NA                        | ND                      |
| 23A-C            | EA3                            | Concrete pads on exterior electrical transformer equipment                              | NA               | NA                         | NA                        | ND                      |
| 24A-C            | EA3                            | Concrete roof slab at FS-21 area                                                        | NA               | NA                         | NA                        | ND                      |
| 25A-C            | EA3                            | Exterior caulk, dark brown, on metal door frame at FS-21                                | NA               | NA                         | NA                        | ND                      |
| 26A-C            | EA3                            | Exterior caulk, cream at brick wall to wood supports for veranda                        | NA               | NA                         | NA                        | ND                      |
| 27A-C            | EA4                            | Exterior caulk, gray beige, residual on brick at northeast window area                  | Poor             | No                         | 6SF                       | 3% Chrysotile           |
| 28A-C            | EA4                            | Exterior caulk, tan on electrical panel box on exterior wall near Verizon space (FS-22) | NA               | NA                         | NA                        | ND                      |
| 29A-C            | EA1                            | Window glaze, to small rectangular metal windows, lower main level                      | NA               | NA                         | NA                        | ND                      |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                            | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|----------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
| 30A-C            | EA5                            | Roofing material, asphalt shingling                                                    | NA               | NA                         | NA                        | ND                      |
| 31A-C            | EA1-4                          | Exterior siding, clay tile                                                             | NA               | NA                         | NA                        | ND                      |
| 32A-C            | EA1-4                          | Exterior siding, very coarse concrete, at upper-level areas                            | NA               | NA                         | NA                        | ND                      |
| 33A-C            | FS32                           | Exterior caulk, beige/tan on FS-32, along bottom seams at veranda areas                | NA               | NA                         | NA                        | ND                      |
| 34A-C            | EA1-4                          | Exterior siding, cement/concrete base substrate for HA-32                              | NA               | NA                         | NA                        | ND                      |
| 35A-C            | EA3                            | Exterior caulk, light tan at brick/clay tile joints/seams at veranda areas             | NA               | NA                         | NA                        | ND                      |
| 36A-C            | EA3                            | Window glaze, on wood windows at veranda areas                                         | NA               | NA                         | NA                        | ND                      |
| 37A-C            | EA3                            | Exterior caulk, on wood frames at veranda areas                                        | NA               | NA                         | NA                        | ND                      |
| 38A-C            | FS4                            | Window glaze, beige on windows with diamond shaped wood mullion                        | NA               | NA                         | NA                        | ND                      |
| 39A-C            | EA3                            | Roofing material, black residual mastic on brick around flashing (near boiler room)    | Fair             | No                         | 56SF                      | 22% Chrysotile          |
| 40A-C            | EA1,2,3                        | Debris, coarse, rocky slag-like material at various accumulations along exterior walls | NA               | NA                         | NA                        | ND                      |
| 41A-C            | FS1-22                         | Concrete floor substrate                                                               | NA               | NA                         | NA                        | ND                      |
| 42A-C            | FS2,3                          | Flooring, 12"x12" floor tile, gray motile with adhesive                                | NA               | NA                         | NA                        | ND                      |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                            | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|----------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
| 43A-C            | FS2,3                          | Wallboard, gypsum panels to walls                                                      | NA               | NA                         | NA                        | ND                      |
| 44A-C            | FS3                            | Wall sheeting, hard board paneling with tan construction adhesive                      | NA               | NA                         | NA                        | ND                      |
| 45A-C            | FS3                            | Interior caulk, off-white, semi-flexible, residual to wall sheeting                    | NA               | NA                         | NA                        | ND                      |
| 46A-C            | FS3                            | Debris, apparent asphalt shingling debris at former kitchen area                       | NA               | NA                         | NA                        | ND                      |
| 47A-C            | FS3                            | Duct insulation, fibrous glass flex duct with plastic wrap                             | NA               | NA                         | NA                        | ND                      |
| 48A-C            | FS3                            | Plaster, textured surfacing to brick doorway opening, heavy stipple-stucco texture     | NA               | NA                         | NA                        | ND                      |
| 49A-C            | FS2                            | Flooring, residual black mastic on concrete floor                                      | NA               | NA                         | NA                        | ND                      |
| 50A-C            | FS2                            | Ceiling panel, 2' x 4' composite suspended panel with pinholes pockmarks pattern       | NA               | NA                         | NA                        | ND                      |
| 51A-C            | FS2                            | Ceiling panel, 2' x 4' composite suspended panel with pinholes fissures pattern        | NA               | NA                         | NA                        | ND                      |
| 52A-C            | FS1                            | Wallboard, gypsum panels with panels with joint compound to ceiling walls at vestibule | NA               | NA                         | NA                        | ND                      |
| 53A-C            | FS2                            | Flooring, 12" x 12" floor tile, light beige mottle with adhesive                       | NA               | NA                         | NA                        | ND                      |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                           | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|---------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
| 54A-C            | FS2                            | Flooring, 12" x 12" floor tile, yellow mottle with adhesive                           | NA               | NA                         | NA                        | ND                      |
| 55A-C            | FS3                            | Cove base, 4" vinyl cove base, dark brown with adhesive                               | NA               | NA                         | NA                        | ND                      |
| 56A-C            | FS2                            | Interior caulk, white, semi-flexible, coarse, to ceiling deck                         | NA               | NA                         | NA                        | ND                      |
| 57A-G            | FS2,8                          | Plaster, 2-layer plaster system, coarse, to ceiling deck                              | NA               | NA                         | NA                        | ND                      |
| 58A-C            | FS5,6,16,17                    | Flooring, grout to ceramic floor tile                                                 | NA               | NA                         | NA                        | ND                      |
| 59A-C            | FS5,6,16,17                    | Flooring, mortar/thin set on ceramic floor tile                                       | NA               | NA                         | NA                        | ND                      |
| 60A-C            | FS2,5,6,8                      | Block, concrete block walls                                                           | NA               | NA                         | NA                        | ND                      |
| 61A-C            | FS2,5,6,8                      | Block mortar, cementitious, associated with HA-60                                     | NA               | NA                         | NA                        | ND                      |
| 62A-C            | FS7                            | Ceiling panel, 2'x2' suspended panels vinyl covered gypsum                            | NA               | NA                         | NA                        | ND                      |
| 63A-C            | FS7                            | Cove base, 4" vinyl cove base, dark brown/black with adhesive                         | NA               | NA                         | NA                        | ND                      |
| 64A-C            | FS5,6,13,16,17                 | Plaster, 2-layer plaster system smooth ceilings                                       | NA               | NA                         | NA                        | ND                      |
| 65A-C            | FS10,11,12                     | Wallboard, gypsum panels with joint compound as south vestibules and central stairway | NA               | NA                         | NA                        | ND                      |
| 66A-C            | FS10,12                        | Mechanical insulation, unit ventilator insulation, fibrous glass bait                 | NA               | NA                         | NA                        | ND                      |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                                          | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|------------------------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
| 67A-C            | FS31                           | Duct sealant, brown dense, to metal HVAC duct seams                                                  | NA               | NA                         | NA                        | ND                      |
| 68A-C            | FS31                           | Pipe insulation, fibrous glass with reinforced threaded paper foil wrap                              | NA               | NA                         | NA                        | ND                      |
| 69A-C            | NA                             | Duct sealant, olive green, dense, to metal HVAC duct seams                                           | NA               | NA                         | NA                        | ND                      |
| 70A-C            | NA                             | Vapor barrier, brown corrugated cardboard, with black paper facing to column wrap inside block walls | NA               | NA                         | NA                        | ND                      |
| 71A-C            | FS11,25,26,27                  | Wallboard, gypsum panels with joint compound, at upper-level vestibules and central stairway         | NA               | NA                         | NA                        | ND                      |
| 72A-C            | FS29                           | Wallboard, gypsum panels with joint compound to apparent enclosure                                   | NA               | NA                         | NA                        | ND                      |
| 73A-C            | FS30                           | Rolled in insulation, fibrous glass with paper and black coating                                     | NA               | NA                         | NA                        | ND                      |
| 74A-C            | NA                             | Plaster, 2-layer plaster system, wall at upper-level area                                            | NA               | NA                         | NA                        | ND                      |
| 75A-C            | NA                             | Flooring, green rubber flooring                                                                      | NA               | NA                         | NA                        | ND                      |
| 76A-C            | FS31                           | Plaster, plaster boarding system, plaster with gypsum panel, ceiling and debris                      | NA               | NA                         | NA                        | ND                      |
| 77A-C            | FS31                           | Duct insulation, fibrous glass with reinforced                                                       | NA               | NA                         | NA                        | ND                      |

**TABLE 4.2 – Summary of Building Materials Sampling Results**

| <b>Sample ID</b> | <b>Location(s)<br/>(FS/EA)</b> | <b>Material Description</b>                                                        | <b>Condition</b> | <b>Friable<sup>1</sup></b> | <b>Estimated Quantity</b> | <b>Asbestos Content</b> |
|------------------|--------------------------------|------------------------------------------------------------------------------------|------------------|----------------------------|---------------------------|-------------------------|
|                  |                                | threaded foil paper wrap                                                           |                  |                            |                           |                         |
| 78A-C            | FS31                           | Pipe insulation, black foam-plastic sections to pipes                              | NA               | NA                         | NA                        | ND                      |
| 79A-C            | FS31                           | Gasket material, white fibrous matt to gas burner connections at furnace equipment | NA               | NA                         | NA                        | ND                      |
| 80A-C            | FS31                           | Concrete, pads to furnace/boiler equipment                                         | NA               | NA                         | NA                        | ND                      |
| 81A-C            | FS31                           | Stack cement, off-white, crumbly, residual around flue connection at stack         | NA               | NA                         | NA                        | ND                      |
| 82A-C            | FS31                           | Plaster, coarse plaster ceiling section approximately above furnace                | NA               | NA                         | NA                        | ND                      |
| 83A-C            | FS31                           | Concrete cementitious wall patch to brick walls, gray                              | NA               | NA                         | NA                        | ND                      |
| 84A-C            | FS31                           | Stack cement, cementitious, on flue penetration, gray                              | NA               | NA                         | NA                        | ND                      |
| ASSUMED          | FS31                           | Pipe flange gaskets                                                                | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | FS31                           | Pipe valve packing                                                                 | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | FS31                           | Vibration dampener                                                                 | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | FS31                           | Internal furnace insulation                                                        | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | FS31                           | Internal boiler insulation                                                         | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | EA3                            | Mechanical exhaust flue/stack system                                               | NA               | NA                         | NA                        | ASSUMED                 |
| ASSUMED          | FS22                           | Generator insulation and gaskets                                                   | NA               | NA                         | NA                        | ASSUMED                 |

## 5.0 SUSPECT LEAD-BASED PAINT SAMPLING

BLN representative Mr. Tony Rich conducted the lead-containing paint (LCP) sampling of the property building on June 06, 2023. The sampling included physical sampling of paint coatings that were deemed representative of the predominant paint coatings observed.

Forty-two (42) paint chip samples were collected and submitted to EMSL for lead analysis. Bulk samples were analyzed using the Environmental Protection Agency's Test Method SW 846 -7420 and 3050B using Flame Atomic Absorption Spectroscopy (AAS) to determine lead concentration in percent (%) by weight. Copies of the laboratory analytical report and corresponding chain-of-custody forms are provided as Attachment 1. A photographic log documenting LCP identified during the inspection is provided as Attachment 3.

The condition of a painted surface is classified as either good, fair, fair/poor, or poor. Painted surfaces classified as being in poor condition should be prioritized for immediate maintenance. Those classified as fair/poor should be viewed as near-term priorities. Materials in fair condition should be periodically evaluated (biannually) for worsening of the condition and potential re-prioritization of maintenance activity as conditions worsen. Painted surfaces classified as being in good condition do not require maintenance in the near term but would still need to be managed during renovation activities. A cost estimate range is provided for painted surfaces classified as poor and fair/poor.

The following table provides a summary of the LCP sampling:

**TABLE 5.1 – Summary of Paint Sampling Results**

| Sample ID | Sample Description                                  | Location (FS/EA) | Sample Substrate | Condition | Color       | Lead Content (%) | Recommendation                                                                  | Cost Est. |
|-----------|-----------------------------------------------------|------------------|------------------|-----------|-------------|------------------|---------------------------------------------------------------------------------|-----------|
| PC1       | Brown on metal, entry/exit storefront framing doors | EA1              | Metal            | Fair      | Brown       | <0.013           | NA                                                                              | NA        |
| PC2       | Light cream on wood, veranda supports               | EA3              | Wood             | Fair      | Light cream | 8.6              | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA        |
| PC3       | Light cream on wood, fascia boards/trim             | EA3              | Wood             | Fair      | Light cream | 11               | Periodic Inspections to check condition- Abate if future renovation/ demolition | NA        |

**TABLE 5.1 – Summary of Paint Sampling Results**

| <b>Sample ID</b> | <b>Sample Description</b>                                 | <b>Location (FS/EA)</b> | <b>Sample Substrate</b> | <b>Condition</b> | <b>Color</b> | <b>Lead Content (%)</b> | <b>Recommendation</b>                                                                                   | <b>Cost Est.</b>                           |
|------------------|-----------------------------------------------------------|-------------------------|-------------------------|------------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC4              | Brown on metal, window lintel/l-beam                      | EA4                     | Metal                   | Poor             | Brown        | 33                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC5              | Black on metal, fence/gate railing                        | EA1                     | Metal                   | Fair/poor        | Black        | 0.030                   | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC6              | Light sage green on concrete, concrete siding at verandas | EA3                     | Concrete                | Fair             | Sage green   | 0.088                   | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC7              | Brown on metal, lower-level window framing                | EA3                     | Metal                   | Fair/poor        | Brown        | 11                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |



**TABLE 5.1 – Summary of Paint Sampling Results**

| <b>Sample ID</b> | <b>Sample Description</b>                        | <b>Location (FS/EA)</b> | <b>Sample Substrate</b> | <b>Condition</b> | <b>Color</b> | <b>Lead Content (%)</b> | <b>Recommendation</b>                                                                                   | <b>Cost Est.</b>                           |
|------------------|--------------------------------------------------|-------------------------|-------------------------|------------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC8              | Brown on wood, upper-level window framing        | EA1                     | Wood                    | Fair/poor        | Brown        | 5.1                     | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC9              | Light cream on wood, veranda ceilings/roof eaves | EA3                     | Wood                    | Fair/poor        | Light cream  | 5.1                     | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC10             | White on wood, upper-level windows               | FS28                    | Wood                    | Fair/poor        | White        | 20                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC11             | White on wood, upper-level ceiling/wood walls    | FS28                    | Wood                    | Poor             | White        | 16                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |

**TABLE 5.1 – Summary of Paint Sampling Results**

| <b>Sample ID</b> | <b>Sample Description</b>                      | <b>Location (FS/EA)</b> | <b>Sample Substrate</b> | <b>Condition</b> | <b>Color</b> | <b>Lead Content (%)</b> | <b>Recommendation</b>                                                                                   | <b>Cost Est.</b>                           |
|------------------|------------------------------------------------|-------------------------|-------------------------|------------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC12             | White on concrete, coarse concrete walls       | FS28                    | Concrete                | Fair             | White        | 4.5                     | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC13             | White on metal, upper-level structural members | FS28                    | Metal                   | Fair/poor        | White        | 14                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC14             | Gray on concrete, upper-level coating to floor | FS28                    | Concrete                | Fair/poor        | Gray         | 0.016                   | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC15             | Light yellow on wallboard, walls               | FS26                    | Wallboard               | Good             | Light yellow | 0.12                    | Periodic Inspections to check condition- Abate if future renovation/ demolition- Periodic Inspection    | NA                                         |

**TABLE 5.1 – Summary of Paint Sampling Results**

| Sample ID | Sample Description                                  | Location (FS/EA) | Sample Substrate | Condition | Color       | Lead Content (%) | Recommendation                                                                                          | Cost Est.                                  |
|-----------|-----------------------------------------------------|------------------|------------------|-----------|-------------|------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC16      | Gray on wood, wood floors at upper level            | FS26             | Wood             | Poor      | Gray        | 0.73             | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC17      | Light gray on metal, doors/framing at verandas      | EA5              | Metal            | Fair      | Light gray  | <0.0094          | NA                                                                                                      | NA                                         |
| PC18      | Light green on wood, transom above door to veranda  | FS27             | Wood             | Poor      | Light green | 3                | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC19      | White on wood, windows at upper vestibules          | FS27             | Wood             | Fair      | White       | 6.7              | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC20      | White on wood, door framing at upper-level stairway | FS25             | Wood             | Fair/poor | White       | 5.5              | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |

**TABLE 5.1 – Summary of Paint Sampling Results**

| Sample ID | Sample Description                                       | Location (FS/EA) | Sample Substrate | Condition | Color    | Lead Content (%) | Recommendation                                                                                          | Cost Est.                                  |
|-----------|----------------------------------------------------------|------------------|------------------|-----------|----------|------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC21      | White on metal, central stairs components                | FS25             | Metal            | Poor      | White    | 7.9              | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC22      | White on plaster, plaster wall at upper central stairs   | FS25             | Plaster          | Fair/poor | White    | 0.25             | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC23      | White on wood, wood walls at central stairs              | FS9              | Wood             | Poor      | White    | 0.41             | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC24      | Gray on concrete, lower level, coating to concrete floor | FS2              | Gray             | Poor      | Concrete | .011             | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC25      | Red on metal, HVAC ducts                                 | FS2              | Red              | Fair      | Metal    | <0.022           | NA                                                                                                      | NA                                         |

**TABLE 5.1 – Summary of Paint Sampling Results**

| <b>Sample ID</b> | <b>Sample Description</b>                                            | <b>Location (FS/EA)</b> | <b>Sample Substrate</b> | <b>Condition</b> | <b>Color</b> | <b>Lead Content (%)</b> | <b>Recommendation</b>                                                                                   | <b>Cost Est.</b>                           |
|------------------|----------------------------------------------------------------------|-------------------------|-------------------------|------------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC26             | White on wallboard, lower-level vestibule                            | FS10                    | Wallboard               | Fair             | White        | 0.016                   | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC27             | Yellow on metal, support columns                                     | FS2                     | Metal                   | Fair             | Yellow       | 0.27                    | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC28             | Green on wood, serving counter support structure                     | FS2                     | Wood                    | Fair             | Green        | <0.0085                 | NA                                                                                                      | NA                                         |
| PC29             | Yellow on wood, wood ceiling                                         | FS3                     | Wood                    | Fair             | Yellow       | 0.080                   | Periodic Inspections to check condition- Abate if future renovation/ demolition                         | NA                                         |
| PC30             | Gray on concrete, lower-level, coating (no flecks) to concrete floor | FS2                     | Concrete                | Fair/poor        | Gray         | 0.0097                  | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC31             | White on metal, column supports                                      | FS4                     | Metal                   | Fair             | White        | <0.011                  | NA                                                                                                      | NA                                         |
| PC32             | Light cream on concrete, block walls                                 | FS16                    | Concrete                | Good             | Light cream  | <0.008                  | NA                                                                                                      | NA                                         |

**TABLE 5.1 – Summary of Paint Sampling Results**

| Sample ID | Sample Description                                                   | Location (FS/EA) | Sample Substrate | Condition | Color       | Lead Content (%) | Recommendation                                                                                          | Cost Est.                                  |
|-----------|----------------------------------------------------------------------|------------------|------------------|-----------|-------------|------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC33      | Dark orange on metal, lockers in men's locker room                   | FS16             | Metal            | Good      | Dark orange | <0.06            | NA                                                                                                      | NA                                         |
| PC34      | Dark yellow on metal, lockers in women's locker room                 | FS17             | Metal            | Good      | Dark yellow | <0.027           | NA                                                                                                      | NA                                         |
| PC35      | Dark red on metal stair railing                                      | FS31             | Metal            | Poor      | Dark red    | <0.018           | NA                                                                                                      | NA                                         |
| PC36      | Dark red on metal, plumbing control valves                           | FS31             | Metal            | Fair/poor | Dark red    | <0.037           | NA                                                                                                      | NA                                         |
| PC37      | Dark red orange on metal, furnace housing                            | FS31             | Metal            | Fair/poor | Red orange  | <0.039           | NA                                                                                                      | NA                                         |
| PC38      | Light gray on metal, various mechanical/electrical equipment housing | FS31             | Metal            | Fair/poor | Light gray  | 0.023            | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC39      | Blue on metal, gas burner equipment                                  | FS31             | Metal            | Fair/poor | Blue        | <0.020           | NA                                                                                                      | NA                                         |
| PC40      | Light green on brick, brick wall                                     | FS20             | Brick            | Poor      | Light green | 0.25             | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |

**TABLE 5.1 – Summary of Paint Sampling Results**

| <b>Sample ID</b> | <b>Sample Description</b>                    | <b>Location (FS/EA)</b> | <b>Sample Substrate</b> | <b>Condition</b> | <b>Color</b> | <b>Lead Content (%)</b> | <b>Recommendation</b>                                                                                   | <b>Cost Est.</b>                           |
|------------------|----------------------------------------------|-------------------------|-------------------------|------------------|--------------|-------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|
| PC41             | Black on wood, loose doors stored in kitchen | FS3                     | Wood                    | Poor             | Black        | 30                      | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |
| PC42             | Gray on metal, bench posts in locker rooms   | FS17                    | Metal                   | Fair/poor        | Gray         | 0.038                   | Remove Loose/Peeling paint, clean up debris & encapsulate- Abate all at renovation- Periodic Inspection | Paint Scrape & Encapsulation \$5-15 per SF |

## 6.0 OTHER HAZARDOUS AND/OR REGULATED MATERIALS

In addition to inspecting the structure for ACMs in general compliance consistent with the EPA's Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP, 40 CFR 61 Subpart M) and applicable Michigan Occupational Safety and Health Administration (MIOSHA) standards, BLN was responsible for a visual, non-intrusive inspection of hazardous and/or regulated materials, which did not involve testing. BLN has attempted to accurately quantify hazardous and/or regulated materials that may require decontamination or proper disposal prior to renovation/demolition. Further inspection, testing, sampling, and/or remediation of any conditions inspected or noted in this report, including actual quantities, remain the sole responsibility of others. Potential hazardous and/or regulated materials addressed by the inspection include, but are not limited to, the following:

- (1) Refrigerants and related chemicals (40 CFR 82);
- (2) Solid wastes which exhibit any of the characteristics of ignitability, corrosivity, reactivity, or toxicity (40 CFR 261.20 – 261.24);
- (3) Hazardous wastes (40 CFR 261.31, 261.32) and discarded commercial chemical products (40 CFR 261.33 & Part 111, Public Act 451 of 1994, as amended);
- (4) Universal wastes, including batteries, pesticides, mercury-containing products, and certain household wastes (40 CFR 273);
- (5) PCB-containing products (40 CFR 761);
- (6) Scrap tires (Part 169, Public Act 451 of 1994, as amended);
- (7) Medical wastes (Part 138, Public Act 368 or 1978, as amended) and controlled substances;
- (8) Used oil (Part 167, Public Act 451 of 1994, as amended); and
- (9) Liquid industrial by-product (Part 121, Public Act 451 of 1994, as amended).

**Table 6.1** below summarizes other regulated materials (ORM) that were observed at the Site by BLN field staff the day of the inspection. ORM should be disposed of properly when they have reached the end of their useful life or are no longer needed. Licensed waste disposal companies can provide lab pack services and direct waste streams for appropriate final disposition.

| TABLE 6.1 – Other Regulated Materials |                      |                           |                    |           |
|---------------------------------------|----------------------|---------------------------|--------------------|-----------|
| Location (FS/EA)                      | Hazardous Concern    | Description               | Estimated Quantity | Cost Est. |
| FS3                                   | Pressurized Chemical | Fire Suppression System   | 1                  | \$100.00  |
| FS3, 19                               | Mercury              | Smoke Detector            | 2                  | \$45.54   |
| FS2, FS3, FS4, FS16, FS17, FS28       | Mercury              | Fluorescent light fixture | 28                 | \$153.72  |
| FS2, FS4, FS28                        | Mercury              | 4' fluorescent tubes      | 79                 | \$165.11  |



**TABLE 6.1 – Other Regulated Materials**

| <b>Location (FS/EA)</b>              | <b>Hazardous Concern</b> | <b>Description</b>           | <b>Estimated Quantity</b> | <b>Cost Est.</b> |
|--------------------------------------|--------------------------|------------------------------|---------------------------|------------------|
| FS2                                  | Mercury                  | 6' fluorescent tubes         | 3                         | \$6.03           |
| FS2,4                                | Hazardous Waste          | 5 Gallon paint               | 3                         | \$11.67          |
| FS2, FS13, FS16, FS17, FS19, FS28    | Mercury                  | Emergency Lights             | 7                         | \$140.00         |
| FS2, FS19                            | Mercury                  | Thermostats                  | 4                         | \$148.84         |
| FS2                                  | Hazardous Waste          | 1 Gallon can Thompson Seal   | 2                         | \$3.94           |
| FS4                                  | Hazardous Waste          | 22oz stainless steel cleaner | 1                         | \$1.97           |
| FS4                                  | Hazardous Waste          | 1 Gallon bleach              | 2                         | \$3.94           |
| FS4                                  | Hazardous Waste          | 32oz detergent               | 2                         | \$3.94           |
| FS4                                  | Hazardous Waste          | 16oz spray paint             | 3                         | \$11.67          |
| FS4, FS14                            | Hazardous Waste          | 1 Gallon Paint Can           | 23                        | \$89.47          |
| FS4                                  | Hazardous Waste          | Power Steering Fluid         | 1                         | \$1.97           |
| FS4                                  | Hazardous Waste          | 1 Qt. Paint can              | 3                         | \$11.67          |
| FS7                                  | CFCs & HCFCs             | Large Freezer Unit           | 1                         | \$103.63         |
| FS1, FS5, FS6, FS7, FS14, FS10, FS12 | Aluminum                 | Mechanical Door Closure      | 17                        | \$1,461.32       |
| FS1, FS10, FS12, FS28                | Mercury                  | Exit Sign                    | 7                         | \$140.00         |
| FS20                                 | Hazardous Waste          | 22oz Spray Paint             | 1                         | \$3.89           |
| FS28                                 | Hazardous Waste          | 5 Gallon Bucket, Black Tar   | 1                         | \$5.00           |
| FS28                                 | Hazardous Waste          | 30 Gallon Drum Oil           | 1                         | \$710.24         |
| EA3                                  | Hazardous Waste          | Large Transformers           | 2                         | \$1,420.48       |

## 7.0 MOLD OBSERVATIONS

BLN staff observed accessible areas of the structure for visual evidence of mold. The inspector conducting the HRM assessment did not open walls or enter structural cavities during the study. Field efforts were non-destructive and limited to what was readily visible on the structure's accessible surfaces. BLN did not collect any mold-related samples while performing mold observations. BLN observed multiple localized areas of readily visible mold within the building. Additionally, areas of apparent historical moisture impact to materials were also noted within the structure. Due to the limitations of the field methodology employed, the user should not construe these findings to mean that mold is not present at other locations associated with the structure.

**TABLE 7.1 – Mold Observations**

| <b>Location (FS/EA)</b> | <b>Substrate</b>         | <b>Description</b>                                    | <b>Evidence of Water Infiltration</b> | <b>Estimated Area of Visible Mold</b> |
|-------------------------|--------------------------|-------------------------------------------------------|---------------------------------------|---------------------------------------|
| FS3                     | Walls, plaster/wallboard | Heavy moisture damage & mold to wall system materials | Yes                                   | ~ 750-SF                              |
| FS26                    | Walls, wallboard system  | Localized mold growth to lower wall                   | Yes                                   | ~ 20-SF                               |
| FS27                    | Walls, wallboard system  | Localized mold growth to lower wall                   | Yes                                   | ~ 20-SF                               |

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 ASBESTOS CONTAINING MATERIALS

The results of laboratory testing during the pre-renovation asbestos survey conducted at the property indicate that two (2) of the materials sampled were found to contain asbestos. In compliance with applicable regulatory requirements, ACMs must be removed by a Michigan-licensed asbestos abatement contractor prior to renovation/demolition or other activities that would disturb identified ACM. If any additional materials are discovered during renovation/demolition activities, such materials must be assumed to contain asbestos and treated as ACM until sampling and analysis can prove otherwise. Building materials confirmed to be ACM through laboratory analysis are prioritized for abatement in Table 8.1.1 below.

| TABLE 8.1.1 – ACM Risk and Abatement Priority |           |                        |                                                                                     |           |
|-----------------------------------------------|-----------|------------------------|-------------------------------------------------------------------------------------|-----------|
| Priority Ranking                              | Sample ID | Location(s)<br>(FS/EA) | Material Description                                                                | Condition |
| 1                                             | 27A-C     | EA4                    | Exterior caulk, gray beige, residual on brick at northeast window area              | Poor      |
| 2                                             | 39A-C     | EA3                    | Roofing material, black residual mastic on brick around flashing (near boiler room) | Fair      |

None of the materials are friable; however, the condition of caulk and mastic has deteriorated with time and exposure to the elements, resulting in the potential release of fibers. Given the location and condition of the caulk, it presents a greater risk, and its abatement should be prioritized.

### 8.2 LEAD-BASED PAINT

Forty-two (42) composite samples of paint, taken from interior and exterior areas of the buildings, were collected and submitted for analysis by Flame Atomic Absorption Spectroscopy (AAS). The results of laboratory testing from the limited lead-containing paint sampling conducted at the property indicate that thirty (30) samples contained levels of lead greater than the method detection limits.

Under OSHA Lead in Construction Standard 1926.62 and MIOSHA Construction Safety and Health Standard Part 603 requirements, the presence of lead-containing paint requires that affected workers (employees, general contractors, sub-contractors, etc.) performing renovation, surface preparation, or other activities that impact or potentially impact lead-coated components or surfaces contaminated with lead-containing coatings, evaluate potential worker exposures to airborne lead. Generally, worker exposure monitoring can be implemented to evaluate worksite conditions in compliance with OSHA standards. However, this evaluation can also be based (for specific activities denoted in OSHA CFR 1926.62) on objective data obtained by the employer on other similar worksites within the prior calendar year. Lead-containing paint and lead-coated waste and construction debris should be characterized through quantitative analysis prior to disposal to ensure compliance with EPA and Michigan EGLE waste disposal regulations.

The presence of lead-containing paint (LCP) and/or lead-based paint (LBP) may not necessarily trigger regulatory compliance actions. However, when these materials are disturbed, the requirements of OSHA (1926.62), EPA and/or applicable State of Michigan standards may become operative. Appropriate actions in terms of communication of hazard, removal methods, emissions control, worker protection, and waste disposal must be considered by the employer, general contractor and applicable subcontractors while completing renovation activities. Additionally, according to the OSHA lead standard for general industry, lead awareness training is mandatory for any worker who may be exposed to harmful levels of lead on the job. Painted surfaces confirmed to contain lead through laboratory analysis are priority ranked for abatement in Table 8.2.1 below.

| <b>TABLE 8.2.1 – Lead Risk and Abatement Priority</b> |                  |                                                     |                         |                  |              |                         |                         |
|-------------------------------------------------------|------------------|-----------------------------------------------------|-------------------------|------------------|--------------|-------------------------|-------------------------|
| <b>Priority Ranking</b>                               | <b>Sample ID</b> | <b>Sample Description</b>                           | <b>Location (FS/EA)</b> | <b>Condition</b> | <b>Color</b> | <b>Friction/ Impact</b> | <b>Lead Content (%)</b> |
| 1                                                     | PC10             | White on wood, upper-level windows                  | FS28                    | Fair/poor        | White        | Yes                     | 20                      |
| 1                                                     | PC20             | White on wood, door framing at upper-level stairway | FS25                    | Fair/poor        | White        | Yes                     | 5.5                     |
| 1                                                     | PC21             | White on metal, central stairs components           | FS25                    | Poor             | White        | Yes                     | 7.9                     |
| 2                                                     | PC13             | White on metal, upper-level structural members      | FS28                    | Fair/poor        | White        | No                      | 14                      |
| 2                                                     | PC11             | White on wood, upper-level ceiling/wood walls       | FS28                    | Poor             | White        | No                      | 16                      |
| 2                                                     | PC41             | Black on wood, loose doors stored in kitchen        | FS3                     | Poor             | Black        | No                      | 30                      |
| 3                                                     | PC18             | Light green on wood, transom above door to veranda  | FS27                    | Poor             | Light green  | No                      | 3                       |
| 3                                                     | PC8              | Brown on wood, upper-level window framing           | EA1                     | Fair/poor        | Brown        | Yes                     | 5.1                     |
| 3                                                     | PC9              | Light cream on wood, veranda ceilings/roof eaves    | EA3                     | Fair/poor        | Light cream  | No                      | 5.1                     |
| 4                                                     | PC42             | Gray on metal, bench posts in locker rooms          | FS17                    | Fair/poor        | Gray         | No                      | 0.038                   |
| 4                                                     | PC16             | Gray on wood, wood floors at upper level            | FS26                    | Poor             | Gray         | Yes                     | 0.73                    |

**TABLE 8.2.1 – Lead Risk and Abatement Priority**

| <b>Priority Ranking</b> | <b>Sample ID</b> | <b>Sample Description</b>                                            | <b>Location (FS/EA)</b> | <b>Condition</b> | <b>Color</b> | <b>Friction/ Impact</b> | <b>Lead Content (%)</b> |
|-------------------------|------------------|----------------------------------------------------------------------|-------------------------|------------------|--------------|-------------------------|-------------------------|
| 4                       | PC24             | Gray on concrete, lower level, coating to concrete floor             | FS2                     | Poor             | Concrete     | Yes                     | .011                    |
| 4                       | PC14             | Gray on concrete, upper-level coating to floor                       | FS28                    | Fair/poor        | Gray         | Yes                     | 0.016                   |
| 4                       | PC30             | Gray on concrete, lower-level, coating (no flecks) to concrete floor | FS2                     | Fair/poor        | Gray         | Yes                     | 0.0097                  |
| 4                       | PC38             | Light gray on metal, various mechanical/electrical equipment housing | FS31                    | Fair/poor        | Light gray   | No                      | 0.023                   |
| 4                       | PC23             | White on wood, wood walls at central stairs                          | FS9                     | Poor             | White        | No                      | 0.41                    |
| 4                       | PC40             | Light green on brick, brick wall                                     | FS20                    | Poor             | Light green  | No                      | 0.25                    |
| 4                       | PC22             | White on plaster, plaster wall at upper central stairs               | FS25                    | Fair/poor        | White        | No                      | 0.25                    |
| 4                       | PC4              | Brown on metal, window lintel/I-beam                                 | EA4                     | Poor             | Brown        | No                      | 33                      |
| 4                       | PC7              | Brown on metal, lower-level window framing                           | EA3                     | Fair/poor        | Brown        | No                      | 11                      |
| 5                       | PC5              | Black on metal, fence/gate railing                                   | EA1                     | Fair/poor        | Black        | No                      | 0.030                   |

Painted surfaces designated as being in poor condition and located inside the building are perceived to pose a greater risk of exposure than those in better condition and/or located in exterior areas. Additionally, painted surfaces determined to be friction/impact<sup>1</sup> surfaces pose a greater risk of exposure and should be prioritized for maintenance. Finally, the percentage of lead in paint is considered when determining possible risk. Actions and materials that generate inhalable/edible lead-based-paint dust result in the most risk.

### **8.3 OTHER REGULATED MATERIALS**

Regulated materials and universal wastes were identified throughout the buildings included: Chlorofluorocarbons (CFCs) containing equipment; capacitors and ballasts; and used oils. Additionally, Universal Wastes including intact fluorescent lamps; intact high intensity discharge lamps, batteries, mercury containing devices and electronics (cathode ray tubes) were identified.

Removal and disposal of the identified regulated materials and universal wastes shall be in accordance with federal, state and local requirements as per the Resource Conservation and Recovery Act (RCRA) and Michigan EGLE – Materials Management Division hazardous waste rules. Contractors that remove the materials must ensure that proper manifests, disposal and/or recovery is documented and provided to the Owner.

### **8.4 MOLD OBSERVATIONS**

BLN staff observed accessible areas of the structure for visual evidence of mold. The inspector conducting the HRM assessment did not open walls or enter structural cavities during the limited study. Field efforts were non-destructive and limited to what was readily visible on the structure's accessible surfaces. BLN did not collect any mold-related samples while performing mold observations. BLN observes multiple locations of readily visible mold within the building. In addition to this, some localized areas of apparent historical moisture impact to building materials and components were also noted to the structure. It is recommended that a comprehensive mold/microbial inspection be conducted to evaluate potential mold/microbial conditions that may be present and potentially affect indoor air quality. Due to the limitations of the field methodology employed, the user should not construe these findings to mean that mold is not present at other locations inside the structure.

<sup>1</sup> As defined by EPA, the term 'friction surface' means an interior or exterior surface that is subject to abrasion or friction, including certain window, floor, and stair surfaces."(6) Impact surface. The term 'impact surface' means an interior or exterior surface that is subject to damage by repeated impacts, for example, certain parts of door frames.

## 9.0 LIMITATIONS

Assumed ACMs were not sampled because such sampling would require destructive methods to collect samples and/or sampling the assumed ACMS could potentially compromise specific mechanical or structural systems. Assumed ACMs must be managed in accordance with applicable regulations governing such material. If later access to these assumed ACMs is available, a secondary assessment can be conducted, the materials can be sampled and analyzed to determine the presence or not of asbestos in these materials. BLN, LLC is not responsible for this secondary supplemental inspection unless specifically requested to do so.

The conclusions of this report are based solely upon observations made during this evaluation. This report is intended to present a professional opinion of potential asbestos containing materials that may or may not be present at the project property. Our opinions should not be construed as relating to health and safety issues directly. Should additional information become available, this information should be reviewed, and the conclusions herein modified as appropriate. In addition, this report should not be construed as verification of compliance by the present owners or operators of the Site with federal, state, or local laws and regulations. BLN, LLC is responsible to perform our services in a professional manner, consistent with typical industry practice. The conclusions drawn based on this evaluation are deemed as appropriate by BLN, LLC in the exercise of professional judgment.

Our observations did not indicate conditions existing beyond those discussed, although it is possible, limitation of scope or the standard practice precluded recognition of asbestos containing materials present at the site, such as inaccessible and/or confined spaces of the structure. BLN, LLC does not enter confined spaces as part of the inspection survey process. Confined spaces include crawlspaces and attics or any other such space where there is limited ingress and egress.

BLN, LLC reserves the right to determine when and where a confined space may be present and use professional judgment when deciding upon entry. We cannot be held liable for materials that may be present in these spaces and unable to be reported as part of our inspection process. The presence of confined spaces will be reported as applicable, and all limitations expressed herein will apply. There were no confined spaces.

We cannot be held liable for consequential damages, if it is determined in the future that contamination of some type is present at the site. This report should not be considered as a recommendation to purchase, sell, or develop the Site, and the opinions expressed herein are not legal opinions. To evaluate the information contained in this report, the reader must understand the limitations associated with this assessment. Specifically, the services for this project have been performed in general conformance with the contract negotiated between DTMB and BLN. This report was prepared for the benefit and exclusive use of DTMB, its agents and assigns. Any third-party use of this report or reliance upon the information and opinions therein is the sole responsibility of the third-party. BLN has no responsibility for any damages that may be suffered by a third-party because of any decision made or action taken by a third-party based on this report.

## **ATTACHMENT 1 – LABORATORY ANALYTICAL REPORTS**





# EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-5974  
<http://www.EMSL.com> / [cinnasblab@EMSL.com](mailto:cinnasblab@EMSL.com)

EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

**Attn:** Craig Willey  
Beam, Longest & Neff, LLC  
51151 W. Pontiac Trail  
Wixom, MI 48393

**Phone:** (313) 408-4893  
**Fax:**  
**Collected:** 6/ 6/2023  
**Received:** 6/08/2023  
**Analyzed:** 6/16/2023

**Proj:** Athletic Shelter

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 1A **Lab Sample ID:** 042313613-0001

**Sample Description:** Concrete - Exterior Walkways

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 1B **Lab Sample ID:** 042313613-0002

**Sample Description:** Concrete - Exterior Walkways

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 1C **Lab Sample ID:** 042313613-0003

**Sample Description:** Concrete - Exterior Walkways

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 2A **Lab Sample ID:** 042313613-0004

**Sample Description:** Asphalt\_Paving - Parking Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 1.0%         | 99.0%       | None Detected |         |

**Client Sample ID:** 2B **Lab Sample ID:** 042313613-0005

**Sample Description:** Asphalt\_Paving - Parking Areas

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray/Black | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 2C **Lab Sample ID:** 042313613-0006

**Sample Description:** Asphalt\_Paving - Parking Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 3A **Lab Sample ID:** 042313613-0007

**Sample Description:** Brick - Main Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 3B **Lab Sample ID:** 042313613-0008

**Sample Description:** Brick - Main Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 3C **Lab Sample ID:** 042313613-0009

**Sample Description:** Brick - Main Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 4A **Lab Sample ID:** 042313613-0010

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-03

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 4B **Lab Sample ID:** 042313613-0011

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-03

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 4C **Lab Sample ID:** 042313613-0012

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-03

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 5A **Lab Sample ID:** 042313613-0013

**Sample Description:** Exterior\_Caulk - Grey, to Brick/Sill Seams at Main Level Lower Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 5B **Lab Sample ID:** 042313613-0014

**Sample Description:** Exterior\_Caulk - Grey, to Brick/Sill Seams at Main Level Lower Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 5C **Lab Sample ID:** 042313613-0015

**Sample Description:** Exterior\_Caulk - Grey, to Brick/Sill Seams at Main Level Lower Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 6A **Lab Sample ID:** 042313613-0016

**Sample Description:** Concrete - Sill Base (Block) Under Brick Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 6B **Lab Sample ID:** 042313613-0017

**Sample Description:** Concrete - Sill Base (Block) Under Brick Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 6C **Lab Sample ID:** 042313613-0018

**Sample Description:** Concrete - Sill Base (Block) Under Brick Exterior Walls

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Gray  | 1.0%         | 99.0%       | None Detected |         |

**Client Sample ID:** 7A **Lab Sample ID:** 042313613-0019

**Sample Description:** Exterior\_Caulk - Black Sealant, Along Seams at Brick/Concrete Base Below Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Black | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 7B **Lab Sample ID:** 042313613-0020

**Sample Description:** Exterior\_Caulk - Black Sealant, Along Seams at Brick/Concrete Base Below Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Black | 20.0%        | 80.0%       | None Detected |         |

**Client Sample ID:** 7C **Lab Sample ID:** 042313613-0021

**Sample Description:** Exterior\_Caulk - Black Sealant, Along Seams at Brick/Concrete Base Below Window Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | Black | 20.0%        | 80.0%       | None Detected |         |

**Client Sample ID:** 8A **Lab Sample ID:** 042313613-0022

**Sample Description:** Concrete - Window Sills (Block Foam)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 8B **Lab Sample ID:** 042313613-0023

**Sample Description:** Concrete - Window Sills (Block Foam)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 3.0%         | 97.0%       | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 8C **Lab Sample ID:** 042313613-0024

**Sample Description:** Concrete - Window Sills (Block Foam)

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 9A **Lab Sample ID:** 042313613-0025

**Sample Description:** Exterior\_Caulk - Black.Dk. Brown (Layers), to Main Level Windows (w/Dk. Brown Metal Framing )

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Brown/Black | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 9B **Lab Sample ID:** 042313613-0026

**Sample Description:** Exterior\_Caulk - Black.Dk. Brown (Layers), to Main Level Windows (w/Dk. Brown Metal Framing )

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 9C **Lab Sample ID:** 042313613-0027

**Sample Description:** Exterior\_Caulk - Black.Dk. Brown (Layers), to Main Level Windows (w/Dk. Brown Metal Framing )

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Brown/Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 10A **Lab Sample ID:** 042313613-0028

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Metal "Storefront" Door/Window System

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 10B **Lab Sample ID:** 042313613-0029

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Metal "Storefront" Door/Window System

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 10C **Lab Sample ID:** 042313613-0030

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Metal "Storefront" Door/Window System

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 11A **Lab Sample ID:** 042313613-0031

**Sample Description:** Expansion\_Joint - Black, Fibrous, To Exterior Walkway Concrete Seams

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Black | 20.0%        | 80.0%       | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 11B **Lab Sample ID:** 042313613-0032

**Sample Description:** Expansion\_Joint - Black, Fibrous, To Exterior Walkway Concrete Seams

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Black | 50.0%        | 50.0%       | None Detected |         |

**Client Sample ID:** 11C **Lab Sample ID:** 042313613-0033

**Sample Description:** Expansion\_Joint - Black, Fibrous, To Exterior Walkway Concrete Seams

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Black | 50.0%        | 50.0%       | None Detected |         |

**Client Sample ID:** 12A **Lab Sample ID:** 042313613-0034

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Concrete Window Sill Joints

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 12B **Lab Sample ID:** 042313613-0035

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Concrete Window Sill Joints

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 12C **Lab Sample ID:** 042313613-0036

**Sample Description:** Exterior\_Caulk - Lt. Grey, to Concrete Window Sill Joints

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 13A **Lab Sample ID:** 042313613-0037

**Sample Description:** Brick - Beveled Edges, at Some Main Level Lower Window Areas

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 13B **Lab Sample ID:** 042313613-0038

**Sample Description:** Brick - Beveled Edges, at Some Main Level Lower Window Areas

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 13C **Lab Sample ID:** 042313613-0039

**Sample Description:** Brick - Beveled Edges, at Some Main Level Lower Window Areas

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023     | Red   | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 14A **Lab Sample ID:** 042313613-0040

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-13

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 14B **Lab Sample ID:** 042313613-0041

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-13

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 14C **Lab Sample ID:** 042313613-0042

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-13

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/13/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 15A **Lab Sample ID:** 042313613-0043

**Sample Description:** Window\_Glaze - Black, Thin Bead, Sticky, Pliable, to Main Level Windows w/Dk. Brown Metal Framing

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 15B **Lab Sample ID:** 042313613-0044

**Sample Description:** Window\_Glaze - Black, Thin Bead, Sticky, Pliable, to Main Level Windows w/Dk. Brown Metal Framing

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 15C **Lab Sample ID:** 042313613-0045

**Sample Description:** Window\_Glaze - Black, Thin Bead, Sticky, Pliable, to Main Level Windows w/Dk. Brown Metal Framing

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 16A **Lab Sample ID:** 042313613-0046

**Sample Description:** Exterior\_Caulk - Brown, to Roof Flasing & Fascia Boards (Near Boiler Room)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 16B **Lab Sample ID:** 042313613-0047

**Sample Description:** Exterior\_Caulk - Brown, to Roof Flasing & Fascia Boards (Near Boiler Room)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 16C **Lab Sample ID:** 042313613-0048

**Sample Description:** Exterior\_Caulk - Brown, to Roof Flasing & Fascia Boards (Near Boiler Room)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 17A **Lab Sample ID:** 042313613-0049

**Sample Description:** Exterior\_Caulk - Off-White, to Various Door Frames

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 17B **Lab Sample ID:** 042313613-0050

**Sample Description:** Exterior\_Caulk - Off-White, to Various Door Frames

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 17C **Lab Sample ID:** 042313613-0051

**Sample Description:** Exterior\_Caulk - Off-White, to Various Door Frames

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 18A **Lab Sample ID:** 042313613-0052

**Sample Description:** Brick - Coarse, to Mechanical Exhaust Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 18B **Lab Sample ID:** 042313613-0053

**Sample Description:** Brick - Coarse, to Mechanical Exhaust Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 18C **Lab Sample ID:** 042313613-0054

**Sample Description:** Brick - Coarse, to Mechanical Exhaust Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 19A **Lab Sample ID:** 042313613-0055

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-18

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |





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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 19B **Lab Sample ID:** 042313613-0056

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-18

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 19C **Lab Sample ID:** 042313613-0057

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-18

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 20A **Lab Sample ID:** 042313613-0058

**Sample Description:** Brick - Smaller Dimension Brick, Wall Fill-In as FS21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 20B **Lab Sample ID:** 042313613-0059

**Sample Description:** Brick - Smaller Dimension Brick, Wall Fill-In as FS21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 20C **Lab Sample ID:** 042313613-0060

**Sample Description:** Brick - Smaller Dimension Brick, Wall Fill-In as FS21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Red   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 21A **Lab Sample ID:** 042313613-0061

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-21

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 21B **Lab Sample ID:** 042313613-0062

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-21

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 21C **Lab Sample ID:** 042313613-0063

**Sample Description:** Brick\_Mortar - Cementitious, Associated w/HA-21

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |





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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 22A **Lab Sample ID:** 042313613-0064

**Sample Description:** Exterior\_Caulk - Dk. Brown, To Metal Louvers at FS-21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 22B **Lab Sample ID:** 042313613-0065

**Sample Description:** Exterior\_Caulk - Dk. Brown, To Metal Louvers at FS-21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 22C **Lab Sample ID:** 042313613-0066

**Sample Description:** Exterior\_Caulk - Dk. Brown, To Metal Louvers at FS-21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 23A **Lab Sample ID:** 042313613-0067

**Sample Description:** Concrete - Pads to Exterior Electrical Transformer Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 3.0%         | 97.0%       | None Detected |         |

**Client Sample ID:** 23B **Lab Sample ID:** 042313613-0068

**Sample Description:** Concrete - Pads to Exterior Electrical Transformer Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 23C **Lab Sample ID:** 042313613-0069

**Sample Description:** Concrete - Pads to Exterior Electrical Transformer Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 24A **Lab Sample ID:** 042313613-0070

**Sample Description:** Concrete - Roof Slab at FS-21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 24B **Lab Sample ID:** 042313613-0071

**Sample Description:** Concrete - Roof Slab at FS-21 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 24C **Lab Sample ID:** 042313613-0072

**Sample Description:** Concrete - Roof Slab at FS-21 Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 25A **Lab Sample ID:** 042313613-0073

**Sample Description:** Exterior\_Caulk - Dk. Brown, to Metal Door Frame at FS-21 Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 25B **Lab Sample ID:** 042313613-0074

**Sample Description:** Exterior\_Caulk - Dk. Brown, to Metal Door Frame at FS-21 Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 25C **Lab Sample ID:** 042313613-0075

**Sample Description:** Exterior\_Caulk - Dk. Brown, to Metal Door Frame at FS-21 Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 26A **Lab Sample ID:** 042313613-0076

**Sample Description:** Exterior\_Caulk - Cream, at Brick Wall to Wood Supports for Veranda

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 26B **Lab Sample ID:** 042313613-0077

**Sample Description:** Exterior\_Caulk - Cream, at Brick Wall to Wood Supports for Veranda

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 26C **Lab Sample ID:** 042313613-0078

**Sample Description:** Exterior\_Caulk - Cream, at Brick Wall to Wood Supports for Veranda

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | White | 2.0%         | 98.0%       | None Detected |         |

**Client Sample ID:** 27A **Lab Sample ID:** 042313613-0079

**Sample Description:** Exterior\_Caulk - Grey/Beige, Residual on Brick at NE Window Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray  | 0.0%         | 97.0%       | 3% Chrysotile |         |



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Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 27B **Lab Sample ID:** 042313613-0080

**Sample Description:** Exterior\_Caulk - Grey/Beige, Residual on Brick at NE Window Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos                     | Comment |
|------|------------------|-------|--------------|-------------|------------------------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |                              |         |
| PLM  | 6/14/2023        |       |              |             | Positive Stop (Not Analyzed) |         |

**Client Sample ID:** 27C **Lab Sample ID:** 042313613-0081

**Sample Description:** Exterior\_Caulk - Grey/Beige, Residual on Brick at NE Window Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos                     | Comment |
|------|------------------|-------|--------------|-------------|------------------------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |                              |         |
| PLM  | 6/14/2023        |       |              |             | Positive Stop (Not Analyzed) |         |

**Client Sample ID:** 28A **Lab Sample ID:** 042313613-0082

**Sample Description:** Exterior\_Caulk - Tan, to Electrical Panel Box on Exterior Wall near Verizon Soace (FS-22)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 28B **Lab Sample ID:** 042313613-0083

**Sample Description:** Exterior\_Caulk - Tan, to Electrical Panel Box on Exterior Wall near Verizon Soace (FS-22)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 28C **Lab Sample ID:** 042313613-0084

**Sample Description:** Exterior\_Caulk - Tan, to Electrical Panel Box on Exterior Wall near Verizon Soace (FS-22)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 29A **Lab Sample ID:** 042313613-0085

**Sample Description:** Window\_Glaze - To Sm. Rectangular Metal Windows, Lower Main Level EA1 Area

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/White | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 29B **Lab Sample ID:** 042313613-0086

**Sample Description:** Window\_Glaze - To Sm. Rectangular Metal Windows, Lower Main Level EA1 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 29C **Lab Sample ID:** 042313613-0087

**Sample Description:** Window\_Glaze - To Sm. Rectangular Metal Windows, Lower Main Level EA1 Area

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 12.0%        | 88.0%       | None Detected |         |



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Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 30A **Lab Sample ID:** 042313613-0088

**Sample Description:** Roofing\_Material - Asphalt Shingling

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Black | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 30B **Lab Sample ID:** 042313613-0089

**Sample Description:** Roofing\_Material - Asphalt Shingling

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Black | 20.0%        | 80.0%       | None Detected |         |

**Client Sample ID:** 30C **Lab Sample ID:** 042313613-0090

**Sample Description:** Roofing\_Material - Asphalt Shingling

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Black | 20.0%        | 80.0%       | None Detected |         |

**Client Sample ID:** 31A **Lab Sample ID:** 042313613-0091

**Sample Description:** Exterior\_Siding - Clay Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 31B **Lab Sample ID:** 042313613-0092

**Sample Description:** Exterior\_Siding - Clay Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 31C **Lab Sample ID:** 042313613-0093

**Sample Description:** Exterior\_Siding - Clay Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 32A **Lab Sample ID:** 042313613-0094

**Sample Description:** Exterior\_Siding - Very Coarse Concrete, at Upper Level Areas

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 32B **Lab Sample ID:** 042313613-0095

**Sample Description:** Exterior\_Siding - Very Coarse Concrete, at Upper Level Areas

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 32C **Lab Sample ID:** 042313613-0096

**Sample Description:** Exterior\_Siding - Very Coarse Concrete, at Upper Level Areas

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 33A **Lab Sample ID:** 042313613-0097

**Sample Description:** Exterior\_Caulk - Beige/Tan, to HS-32, Along Bottom Seams at Veranda Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 33B **Lab Sample ID:** 042313613-0098

**Sample Description:** Exterior\_Caulk - Beige/Tan, to HS-32, Along Bottom Seams at Veranda Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 33C **Lab Sample ID:** 042313613-0099

**Sample Description:** Exterior\_Caulk - Beige/Tan, to HS-32, Along Bottom Seams at Veranda Areas

| TEST | Analyzed<br>Date | Color     | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-----------|--------------|-------------|---------------|---------|
|      |                  |           | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/Rust | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 34A **Lab Sample ID:** 042313613-0100

**Sample Description:** Exterior\_Siding - Cement/Concrete Base Substrate for HA-32

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 34B **Lab Sample ID:** 042313613-0101

**Sample Description:** Exterior\_Siding - Cement/Concrete Base Substrate for HA-32

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 34C **Lab Sample ID:** 042313613-0102

**Sample Description:** Exterior\_Siding - Cement/Concrete Base Substrate for HA-32

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 35A **Lab Sample ID:** 042313613-0103

**Sample Description:** Exterior\_Caulk - Lt. Tan, at Brick/Clay Tile Joints/Seams at Veranda Areas

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 35B **Lab Sample ID:** 042313613-0104

**Sample Description:** Exterior\_Caulk - Lt. Tan, at Brick/Clay Tile Joints/Seams at Veranda Areas

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 35C **Lab Sample ID:** 042313613-0105

**Sample Description:** Exterior\_Caulk - Lt. Tan, at Brick/Clay Tile Joints/Seams at Veranda Areas

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 36A **Lab Sample ID:** 042313613-0106

**Sample Description:** Window\_Glaze - To Wood Windows at Veranda Areas

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 36B **Lab Sample ID:** 042313613-0107

**Sample Description:** Window\_Glaze - To Wood Windows at Veranda Areas

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 36C **Lab Sample ID:** 042313613-0108

**Sample Description:** Window\_Glaze - To Wood Windows at Veranda Areas

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 37A **Lab Sample ID:** 042313613-0109

**Sample Description:** Exterior\_Caulk - To Wood Window Frames at Veranda Areas

| TEST | Analyzed  | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------|--------------|-------------|---------------|---------|
|      | Date      |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 37B **Lab Sample ID:** 042313613-0110

**Sample Description:** Exterior\_Caulk - To Wood Window Frames at Veranda Areas

| TEST | Analyzed  | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------|--------------|-------------|---------------|---------|
|      | Date      |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 37C **Lab Sample ID:** 042313613-0111

**Sample Description:** Exterior\_Caulk - To Wood Window Frames at Veranda Areas

| TEST | Analyzed  | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------|--------------|-------------|---------------|---------|
|      | Date      |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray | 20.0%        | 80.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 38A **Lab Sample ID:** 042313613-0112

**Sample Description:** Window\_Glaze - Beige, to Windows w/Diamond-Shaped Wood Mullion

| TEST | Analyzed  | Color           | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-----------------|--------------|-------------|---------------|---------|
|      | Date      |                 | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Tan/White/Beige | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 38B **Lab Sample ID:** 042313613-0113

**Sample Description:** Window\_Glaze - Beige, to Windows w/Diamond-Shaped Wood Mullion

| TEST | Analyzed  | Color           | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-----------------|--------------|-------------|---------------|---------|
|      | Date      |                 | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Tan/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 38C **Lab Sample ID:** 042313613-0114

**Sample Description:** Window\_Glaze - Beige, to Windows w/Diamond-Shaped Wood Mullion

| TEST | Analyzed  | Color           | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-----------------|--------------|-------------|---------------|---------|
|      | Date      |                 | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Tan/White/Beige | 5.0%         | 95.0%       | None Detected |         |

**Client Sample ID:** 39A **Lab Sample ID:** 042313613-0115

**Sample Description:** Roofing\_Material - Residual Black Mastic on Brick Around Flashing (Near Boiler Room)

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos       | Comment |
|------|-----------|------------------|--------------|-------------|----------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |                |         |
| PLM  | 6/14/2023 | Gray/White/Black | 0.0%         | 78.0%       | 22% Chrysotile |         |

**Client Sample ID:** 39B **Lab Sample ID:** 042313613-0116

**Sample Description:** Roofing\_Material - Residual Black Mastic on Brick Around Flashing (Near Boiler Room)

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos | Comment                      |
|------|-----------|-------|--------------|-------------|----------|------------------------------|
|      | Date      |       | Fibrous      | Non-Fibrous |          |                              |
| PLM  | 6/14/2023 |       |              |             |          | Positive Stop (Not Analyzed) |

**Client Sample ID:** 39C **Lab Sample ID:** 042313613-0117

**Sample Description:** Roofing\_Material - Residual Black Mastic on Brick Around Flashing (Near Boiler Room)

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos | Comment                      |
|------|-----------|-------|--------------|-------------|----------|------------------------------|
|      | Date      |       | Fibrous      | Non-Fibrous |          |                              |
| PLM  | 6/14/2023 |       |              |             |          | Positive Stop (Not Analyzed) |

**Client Sample ID:** 40A **Lab Sample ID:** 042313613-0118

**Sample Description:** Debris - Coarse, Rocky Slag-Like Material at Various Accumulations Along Exterior Walls

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/Black | 4.0%         | 96.0%       | None Detected |         |

**Client Sample ID:** 40B **Lab Sample ID:** 042313613-0119

**Sample Description:** Debris - Coarse, Rocky Slag-Like Material at Various Accumulations Along Exterior Walls

| TEST | Analyzed  | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|------------------|--------------|-------------|---------------|---------|
|      | Date      |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/Black | 3.0%         | 97.0%       | None Detected |         |





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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 40C **Lab Sample ID:** 042313613-0120

**Sample Description:** Debris - Coarse, Rocky Slag-Like Material at Various Accumulations Along Exterior Walls

| TEST | Analyzed  | Color          | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|----------------|--------------|-------------|---------------|---------|
|      | Date      |                | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Brown/Gray/Red | 2.0%         | 98.0%       | None Detected |         |

**Client Sample ID:** 41A **Lab Sample ID:** 042313613-0121

**Sample Description:** Concrete - Floor Substrate

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Gray  | 5.0%         | 95.0%       | None Detected |         |

**Client Sample ID:** 41B **Lab Sample ID:** 042313613-0122

**Sample Description:** Concrete - Floor Substrate

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Gray  | 3.0%         | 97.0%       | None Detected |         |

**Client Sample ID:** 41C **Lab Sample ID:** 042313613-0123

**Sample Description:** Concrete - Floor Substrate

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Gray  | 3.0%         | 97.0%       | None Detected |         |

**Client Sample ID:** 42A-Floor Tile **Lab Sample ID:** 042313613-0124

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Blue  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 42A-Mastic **Lab Sample ID:** 042313613-0124A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 42B-Floor Tile **Lab Sample ID:** 042313613-0125

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Blue  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 42B-Mastic **Lab Sample ID:** 042313613-0125A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed  | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|-----------|-------|--------------|-------------|---------------|---------|
|      | Date      |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023 | Black | 6.0%         | 94.0%       | None Detected |         |





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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 42C-Floor Tile **Lab Sample ID:** 042313613-0126

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Blue  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 42C-Mastic **Lab Sample ID:** 042313613-0126A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Grey Mottle w/Adhesive

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 8.0%         | 92.0%       | None Detected |         |

**Client Sample ID:** 43A **Lab Sample ID:** 042313613-0127

**Sample Description:** Wallboard - Gypsum Panels to Walls

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray  | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 43B **Lab Sample ID:** 042313613-0128

**Sample Description:** Wallboard - Gypsum Panels to Walls

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray  | 12.0%        | 88.0%       | None Detected |         |

**Client Sample ID:** 43C **Lab Sample ID:** 042313613-0129

**Sample Description:** Wallboard - Gypsum Panels to Walls

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray  | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 44A-Wall Sheeting **Lab Sample ID:** 042313613-0130

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 70.0%        | 30.0%       | None Detected |         |

**Client Sample ID:** 44A-Adhesive **Lab Sample ID:** 042313613-0130A

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown | 2.0%         | 98.0%       | None Detected |         |

**Client Sample ID:** 44B-Wall Sheeting **Lab Sample ID:** 042313613-0131

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 70.0%        | 30.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 44B-Adhesive **Lab Sample ID:** 042313613-0131A

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 44C-Wall Sheetting **Lab Sample ID:** 042313613-0132

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 70.0%        | 30.0%       | None Detected |         |

**Client Sample ID:** 44C-Adhesive **Lab Sample ID:** 042313613-0132A

**Sample Description:** Wall\_Sheeting - Hard-Board Paneling w/Tan Construction Adhesive

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown | 4.0%         | 96.0%       | None Detected |         |

**Client Sample ID:** 45A **Lab Sample ID:** 042313613-0133

**Sample Description:** Interior\_Caulk - Off-White, Semi-Flexible, Residual to Wall Sheetting

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 45B **Lab Sample ID:** 042313613-0134

**Sample Description:** Interior\_Caulk - Off-White, Semi-Flexible, Residual to Wall Sheetting

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 45C **Lab Sample ID:** 042313613-0135

**Sample Description:** Interior\_Caulk - Off-White, Semi-Flexible, Residual to Wall Sheetting

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/White | 8.0%         | 92.0%       | None Detected |         |

**Client Sample ID:** 46A **Lab Sample ID:** 042313613-0136

**Sample Description:** Debris - Apparent Asphalt Shingling Debris at Former Kitchen Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 46B **Lab Sample ID:** 042313613-0137

**Sample Description:** Debris - Apparent Asphalt Shingling Debris at Former Kitchen Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 25.0%        | 75.0%       | None Detected |         |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 46C **Lab Sample ID:** 042313613-0138

**Sample Description:** Debris - Apparent Asphalt Shingling Debris at Former Kitchen Area

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Black | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 47A **Lab Sample ID:** 042313613-0139

**Sample Description:** Duct\_Insulation - Fibrous-Glass Flex-Duct w/Plastic Wrap

| TEST | Analyzed Date | Color   | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|---------|--------------|-------------|---------------|---------|
|      |               |         | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Tan/Red | 85.0%        | 15.0%       | None Detected |         |

**Client Sample ID:** 47B **Lab Sample ID:** 042313613-0140

**Sample Description:** Duct\_Insulation - Fibrous-Glass Flex-Duct w/Plastic Wrap

| TEST | Analyzed Date | Color   | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|---------|--------------|-------------|---------------|---------|
|      |               |         | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Tan/Red | 85.0%        | 15.0%       | None Detected |         |

**Client Sample ID:** 47C **Lab Sample ID:** 042313613-0141

**Sample Description:** Duct\_Insulation - Fibrous-Glass Flex-Duct w/Plastic Wrap

| TEST | Analyzed Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|--------------|--------------|-------------|---------------|---------|
|      |               |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray/Tan/Red | 85.0%        | 15.0%       | None Detected |         |

**Client Sample ID:** 48A **Lab Sample ID:** 042313613-0142

**Sample Description:** Plaster - Textured Surfacing to Brick Doorway Opening, Heavy Stipple Stucco Texture

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 48B **Lab Sample ID:** 042313613-0143

**Sample Description:** Plaster - Textured Surfacing to Brick Doorway Opening, Heavy Stipple Stucco Texture

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 48C **Lab Sample ID:** 042313613-0144

**Sample Description:** Plaster - Textured Surfacing to Brick Doorway Opening, Heavy Stipple Stucco Texture

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 30.0%        | 70.0%       | None Detected |         |

**Client Sample ID:** 49A **Lab Sample ID:** 042313613-0145

**Sample Description:** Flooring - Residual Black Mastic on Concrete Floor

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/Black | 20.0%        | 80.0%       | None Detected |         |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 49B **Lab Sample ID:** 042313613-0146

**Sample Description:** Flooring - Residual Black Mastic on Concrete Floor

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/Black | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 49C **Lab Sample ID:** 042313613-0147

**Sample Description:** Flooring - Residual Black Mastic on Concrete Floor

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/Black | 35.0%        | 65.0%       | None Detected |         |

**Client Sample ID:** 50A **Lab Sample ID:** 042313613-0148

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Pockmarks Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 55.0%        | 45.0%       | None Detected |         |

**Client Sample ID:** 50B **Lab Sample ID:** 042313613-0149

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Pockmarks Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 55.0%        | 45.0%       | None Detected |         |

**Client Sample ID:** 50C **Lab Sample ID:** 042313613-0150

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Pockmarks Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 50.0%        | 50.0%       | None Detected |         |

**Client Sample ID:** 51A **Lab Sample ID:** 042313613-0151

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Fissures Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 55.0%        | 45.0%       | None Detected |         |

**Client Sample ID:** 51B **Lab Sample ID:** 042313613-0152

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Fissures Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 55.0%        | 45.0%       | None Detected |         |

**Client Sample ID:** 51C **Lab Sample ID:** 042313613-0153

**Sample Description:** Ceiling\_Panel - 2' x 4' Composite Suspended Panel w/Pinholes-Fissures Pattern

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023     | Brown/Gray/White | 55.0%        | 45.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 52A-Drywall **Lab Sample ID:** 042313613-0154

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/White | 30.0%        | 70.0%       | None Detected |         |

**Client Sample ID:** 52A-Joint Compound **Lab Sample ID:** 042313613-0154A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White/Yellow | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 52B-Drywall **Lab Sample ID:** 042313613-0155

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/White | 35.0%        | 65.0%       | None Detected |         |

**Client Sample ID:** 52B-Joint Compound **Lab Sample ID:** 042313613-0155A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | White/Yellow | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 52C-Drywall **Lab Sample ID:** 042313613-0156

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/White | 20.0%        | 80.0%       | None Detected |         |

**Client Sample ID:** 52C-Joint Compound **Lab Sample ID:** 042313613-0156A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound to Ceiling/Walls at Vestibule

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 53A-Floor Tile **Lab Sample ID:** 042313613-0157

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 53A-Adhesive **Lab Sample ID:** 042313613-0157A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/Black/Yellow | 12.0%        | 88.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 53B-Floor Tile **Lab Sample ID:** 042313613-0158

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 53B-Adhesive **Lab Sample ID:** 042313613-0158A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/Black/Yellow | 12.0%        | 88.0%       | None Detected |         |

**Client Sample ID:** 53C-Floor Tile **Lab Sample ID:** 042313613-0159

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------------|--------------|-------------|---------------|---------|
|      |                  |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 53C-Adhesive **Lab Sample ID:** 042313613-0159A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Lt. Beige Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/Black/Yellow | 19.0%        | 81.0%       | None Detected |         |

**Client Sample ID:** 54A-Floor Tile **Lab Sample ID:** 042313613-0160

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color  | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------|--------------|-------------|---------------|---------|
|      |                  |        | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Yellow | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 54A-Adhesive **Lab Sample ID:** 042313613-0160A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/Yellow | 5.0%         | 95.0%       | None Detected |         |

**Client Sample ID:** 54B-Floor Tile **Lab Sample ID:** 042313613-0161

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color  | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------|--------------|-------------|---------------|---------|
|      |                  |        | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Yellow | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 54B-Adhesive **Lab Sample ID:** 042313613-0161A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/Yellow | 15.0%        | 85.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 54C-Floor Tile **Lab Sample ID:** 042313613-0162

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color  | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------|--------------|-------------|---------------|---------|
|      |                  |        | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Yellow | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 54C-Adhesive **Lab Sample ID:** 042313613-0162A

**Sample Description:** Flooring - 12" x 12" Floor Tile, Yellow Mottle w/Adhesive

| TEST | Analyzed<br>Date | Color             | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------------|--------------|-------------|---------------|---------|
|      |                  |                   | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/Yellow | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 55A-Cove Base **Lab Sample ID:** 042313613-0163

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 55A-Adhesive **Lab Sample ID:** 042313613-0163A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color          | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|----------------|--------------|-------------|---------------|---------|
|      |                  |                | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray/Tan | 25.0%        | 75.0%       | None Detected |         |

**Client Sample ID:** 55B-Cove Base **Lab Sample ID:** 042313613-0164

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 55B-Adhesive **Lab Sample ID:** 042313613-0164A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Tan/Yellow | 7.0%         | 93.0%       | None Detected |         |

**Client Sample ID:** 55C-Cove Base **Lab Sample ID:** 042313613-0165

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/Gray | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 55C-Adhesive **Lab Sample ID:** 042313613-0165A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown w/ Adhesive

| TEST | Analyzed<br>Date | Color              | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------------|--------------|-------------|---------------|---------|
|      |                  |                    | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Brown/White/Yellow | 25.0%        | 75.0%       | None Detected |         |





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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 56A **Lab Sample ID:** 042313613-0166

**Sample Description:** Interior\_Caulk - White, Semi-Flexible, to S. Window Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/14/2023        | Gray/White | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 56B **Lab Sample ID:** 042313613-0167

**Sample Description:** Interior\_Caulk - White, Semi-Flexible, to S. Window Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 22.0%        | 78.0%       | None Detected |         |

**Client Sample ID:** 56C **Lab Sample ID:** 042313613-0168

**Sample Description:** Interior\_Caulk - White, Semi-Flexible, to S. Window Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 57A-White Plaster **Lab Sample ID:** 042313613-0169

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 57A-Gray Plaster **Lab Sample ID:** 042313613-0169A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray | 5.0%         | 95.0%       | None Detected |         |

**Client Sample ID:** 57B-White Plaster **Lab Sample ID:** 042313613-0170

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 57B-Gray Plaster **Lab Sample ID:** 042313613-0170A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray | 7.0%         | 93.0%       | None Detected |         |

**Client Sample ID:** 57C-White Plaster **Lab Sample ID:** 042313613-0171

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |





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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 57C-Gray Plaster **Lab Sample ID:** 042313613-0171A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 57D-White Plaster **Lab Sample ID:** 042313613-0172

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 57D-Gray Plaster **Lab Sample ID:** 042313613-0172A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray | 8.0%         | 92.0%       | None Detected |         |

**Client Sample ID:** 57E-White Plaster **Lab Sample ID:** 042313613-0173

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 57E-Gray Plaster **Lab Sample ID:** 042313613-0173A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color           | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-----------------|--------------|-------------|---------------|---------|
|      |                  |                 | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray/Rust | 8.0%         | 92.0%       | None Detected |         |

**Client Sample ID:** 57F-White Plaster **Lab Sample ID:** 042313613-0174

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 57F-Gray Plaster **Lab Sample ID:** 042313613-0174A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Gray | 5.0%         | 95.0%       | None Detected |         |

**Client Sample ID:** 57G-White Plaster **Lab Sample ID:** 042313613-0175

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray/White | 0.0%         | 100.0%      | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 57G-Gray Plaster **Lab Sample ID:** 042313613-0175A

**Sample Description:** Plaster - 2 Layer Plaster System, Coarse, to Ceiling Deck

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Gray | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 58A **Lab Sample ID:** 042313613-0176

**Sample Description:** Flooring - Grout to Ceramic Floor Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 58B **Lab Sample ID:** 042313613-0177

**Sample Description:** Flooring - Grout to Ceramic Floor Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 58C **Lab Sample ID:** 042313613-0178

**Sample Description:** Flooring - Grout to Ceramic Floor Tile

| TEST | Analyzed Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------------|--------------|-------------|---------------|---------|
|      |               |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 59A **Lab Sample ID:** 042313613-0179

**Sample Description:** Flooring - Mortar/Thinset, to Ceramic Floor Tile

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 59B **Lab Sample ID:** 042313613-0180

**Sample Description:** Flooring - Mortar/Thinset, to Ceramic Floor Tile

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 59C **Lab Sample ID:** 042313613-0181

**Sample Description:** Flooring - Mortar/Thinset, to Ceramic Floor Tile

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 60A **Lab Sample ID:** 042313613-0182

**Sample Description:** Block - Concrete Block, Walls

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Gray/Beige | 0.0%         | 100.0%      | None Detected |         |



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## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 60B **Lab Sample ID:** 042313613-0183

**Sample Description:** Block - Concrete Block, Walls

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 60C **Lab Sample ID:** 042313613-0184

**Sample Description:** Block - Concrete Block, Walls

| TEST | Analyzed Date | Color            | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------------|--------------|-------------|---------------|---------|
|      |               |                  | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown/Gray/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 61A **Lab Sample ID:** 042313613-0185

**Sample Description:** Block\_Mortar - Cementitious, Associated w/HA-60

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 61B **Lab Sample ID:** 042313613-0186

**Sample Description:** Block\_Mortar - Cementitious, Associated w/HA-60

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 61C **Lab Sample ID:** 042313613-0187

**Sample Description:** Block\_Mortar - Cementitious, Associated w/HA-60

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 62A **Lab Sample ID:** 042313613-0188

**Sample Description:** Ceiling\_Panel - 2' x 2' Suspended Panels, Vinyl-Covered Gypsum

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 13.0%        | 87.0%       | None Detected |         |

**Client Sample ID:** 62B **Lab Sample ID:** 042313613-0189

**Sample Description:** Ceiling\_Panel - 2' x 2' Suspended Panels, Vinyl-Covered Gypsum

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 12.0%        | 88.0%       | None Detected |         |

**Client Sample ID:** 62C **Lab Sample ID:** 042313613-0190

**Sample Description:** Ceiling\_Panel - 2' x 2' Suspended Panels, Vinyl-Covered Gypsum

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 15.0%        | 85.0%       | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 63A-Cove Base **Lab Sample ID:** 042313613-0191

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 63A-Adhesive **Lab Sample ID:** 042313613-0191A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Tan   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 63B-Cove Base **Lab Sample ID:** 042313613-0192

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 63B-Adhesive **Lab Sample ID:** 042313613-0192A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color     | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-----------|--------------|-------------|---------------|---------|
|      |                  |           | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Tan/White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 63C-Cove Base **Lab Sample ID:** 042313613-0193

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 63C-Adhesive **Lab Sample ID:** 042313613-0193A

**Sample Description:** Cove\_Base - 4" Vinyl Cove Base, Dk. Brown/Black w/Adhesive

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Tan   | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64A-Skim Coat **Lab Sample ID:** 042313613-0194

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64A-Rough Coat **Lab Sample ID:** 042313613-0194A

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 64B-Skim Coat **Lab Sample ID:** 042313613-0195

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64B-Rough Coat **Lab Sample ID:** 042313613-0195A

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64C-Skim Coat **Lab Sample ID:** 042313613-0196

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64C-Rough Coat **Lab Sample ID:** 042313613-0196A

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 64D-Skim Coat **Lab Sample ID:** 042313613-0197

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64D-Rough Coat **Lab Sample ID:** 042313613-0197A

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64E-Skim Coat **Lab Sample ID:** 042313613-0198

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 64E-Rough Coat **Lab Sample ID:** 042313613-0198A

**Sample Description:** Plaster - 2 Layer Plaster System Smooth Ceilings & Associated Overspray

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023     | Brown | 0.0%         | 100.0%      | None Detected |         |



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## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 65A-Joint Compound **Lab Sample ID:** 042313613-0199

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 65A-Gypsum Wallboard **Lab Sample ID:** 042313613-0199A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 16.0%        | 84.0%       | None Detected |         |

**Client Sample ID:** 65B-Joint Compound **Lab Sample ID:** 042313613-0200

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White | 15.0%        | 85.0%       | None Detected |         |

**Client Sample ID:** 65B-Gypsum Wallboard **Lab Sample ID:** 042313613-0200A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 19.0%        | 81.0%       | None Detected |         |

**Client Sample ID:** 65C-Joint Compound **Lab Sample ID:** 042313613-0201

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 65C-Gypsum Wallboard **Lab Sample ID:** 042313613-0201A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound at S. Vestibules & Central Stairway

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Gray  | 14.0%        | 86.0%       | None Detected |         |

**Client Sample ID:** 66A **Lab Sample ID:** 042313613-0202

**Sample Description:** Mechanical\_Insulation - Unit Ventilator Insulation, Fibrous-Glass Batt

| TEST | Analyzed<br>Date | Color  | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------|--------------|-------------|---------------|---------|
|      |                  |        | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Yellow | 95.0%        | 5.0%        | None Detected |         |

**Client Sample ID:** 66B **Lab Sample ID:** 042313613-0203

**Sample Description:** Mechanical\_Insulation - Unit Ventilator Insulation, Fibrous-Glass Batt

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Black/Yellow | 95.0%        | 5.0%        | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 66C **Lab Sample ID:** 042313613-0204

**Sample Description:** Mechanical\_Insulation - Unit Ventilator Insulation, Fibrous-Glass Batt

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Black/Yellow | 95.0%        | 5.0%        | None Detected |         |

**Client Sample ID:** 67A **Lab Sample ID:** 042313613-0205

**Sample Description:** Duct\_Sealant - Brown, Dense, to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 67B **Lab Sample ID:** 042313613-0206

**Sample Description:** Duct\_Sealant - Brown, Dense, to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 67C **Lab Sample ID:** 042313613-0207

**Sample Description:** Duct\_Sealant - Brown, Dense, to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 68A **Lab Sample ID:** 042313613-0208

**Sample Description:** Pipe\_Insulation - Fibrous-Glass w/Reinfoced Threaded Paper-Foil Wrap

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White/Yellow | 45.0%        | 55.0%       | None Detected |         |

**Client Sample ID:** 68B **Lab Sample ID:** 042313613-0209

**Sample Description:** Pipe\_Insulation - Fibrous-Glass w/Reinfoced Threaded Paper-Foil Wrap

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White/Yellow | 45.0%        | 55.0%       | None Detected |         |

**Client Sample ID:** 68C **Lab Sample ID:** 042313613-0210

**Sample Description:** Pipe\_Insulation - Fibrous-Glass w/Reinfoced Threaded Paper-Foil Wrap

| TEST | Analyzed<br>Date | Color        | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|--------------|--------------|-------------|---------------|---------|
|      |                  |              | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | White/Yellow | 45.0%        | 55.0%       | None Detected |         |

**Client Sample ID:** 69A **Lab Sample ID:** 042313613-0211

**Sample Description:** Duct\_Sealant - Olive Green, Dense to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Green | 0.0%         | 100.0%      | None Detected |         |





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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 69B **Lab Sample ID:** 042313613-0212

**Sample Description:** Duct\_Sealant - Olive Green, Dense to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 69C **Lab Sample ID:** 042313613-0213

**Sample Description:** Duct\_Sealant - Olive Green, Dense to Metal HVAC Duct Seams

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Green/Beige | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 70A **Lab Sample ID:** 042313613-0214

**Sample Description:** Vapor\_Barrier - Brown Corrugated Coardboard w/Black Paper Facing, to Column Wrap Inside  
Bloc,k Walls

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Black | 90.0%        | 10.0%       | None Detected |         |

**Client Sample ID:** 70B **Lab Sample ID:** 042313613-0215

**Sample Description:** Vapor\_Barrier - Brown Corrugated Coardboard w/Black Paper Facing, to Column Wrap Inside  
Bloc,k Walls

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Black | 90.0%        | 10.0%       | None Detected |         |

**Client Sample ID:** 70C **Lab Sample ID:** 042313613-0216

**Sample Description:** Vapor\_Barrier - Brown Corrugated Coardboard w/Black Paper Facing, to Column Wrap Inside  
Bloc,k Walls

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/15/2023        | Brown/Black | 90.0%        | 10.0%       | None Detected |         |

**Client Sample ID:** 71A-Joint Compound **Lab Sample ID:** 042313613-0217

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway  
(FS25-27)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | White | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 71A-Gypsum Wallboard **Lab Sample ID:** 042313613-0217A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway  
(FS25-27)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 12.0%        | 88.0%       | None Detected |         |

**Client Sample ID:** 71B-Joint Compound **Lab Sample ID:** 042313613-0218

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway  
(FS25-27)

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | White | 0.0%         | 100.0%      | None Detected |         |





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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

| <b>Client Sample ID:</b>   | 71B-Gypsum Wallboard                                                                               |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0218A |
|----------------------------|----------------------------------------------------------------------------------------------------|-------|--------------|-------------|---------------|-----------------------|-----------------|
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway (FS25-27) |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | Gray  | 6.0%         | 94.0%       | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 71C-Joint Compound                                                                                 |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0219  |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway (FS25-27) |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | White | 0.0%         | 100.0%      | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 71C-Gypsum Wallboard                                                                               |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0219A |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, at Upper Level Vestibules & Central Stairway (FS25-27) |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | Gray  | 8.0%         | 92.0%       | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 72A-Joint Compound                                                                                 |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0220  |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure                                  |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | White | 0.0%         | 100.0%      | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 72A-Gypsum Board                                                                                   |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0220A |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure                                  |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | Gray  | 7.0%         | 93.0%       | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 72B-Joint Compound                                                                                 |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0221  |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure                                  |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | White | 0.0%         | 100.0%      | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 72B-Gypsum Board                                                                                   |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0221A |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure                                  |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | Gray  | 10.0%        | 90.0%       | None Detected |                       |                 |
| <b>Client Sample ID:</b>   | 72C-Joint Compound                                                                                 |       |              |             |               | <b>Lab Sample ID:</b> | 042313613-0222  |
| <b>Sample Description:</b> | Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure                                  |       |              |             |               |                       |                 |
| TEST                       | Analyzed Date                                                                                      | Color | Non-Asbestos |             | Asbestos      | Comment               |                 |
|                            |                                                                                                    |       | Fibrous      | Non-Fibrous |               |                       |                 |
| PLM                        | 6/16/2023                                                                                          | White | 0.0%         | 100.0%      | None Detected |                       |                 |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 72C-Gypsum Board **Lab Sample ID:** 042313613-0222A

**Sample Description:** Wallboard - Gypsum Panels w/Joint-Compound, to Apparent Enclosure

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 6.0%         | 94.0%       | None Detected |         |

**Client Sample ID:** 73A **Lab Sample ID:** 042313613-0223

**Sample Description:** Rolled\_In\_Insulation - Fibrous-Glass w/Paper & Black Coating

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Brown/Black | 70.0%        | 30.0%       | None Detected |         |

**Client Sample ID:** 73B **Lab Sample ID:** 042313613-0224

**Sample Description:** Rolled\_In\_Insulation - Fibrous-Glass w/Paper & Black Coating

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Brown/Black | 70.0%        | 30.0%       | None Detected |         |

**Client Sample ID:** 73C **Lab Sample ID:** 042313613-0225

**Sample Description:** Rolled\_In\_Insulation - Fibrous-Glass w/Paper & Black Coating

| TEST | Analyzed<br>Date | Color       | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------------|--------------|-------------|---------------|---------|
|      |                  |             | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Brown/Black | 70.0%        | 30.0%       | None Detected |         |

**Client Sample ID:** 74A **Lab Sample ID:** 042313613-0226

**Sample Description:** Plaster - 2 Layer Plaster System, Wall at Upper Level Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray/White | 10.0%        | 90.0%       | None Detected |         |

**Client Sample ID:** 74B **Lab Sample ID:** 042313613-0227

**Sample Description:** Plaster - 2 Layer Plaster System, Wall at Upper Level Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray/White | 7.0%         | 93.0%       | None Detected |         |

**Client Sample ID:** 74C **Lab Sample ID:** 042313613-0228

**Sample Description:** Plaster - 2 Layer Plaster System, Wall at Upper Level Area

| TEST | Analyzed<br>Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|------------|--------------|-------------|---------------|---------|
|      |                  |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray/White | 6.0%         | 94.0%       | None Detected |         |

**Client Sample ID:** 75A **Lab Sample ID:** 042313613-0229

**Sample Description:** Flooring - Green, Rubber Flooring

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Green | 0.0%         | 100.0%      | None Detected |         |



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Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 75B **Lab Sample ID:** 042313613-0230

**Sample Description:** Flooring - Green, Rubber Flooring

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 75C **Lab Sample ID:** 042313613-0231

**Sample Description:** Flooring - Green, Rubber Flooring

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Green | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 76A-Plaster **Lab Sample ID:** 042313613-0232

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 76A-Gypsum Board **Lab Sample ID:** 042313613-0232A

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 76B-Plaster **Lab Sample ID:** 042313613-0233

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 76B-Gypsum Board **Lab Sample ID:** 042313613-0233A

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 76C-Plaster **Lab Sample ID:** 042313613-0234

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | <1%          | 100.0%      | None Detected |         |

**Client Sample ID:** 76C-Gypsum Board **Lab Sample ID:** 042313613-0234A

**Sample Description:** Plaster - Plaster-Board System, Plaster w.Gypsum Panel, Ceiling & Debris

| TEST | Analyzed Date | Color      | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|------------|--------------|-------------|---------------|---------|
|      |               |            | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray/Black | 3.0%         | 97.0%       | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

Client Sample ID: 77A Lab Sample ID: 042313613-0235

Sample Description: Duct\_Insulation - Fibrous-Glass w/Reinfoced Threaded Foil-Paper Wrap

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Beige | 80.0%        | 20.0%       | None Detected |         |

Client Sample ID: 77B Lab Sample ID: 042313613-0236

Sample Description: Duct\_Insulation - Fibrous-Glass w/Reinfoced Threaded Foil-Paper Wrap

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Beige | 70.0%        | 30.0%       | None Detected |         |

Client Sample ID: 77C Lab Sample ID: 042313613-0237

Sample Description: Duct\_Insulation - Fibrous-Glass w/Reinfoced Threaded Foil-Paper Wrap

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Beige | 80.0%        | 20.0%       | None Detected |         |

Client Sample ID: 78A Lab Sample ID: 042313613-0238

Sample Description: Pipe\_Insulation - Black, Foam-Plastic Sections to Pipes

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

Client Sample ID: 78B Lab Sample ID: 042313613-0239

Sample Description: Pipe\_Insulation - Black, Foam-Plastic Sections to Pipes

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

Client Sample ID: 78C Lab Sample ID: 042313613-0240

Sample Description: Pipe\_Insulation - Black, Foam-Plastic Sections to Pipes

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Black | 0.0%         | 100.0%      | None Detected |         |

Client Sample ID: 79A Lab Sample ID: 042313613-0241

Sample Description: Gasket\_Material - White, Fibrous Matt to Gas Burner Connections at Furnace Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | White | 95.0%        | 5.0%        | None Detected |         |

Client Sample ID: 79B Lab Sample ID: 042313613-0242

Sample Description: Gasket\_Material - White, Fibrous Matt to Gas Burner Connections at Furnace Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | White | 95.0%        | 5.0%        | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 79C **Lab Sample ID:** 042313613-0243

**Sample Description:** Gasket\_Material - White, Fibrous Matt to Gas Burner Connections at Furnace Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | White | 95.0%        | 5.0%        | None Detected |         |

**Client Sample ID:** 80A **Lab Sample ID:** 042313613-0244

**Sample Description:** Concrete - Pads to Furnace/Boiler Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 80B **Lab Sample ID:** 042313613-0245

**Sample Description:** Concrete - Pads to Furnace/Boiler Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 80C **Lab Sample ID:** 042313613-0246

**Sample Description:** Concrete - Pads to Furnace/Boiler Equipment

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 81A **Lab Sample ID:** 042313613-0247

**Sample Description:** Stack\_Cement - Off-White, Crumbly, Residual Around Flue Connection at Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 81B **Lab Sample ID:** 042313613-0248

**Sample Description:** Stack\_Cement - Off-White, Crumbly, Residual Around Flue Connection at Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 81C **Lab Sample ID:** 042313613-0249

**Sample Description:** Stack\_Cement - Off-White, Crumbly, Residual Around Flue Connection at Stack

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 82A **Lab Sample ID:** 042313613-0250

**Sample Description:** Plaster - Coarse, Plaster Ceiling Section Approx. Above Furnace

| TEST | Analyzed<br>Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|------------------|-------|--------------|-------------|---------------|---------|
|      |                  |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023        | Gray  | 0.0%         | 100.0%      | None Detected |         |



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EMSL Order ID: 042313613  
Customer ID: BLNL75  
Customer PO: 230022  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Material

**Client Sample ID:** 82B **Lab Sample ID:** 042313613-0251

**Sample Description:** Plaster - Coarse, Plaster Ceiling Section Approx. Above Furnace

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 82C **Lab Sample ID:** 042313613-0252

**Sample Description:** Plaster - Coarse, Plaster Ceiling Section Approx. Above Furnace

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 83A **Lab Sample ID:** 042313613-0253

**Sample Description:** Concrete - Cementitious Wall Patch to Brick Walls, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 83B **Lab Sample ID:** 042313613-0254

**Sample Description:** Concrete - Cementitious Wall Patch to Brick Walls, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 83C **Lab Sample ID:** 042313613-0255

**Sample Description:** Concrete - Cementitious Wall Patch to Brick Walls, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 84A **Lab Sample ID:** 042313613-0256

**Sample Description:** Stack\_Cement - Cementitious, to Flue Penetration, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 84B **Lab Sample ID:** 042313613-0257

**Sample Description:** Stack\_Cement - Cementitious, to Flue Penetration, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |

**Client Sample ID:** 84C **Lab Sample ID:** 042313613-0258

**Sample Description:** Stack\_Cement - Cementitious, to Flue Penetration, Grey

| TEST | Analyzed Date | Color | Non-Asbestos |             | Asbestos      | Comment |
|------|---------------|-------|--------------|-------------|---------------|---------|
|      |               |       | Fibrous      | Non-Fibrous |               |         |
| PLM  | 6/16/2023     | Gray  | 0.0%         | 100.0%      | None Detected |         |



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|                |           |
|----------------|-----------|
| EMSL Order ID: | 042313613 |
| Customer ID:   | BLNL75    |
| Customer PO:   | 230022    |
| Project ID:    |           |

### Summary Test Report for Asbestos Analysis of Bulk Material

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#### Analyst(s):

---

|                   |           |
|-------------------|-----------|
| George Malone     | PLM (90)  |
| Joe Centifonti    | PLM (15)  |
| Katherine Dunkley | PLM (115) |
| Ryan Manion       | PLM (79)  |

#### Reviewed and approved by:

---

Samantha Rundstrom, Laboratory Manager  
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This is a summary report; official reports are available on LabConnect or upon request and relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD NVLAP Lab Code 200293-0

Initial report from: 06/16/2023 17:52:28





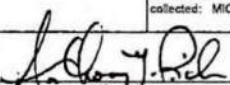
## Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

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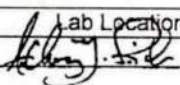
PHONE: (800) 220-3675  
EMAIL: CinnAsblab@EMSL.com

|                                                             |                      |                                                                                              |          |                                            |                                      |                                                                                                                                                             |        |
|-------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|----------|--------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Customer Information                                        | Customer ID:         | BLNL75                                                                                       |          | Billing ID:                                | BLNL75                               |                                                                                                                                                             |        |
|                                                             | Company Name:        | BLN                                                                                          |          | Company Name:                              | Beam, Longest and Neff, LLC          |                                                                                                                                                             |        |
|                                                             | Contact Name:        | Craig Willey                                                                                 |          | Billing Contact:                           | Ryan Jones                           |                                                                                                                                                             |        |
|                                                             | Street Address:      | 51151 W. Pontiac Trail                                                                       |          | Street Address:                            | 8320 Craig Street                    |                                                                                                                                                             |        |
|                                                             | City, State, Zip:    | Wixom, MI 48393                                                                              | Country: | USA                                        | City, State, Zip:                    | Indianapolis, IN 46250 Country: USA                                                                                                                         |        |
|                                                             | Phone:               | (248) 863-2934                                                                               |          | Phone:                                     | (248) 863-2762                       |                                                                                                                                                             |        |
| Billing Information                                         | Email(s) for Report: | cswilley@b-l-n.com                                                                           |          | Email(s) for Invoice:                      | rjones@b-l-n.com; cswilley@b-l-n.com |                                                                                                                                                             |        |
|                                                             | Project Information  |                                                                                              |          |                                            |                                      |                                                                                                                                                             |        |
| Project Name/No:                                            |                      |                                                                                              |          | Athletic Shelter                           |                                      | Purchase Order:                                                                                                                                             | 230022 |
| EMSL LIMS Project ID:<br>(if applicable, EMSL will provide) |                      |                                                                                              |          | US State where samples collected: MICHIGAN |                                      | State of Connecticut (CT) must select project location:<br><input type="checkbox"/> Commercial (Taxable) <input type="checkbox"/> Residential (Non-Taxable) |        |
| Sampled By Name:                                            |                      | Sampled By                                                                                   |          | Date                                       |                                      | No. of                                                                                                                                                      |        |
| Tony Rich                                                   |                      | Signature:  |          | 6/6/2023                                   |                                      | Samples 258                                                                                                                                                 |        |

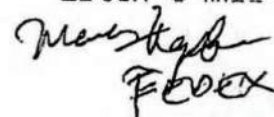
Turn-Around-Time (TAT)

☒ 72 Hours

Please call ahead for large projects and/or turnaround times 6 Hours or Less. \*32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

|                                                                                                                            |           |                                                                                          |                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Test Selection                                                                                                             |           |                                                                                          |                                                                                       |
| <u>PLM - Bulk (reporting limit)</u>                                                                                        |           | <u>TEM - Bulk</u>                                                                        |                                                                                       |
| <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%)                                                                        |           |                                                                                          |                                                                                       |
| Other Tests (please specify)                                                                                               |           |                                                                                          |                                                                                       |
| Point Count samples $\leq$ 1% asbestos by PLM                                                                              |           |                                                                                          |                                                                                       |
| FedEx #                                                                                                                    |           | <input checked="" type="checkbox"/> Positive Stop - Clearly Identified Homogeneous Areas |                                                                                       |
| Sample Number                                                                                                              | HA Number | Sample Location                                                                          | Material Description                                                                  |
| 1 - A, B, C                                                                                                                | CC        | 0                                                                                        | Concrete - Exterior walkways                                                          |
| 2 - A, B, C                                                                                                                | ASP       | 0                                                                                        | Asphalt Paving - Parking areas                                                        |
| 3 - A, B, C                                                                                                                | BM        | 0                                                                                        | Brick - Main exterior walls                                                           |
| 4 - A, B, C                                                                                                                | BM        | 0                                                                                        | Brick Mortar - Cementitious, associated w/HA-03                                       |
| 5 - A, B, C                                                                                                                | EC        | 0                                                                                        | Exterior Caulk - Grey, to brick/sill seams at main level lower window areas           |
| 6 - A, B, C                                                                                                                | CC        | 0                                                                                        | Concrete - Sill base (block) under brick exterior walls                               |
| 7 - A, B, C                                                                                                                | EC        | 0                                                                                        | Exterior Caulk - Black sealant, along seams at brick/concrete base below window areas |
| 8 - A, B, C                                                                                                                | CC        | 0                                                                                        | Concrete - Window sills (block form)                                                  |
| Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.) |           |                                                                                          |                                                                                       |
| Please provide EDD in CSV format                                                                                           |           |                                                                                          |                                                                                       |
| Method of Shipment:                                                                                                        |           | Sample Condition Upon Receipt:                                                           |                                                                                       |
| Relinquished by:                        |           | Received by:                                                                             |                                                                                       |
| Date/Time: 6-7-23 / 10:24                                                                                                  |           | Date/Time:                                                                               |                                                                                       |
| Relinquished by:                                                                                                           |           | Received by:                                                                             |                                                                                       |
| Date/Time:                                                                                                                 |           | Date/Time:                                                                               |                                                                                       |

'23 JUN 8 AM 11:45

  
FEDEx

1 of 4





## Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

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Cinnaminson, NJ 08077

PHONE: (609) 220-3675  
EMAIL: CinnAsblab@EMSL.com

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Additional Pages of the Chain of Custody are only necessary if needed for additional sample

Athletic Shelter

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

| Sample Number | HA Number | Sample Location | Material Description                                                                              |
|---------------|-----------|-----------------|---------------------------------------------------------------------------------------------------|
| 9 - A, B, C   | EC        | 0               | Exterior_Caulk - Black/dk. brown (layers), to main level windows (w/dk. brown metal framing)      |
| 10 - A, B, C  | EC        | 0               | Exterior_Caulk - Lt. grey, to metal "storefront" door/window system                               |
| 11 - A, B, C  | EJ        | 0               | Expansion_Joint - Black, fibrous, to exterior walkway concrete seams                              |
| 12 - A, B, C  | EC        | 0               | Exterior_Caulk - Lt. grey, to concrete window sill joints                                         |
| 13 - A, B, C  | BM        | 0               | Brick - Beveled edges, at some main level lower window areas                                      |
| 14 - A, B, C  | BM        | 0               | Brick_Mortar - Cementitious, associated w/HA-13                                                   |
| 15 - A, B, C  | WG        | 0               | Window_Glaze - Black, thin bead, sticky, pliable; to main level windows w/dk. brown metal framing |
| 16 - A, B, C  | EC        | 0               | Exterior_Caulk - Brown, to roof flashing & fascia boards (near boiler room)                       |
| 17 - A, B, C  | EC        | 0               | Exterior_Caulk - Off-white, to various door frames                                                |
| 18 - A, B, C  | BM        | 0               | Brick - Coarse, to mechanical exhaust stack                                                       |
| 19 - A, B, C  | BM        | 0               | Brick_Mortar - Cementitious, associated w/HA-18                                                   |
| 20 - A, B, C  | BM        | 0               | Brick - Smaller dimension brick, wall fill-in at FS21 area                                        |
| 21 - A, B, C  | BM        | 0               | Brick_Mortar - Cementitious, associated w/HA-21                                                   |
| 22 - A, B, C  | EC        | 0               | Exterior_Caulk - Dk. brown, to metal louvers at FS-21 area                                        |
| 23 - A, B, C  | CC        | 0               | Concrete - Pads to exterior electrical transformer equipment                                      |
| 24 - A, B, C  | CC        | 0               | Concrete - Roof slab at FS-21 area                                                                |
| 25 - A, B, C  | EC        | 0               | Exterior_Caulk - Dk. brown, to metal door frame at FS-21 area                                     |
| 26 - A, B, C  | EC        | 0               | Exterior_Caulk - Cream, at brick wall to wood supports for veranda                                |
| 27 - A, B, C  | EC        | 0               | Exterior_Caulk - Grey/beige, residual on brick at NE window area                                  |
| 28 - A, B, C  | EC        | 0               | Exterior_Caulk - Tan, to electrical panel box on exterior wall near Verizon space (FS-22)         |
| 29 - A, B, C  | WG        | 0               | Window_Glaze - To sm. rectangular metal windows, lower main level EA1 area                        |
| 30 - A, B, C  | RM        | 0               | Roofing_Material - Asphalt shingling                                                              |
| 31 - A, B, C  | ES        | 0               | Exterior_Siding - Clay tile                                                                       |
| 32 - A, B, C  | ES        | 0               | Exterior_Siding - Very coarse concrete, at upper level areas                                      |
| 33 - A, B, C  | EC        | 0               | Exterior_Caulk - Beige/tan, to HS-32, along bottom seams at veranda areas                         |
| 34 - A, B, C  | ES        | 0               | Exterior_Siding - Cement/concrete base substrate for HA-32                                        |
| 35 - A, B, C  | EC        | 0               | Exterior_Caulk - Lt. tan, at brick/clay tile joints/seams at veranda areas                        |
| 36 - A, B, C  | WG        | 0               | Window_Glaze - To wood windows at veranda areas                                                   |

|                                                |                        |                                |                    |
|------------------------------------------------|------------------------|--------------------------------|--------------------|
| Method of Shipment:                            |                        | Sample Condition Upon Receipt: |                    |
| Relinquished by: <i>Anthony J. [Signature]</i> | Date/Time: 6-7-13/5:00 | Received by:                   | Date/Time:         |
| Relinquished by:                               | Date/Time:             | Received by:                   | Date/Time: 396/917 |

2 of 4



## Asbestos Bulk Building Materials - Chain of Custody

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EMSL Analytical, Inc.  
200 Route 130 North  
Cinnaminson, NJ 08077PHONE: (800) 220-3675  
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Additional Pages of the Chain of Custody are only necessary if needed for additional sample

Athletic Shelter

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

| Sample Number            | HA Number | Sample Location | Material Description                                                                    |
|--------------------------|-----------|-----------------|-----------------------------------------------------------------------------------------|
| 37 - A, B, C             | EC        | 0               | Exterior_Caulk - To wood window frames at veranda areas                                 |
| 38 - A, B, C             | WG        | 0               | Window_Glaze - Beige, to windows w/diamond-shaped wood mullion                          |
| 39 - A, B, C             | RM        | 0               | Roofing_Material - Residual black mastic on brick around flashing (near boiler room)    |
| 40 - A, B, C             | DBR       | 0               | Debris - Coarse, rocky slag-like material at various accumulations along exterior walls |
| 41 - A, B, C             | CC        | 0               | Concrete - Floor substrate                                                              |
| 42 - A, B, C             | FLM       | 0               | Flooring - 12"x 12" Floor tile, grey mottle w/adhesive                                  |
| 43 - A, B, C             | WB        | 0               | Wallboard - Gypsum panels to walls                                                      |
| 44 - A, B, C             | WS        | 0               | Wall_Sheeting - Hard-board paneling w/lan construction adhesive                         |
| 45 - A, B, C             | IC        | 0               | Interior_Caulk - Off-white, semi-flexible, residual to wall sheeting                    |
| 46 - A, B, C             | DBR       | 0               | Debris - Apparent asphalt shingling debris at former kitchen area                       |
| 47 - A, B, C             | DI        | 0               | Duct_Insulation - Fibrous-glass flex-duct w/plastic wrap                                |
| 48 - A, B, C             | PL        | 0               | Plaster - Textured surfacing to brick doorway opening, heavy stipple-stucco texture     |
| 49 - A, B, C             | FLM       | 0               | Flooring - Residual black mastic on concrete floor                                      |
| 50 - A, B, C             | CP        | 0               | Ceiling_Panel - 2'x 4' Composite suspended panel w/pinholes-pockmarks pattern           |
| 51 - A, B, C             | CP        | 0               | Ceiling_Panel - 2'x 4' Composite suspended panel w/pinholes-fissures pattern            |
| 52 - A, B, C             | WB        | 0               | Wallboard - Gypsum panels w/joint-compound to ceiling/walls at vestibule                |
| 53 - A, B, C             | FLM       | 0               | Flooring - 12"x 12" Floor tile, lt. beige mottle w/adhesive                             |
| 54 - A, B, C             | FLM       | 0               | Flooring - 12"x 12" Floor tile, yellow mottle w/adhesive                                |
| 55 - A, B, C             | CB        | 0               | Cove_Base - 4" Vinyl cove base, dk. brown w/ adhesive                                   |
| 56 - A, B, C             | IC        | 0               | Interior_Caulk - White, semi-flexible, to S. window area                                |
| 57 - A, B, C, D, E, F, G | PL        | 0               | Plaster - 2-layer plaster system, coarse, to ceiling deck                               |
| 58 - A, B, C             | FLM       | 0               | Flooring - Grout to ceramic floor tile                                                  |
| 59 - A, B, C             | FLM       | 0               | Flooring - Mortar/thinset, to ceramic floor tile                                        |
| 60 - A, B, C             | BM        | 0               | Block - Concrete block, walls                                                           |
| 61 - A, B, C             | BM        | 0               | Block_Mortar - Cementitious, associated w/HA-60                                         |
| 62 - A, B, C             | CP        | 0               | Ceiling_Panel - 2'x 2' Suspended panels, vinyl-covered gypsum                           |
| 63 - A, B, C             | CB        | 0               | Cove_Base - 4" Vinyl cove base, dk. brown/black w/adhesive                              |
| 64 - A, B, C, D, E       | DI        | 0               | Plaster - 2-layer plaster system, smooth, mottle & associated mottle                    |

Method of Shipment:

Relinquished by:

Date/Time:

6-7-23 / 8:54

Sample Condition Upon Receipt:

Received by:

Date/Time

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Date/Time

397/917

3 of 4





EMSL ANALYTICAL, INC.  
TESTING LABS • PRODUCTS • TRAINING

# Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

#042313613

EMSL Analytical, Inc.  
200 Route 130 North  
Cinnaminson, NJ 08077

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Athletic Shelter

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

| Sample Number         | HA Number  | Sample Location | Material Description                                                                               |
|-----------------------|------------|-----------------|----------------------------------------------------------------------------------------------------|
| 65 - A, B, C          | WB         | 0               | Wallboard - Gypsum panels w/joint-compound at S. vestibules & central stairway                     |
| 66 - A, B, C          | MI         | 0               | Mechanical_Insulation - Unit ventilator insulation, fibrous-glass batt                             |
| 67 - A, B, C          | DS         | 0               | Duct_Sealant - Brown, dense, to metal HVAC duct seams                                              |
| 68 - A, B, C          | PI         | 0               | Pipe_Insulation - Fibrous-glass w/reinforced threaded paper-foil wrap                              |
| 69 - A, B, C          | DS         | 0               | Duct_Sealant - Olive green, dense, to metal HVAC duct seams                                        |
| 70 - A, B, C          | VB         | 0               | Vapor_Barrier - Brown corrugated cardboard w/black paper facing, to column wrap inside block walls |
| 71 - A, B, C          | WB         | 0               | Wallboard - Gypsum panels w/joint-compound, at upper level vestibules & central stairway (FS25-27) |
| 72 - A, B, C          | WB         | 0               | Wallboard - Gypsum panels w/joint-compound, to apparent enclosure                                  |
| 73 - A, B, C          | RI         | 0               | Rolled_In_Insulation - Fibrous-glass w/paper & black coating                                       |
| 74 - A, B, C          | PL         | 0               | Plaster - 2-layer plaster system, wall at upper level area                                         |
| 75 - A, B, C          | FLM        | 0               | Flooring - Green, rubber flooring                                                                  |
| 76 - A, B, C          | PL         | 0               | Plaster - Plaster-board system, plaster w/gypsum panel, ceiling & debris                           |
| 77 - A, B, C          | DI         | 0               | Duct_Insulation - Fibrous-glass w/reinforced threaded foil-paper wrap                              |
| 78 - A, B, C          | PI         | 0               | Pipe_Insulation - Black, foam-plastic sections to pipes                                            |
| 79 - A, B, C          | GM         | 0               | Gasket_Material - White, fibrous matt to gas burner connections at furnace equipment               |
| 80 - A, B, C          | CC         | 0               | Concrete - Pads to furnace/boiler equipment                                                        |
| 81 - A, B, C          | SC         | 0               | Stack_Cement - Off-white, crumbly, residual around flue connection at stack                        |
| 82 - A, B, C          | PL         | 0               | Plaster - Coarse, plaster ceiling section approx. above furnace                                    |
| 83 - A, B, C          | CC         | 0               | Concrete - Cementitious wall patch to brick walls, gray                                            |
| 84 - A, B, C          | SC         | 0               | Stack_Cement - Cementitious, to flue penetration, grey                                             |
| (assumed - no sample) | (material) | 0               | - Pipe flange gaskets                                                                              |
| (assumed - no sample) | (material) | 0               | - Pipe valve packing                                                                               |
| (assumed - no sample) | (material) | 0               | - Vibration dampener                                                                               |
| (assumed - no sample) | (material) | 0               | - Internal furnace insulation                                                                      |
| (assumed - no sample) | (material) | 0               | - Internal boiler insulation                                                                       |
| (assumed - no sample) | (material) | 0               | - Mechanical exhaust flue/stack system                                                             |
| (assumed - no sample) | (material) | 0               | - Generator insulation & gaskets                                                                   |
|                       | n          | n               |                                                                                                    |

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<http://www.EMSL.com>[beltsvillelab@emsl.com](mailto:beltsvillelab@emsl.com)

EMSL Order: 192304971

CustomerID: BLNL75

CustomerPO: 230022

ProjectID:

Attn: **Craig Willey**  
**Beam, Longest & Neff, LLC**  
**51151 W. Pontiac Trail**  
**Wixom, MI 48393**

Phone: (313) 408-4893  
Fax:  
Received: 6/8/2023 11:45 AM  
Collected: 6/6/2023

Project: **ATHLETIC SHELTER (LEAD)****Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)\***

| <i>Client Sample Description</i>                              | <i>Lab ID</i>  | <i>Collected</i> | <i>Analyzed</i> | <i>Weight</i> | <i>Lead Concentration</i> |
|---------------------------------------------------------------|----------------|------------------|-----------------|---------------|---------------------------|
| PC1                                                           | 192304971-0001 | 6/6/2023         | 6/9/2023        | 0.1536 g      | <0.013 % wt               |
| Site: BROWN ON METAL - ENTRY/EXIT STOREFRONT FRAMING DOORS    |                |                  |                 |               |                           |
| PC2                                                           | 192304971-0002 | 6/6/2023         | 6/9/2023        | 0.2517 g      | 8.6 % wt                  |
| Site: LT CREAM ON WOOD - VERANDA SUPPORTS                     |                |                  |                 |               |                           |
| PC3                                                           | 192304971-0003 | 6/6/2023         | 6/9/2023        | 0.2508 g      | 11 % wt                   |
| Site: LT CREAM ON WOOD - FASCIA BOARDS/TRIM                   |                |                  |                 |               |                           |
| PC4                                                           | 192304971-0004 | 6/6/2023         | 6/9/2023        | 0.2523 g      | 33 % wt                   |
| Site: BROWN ON METAL - WINDOW INTEL/I-BEAM                    |                |                  |                 |               |                           |
| PC5                                                           | 192304971-0005 | 6/6/2023         | 6/9/2023        | 0.2533 g      | 0.030 % wt                |
| Site: BLACK ON METAL - FENCE/GATE RAILING                     |                |                  |                 |               |                           |
| PC6                                                           | 192304971-0006 | 6/6/2023         | 6/9/2023        | 0.2527 g      | 0.088 % wt                |
| Site: LT SAGE GREEN ON CONCRETE - CONCRETE SIDING AT VERANDAS |                |                  |                 |               |                           |
| PC7                                                           | 192304971-0007 | 6/6/2023         | 6/9/2023        | 0.2519 g      | 11 % wt                   |
| Site: BROWN METAL - LOWER LEVEL WINDOW FRAMING                |                |                  |                 |               |                           |
| PC8                                                           | 192304971-0008 | 6/6/2023         | 6/9/2023        | 0.2527 g      | 5.1 % wt                  |
| Site: BROWN ON WOOD - UPPER LEVEL WINDOW FRAMING              |                |                  |                 |               |                           |
| PC9                                                           | 192304971-0009 | 6/6/2023         | 6/9/2023        | 0.2525 g      | 5.1 % wt                  |
| Site: LT CREAM ON WOOD - VERANDA CEILINGS/ROOF EAVES          |                |                  |                 |               |                           |
| PC10                                                          | 192304971-0010 | 6/6/2023         | 6/9/2023        | 0.2504 g      | 20 % wt                   |
| Site: WHITE ON WOOD - UPPER LEVEL WINDOWS                     |                |                  |                 |               |                           |
| PC11                                                          | 192304971-0011 | 6/6/2023         | 6/9/2023        | 0.2528 g      | 16 % wt                   |
| Site: WHITE ON WOOD - UPPER LEVEL CEILING/WOOD WALLS          |                |                  |                 |               |                           |
| PC12                                                          | 192304971-0012 | 6/6/2023         | 6/9/2023        | 0.2532 g      | 4.5 % wt                  |
| Site: WHITE ON CONCRETE - COARSE CONCRETE WALLS               |                |                  |                 |               |                           |
| PC13                                                          | 192304971-0013 | 6/6/2023         | 6/9/2023        | 0.2506 g      | 14 % wt                   |
| Site: WHITE ON METAL - UPPER LEVEL STRUCTURAL MEMBERS         |                |                  |                 |               |                           |
| PC14                                                          | 192304971-0014 | 6/6/2023         | 6/9/2023        | 0.2514 g      | 0.016 % wt                |
| Site: GRAY ON CONCRETE - UPPER LEVEL COATING TO FLOOR         |                |                  |                 |               |                           |

Joe Centifonti, Laboratory Manager  
or other approved signatory

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Project: **ATHLETIC SHELTER (LEAD)****Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)\***

| <i>Client Sample Description</i>                              | <i>Lab ID</i>  | <i>Collected</i> | <i>Analyzed</i> | <i>Weight</i> | <i>Lead Concentration</i> |
|---------------------------------------------------------------|----------------|------------------|-----------------|---------------|---------------------------|
| PC15                                                          | 192304971-0015 | 6/6/2023         | 6/9/2023        | 0.1792 g      | 0.12 % wt                 |
| Site: LT. YELLOW ON WALLBOARD-WALLS                           |                |                  |                 |               |                           |
| PC16                                                          | 192304971-0016 | 6/6/2023         | 6/9/2023        | 0.2540 g      | 0.73 % wt                 |
| Site: GRAY ON WOOD-WOOD FLOORS AT UPPER LEVEL                 |                |                  |                 |               |                           |
| PC17                                                          | 192304971-0017 | 6/6/2023         | 6/9/2023        | 0.2121 g      | <0.0094 % wt              |
| Site: LT. GRAY ON METAL-DOORS/FRAMING AT VERANDAS             |                |                  |                 |               |                           |
| PC18                                                          | 192304971-0018 | 6/6/2023         | 6/9/2023        | 0.2515 g      | 3.0 % wt                  |
| Site: LT. GREEN ON WOOD-TRANSOM ABOVE DOOR TO VERANDA         |                |                  |                 |               |                           |
| PC19                                                          | 192304971-0019 | 6/6/2023         | 6/9/2023        | 0.2505 g      | 6.7 % wt                  |
| Site: WHITE ON WOOD-WINDOWS AT UPPER VESTIBULES               |                |                  |                 |               |                           |
| PC20                                                          | 192304971-0020 | 6/6/2023         | 6/9/2023        | 0.2504 g      | 5.5 % wt                  |
| Site: WHITE ON WOOD-DOOR FRAMING AT UPPER LEVEL STAIRWAY      |                |                  |                 |               |                           |
| PC21                                                          | 192304971-0021 | 6/6/2023         | 6/9/2023        | 0.2525 g      | 7.9 % wt                  |
| Site: WHITE ON METAL-CENTRAL STAIRS COMPONENTS                |                |                  |                 |               |                           |
| PC22                                                          | 192304971-0022 | 6/6/2023         | 6/9/2023        | 0.2522 g      | 0.25 % wt                 |
| Site: WHITE ON PLASTER-PLASTER WALL AT UPPER CENTRAL STAIRS   |                |                  |                 |               |                           |
| PC23                                                          | 192304971-0023 | 6/6/2023         | 6/9/2023        | 0.2520 g      | 0.41 % wt                 |
| Site: WHITE ON WOOD-WOOD WALLS AT CENTRAL STAIRS              |                |                  |                 |               |                           |
| PC24                                                          | 192304971-0024 | 6/6/2023         | 6/9/2023        | 0.2502 g      | 0.011 % wt                |
| Site: GRAY ON CONCRETE-LOWER LEVEL, COATING TO CONCRETE FLOOR |                |                  |                 |               |                           |
| PC25                                                          | 192304971-0025 | 6/6/2023         | 6/9/2023        | 0.0905 g      | <0.022 % wt               |
| Site: RED ON METAL-HVAC DUCTS                                 |                |                  |                 |               |                           |
| PC26                                                          | 192304971-0026 | 6/6/2023         | 6/9/2023        | 0.2253 g      | 0.016 % wt                |
| Site: WHITE ON WALLBOARD-LOWER LEVEL VESTIBULES               |                |                  |                 |               |                           |
| PC27                                                          | 192304971-0027 | 6/6/2023         | 6/9/2023        | 0.2126 g      | 0.27 % wt                 |
| Site: YELLOW ON METAL-SUPPORTS COLUMNS                        |                |                  |                 |               |                           |

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Project: **ATHLETIC SHELTER (LEAD)****Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)\***

| <i>Client Sample Description</i>                                                  | <i>Lab ID</i>  | <i>Collected</i> | <i>Analyzed</i> | <i>Weight</i> | <i>Lead Concentration</i> |
|-----------------------------------------------------------------------------------|----------------|------------------|-----------------|---------------|---------------------------|
| PC28<br>Site: GREEN ON WOOD-SERVING COUNTER SUPPORT STRUCTURE                     | 192304971-0028 | 6/6/2023         | 6/9/2023        | 0.2350 g      | <0.0085 % wt              |
| PC29<br>Site: YELLOW ON WOOD-WOOD CEILING                                         | 192304971-0029 | 6/6/2023         | 6/9/2023        | 0.2513 g      | 0.080 % wt                |
| PC30<br>Site: GRAY ON CONCRETE-LOWER LEVEL, COATING (NO FLECKS) TO CONCRETE FLOOR | 192304971-0030 | 6/6/2023         | 6/12/2023       | 0.2509 g      | 0.0097 % wt               |
| PC31<br>Site: WHITE ON METAL-COLUMN SUPPORTS                                      | 192304971-0031 | 6/6/2023         | 6/12/2023       | 0.1888 g      | <0.011 % wt               |
| PC32<br>Site: LT. CREAM ON CONCRETE-BLOCK WALLS                                   | 192304971-0032 | 6/6/2023         | 6/12/2023       | 0.2506 g      | <0.0080 % wt              |
| PC33<br>Site: DK. ORANGE ON METAL-LOCKERS IN MEN'S LOCKER ROOM                    | 192304971-0033 | 6/6/2023         | 6/12/2023       | 0.0334 g      | <0.060 % wt               |
| PC34<br>Site: DK. YELLOW ON METAL-LOCKERS IN WOMEN LOCKER ROOM                    | 192304971-0034 | 6/6/2023         | 6/12/2023       | 0.0750 g      | <0.027 % wt               |
| PC35<br>Site: DK. RED ON METAL-STAIR RAILING                                      | 192304971-0035 | 6/6/2023         | 6/12/2023       | 0.1090 g      | <0.018 % wt               |
| PC36<br>Site: DK. RED ON METAL-PLUMBING CONTROL VALVES                            | 192304971-0036 | 6/6/2023         | 6/12/2023       | 0.0544 g      | <0.037 % wt               |
| PC37<br>Site: DK. ORANGE ON METAL-FURNACE HOUSING                                 | 192304971-0037 | 6/6/2023         | 6/12/2023       | 0.0509 g      | <0.039 % wt               |
| PC38<br>Site: LT. GRAY ON METAL-VARIOUS MECHANICAL/ELECTRICAL EQUIPMENT HOUSING   | 192304971-0038 | 6/6/2023         | 6/12/2023       | 0.2508 g      | 0.023 % wt                |
| PC39<br>Site: BLUE ON METAL-GAS BURNER EQUIPMENT                                  | 192304971-0039 | 6/6/2023         | 6/12/2023       | 0.1010 g      | <0.020 % wt               |
| PC40<br>Site: LT. GREEN ON BRICK-BRICK WALL                                       | 192304971-0040 | 6/6/2023         | 6/12/2023       | 0.2502 g      | 0.25 % wt                 |

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Project: **ATHLETIC SHELTER (LEAD)**

### Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)\*

| <i>Client Sample Description</i>                  | <i>Lab ID</i>  | <i>Collected</i> | <i>Analyzed</i> | <i>Weight</i> | <i>Lead Concentration</i> |
|---------------------------------------------------|----------------|------------------|-----------------|---------------|---------------------------|
| PC41                                              | 192304971-0041 | 6/6/2023         | 6/12/2023       | 0.2534 g      | 30 % wt                   |
| Site: BLACK ON WOOD-LOOSE DOORS STORED IN KITCHEN |                |                  |                 |               |                           |
| PC42                                              | 192304971-0042 | 6/6/2023         | 6/12/2023       | 0.2538 g      | 0.038 % wt                |
| Site: GRAY ON METAL-BENCH POSTS IN LOCKER ROOMS   |                |                  |                 |               |                           |

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## Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

EMSL Analytical, Inc.  
200 Route 130 North  
Cinnaminson, NJ 08077

EMSL ANALYTICAL, INC.  
TESTING LABS • PRODUCTS • TRAINING

PHONE (800) 220-3675  
EMAIL CinnAsblab@EMSL.com

192304971

|                                                            |                    |                                              |                       |                                            |                             |                                                                                                                                                             |          |     |
|------------------------------------------------------------|--------------------|----------------------------------------------|-----------------------|--------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|
| Customer Information                                       | Customer ID:       | BLNL75                                       |                       | Billing ID:                                | BLNL75                      |                                                                                                                                                             |          |     |
|                                                            | Company Name:      | BLN                                          |                       | Company Name:                              | Beam, Longest and Neff, LLC |                                                                                                                                                             |          |     |
|                                                            | Contact Name:      | Craig Willey                                 |                       | Billing Contact:                           | Ryan Jones                  |                                                                                                                                                             |          |     |
|                                                            | Street Address:    | 51151 W. Pontiac Trail                       |                       | Street Address:                            | 8320 Craig Street           |                                                                                                                                                             |          |     |
|                                                            | City, State, Zip:  | Wixom, MI 48393                              | Country:              | USA                                        | City, State, Zip:           | Indianapolis, IN 46250                                                                                                                                      | Country: | USA |
|                                                            | Phone:             | (248) 863-2934                               |                       | Phone:                                     | (248) 863-2762              |                                                                                                                                                             |          |     |
| Email(s) for Report:                                       | cswilley@b-l-n.com |                                              | Email(s) for Invoice: | rjones@b-l-n.com; cswilley@b-l-n.com       |                             |                                                                                                                                                             |          |     |
| Project Information                                        |                    |                                              |                       |                                            |                             |                                                                                                                                                             |          |     |
| Project Name/No:                                           |                    |                                              |                       | Athletic Shelter (Lead)                    |                             | Purchase Order:                                                                                                                                             | 230022   |     |
| EMSL LIMS Project ID.<br>(If applicable EMSL will provide) |                    |                                              |                       | US State where samples collected: MICHIGAN |                             | State of Connecticut (CT) must select project location:<br><input type="checkbox"/> Commercial (Taxable) <input type="checkbox"/> Residential (Non-Taxable) |          |     |
| Sampled By Name:<br>Tony Rich                              |                    | Sampled By Signature:<br><i>Anthony Rich</i> |                       | Date Sampled: 6/6/2023                     |                             | No. of Samples: 42                                                                                                                                          |          |     |

Turn-Around-Time (TAT)

☒ 72 Hours

Please call ahead for large projects and/or turnaround times 6 Hours or Less. \*32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

## Test Selection

## Matrix

☒ Flame Atomic Absorption (SW 846-70008)

Other Tests (please specify)

FedEx #

| Sample Number | HA Number | Sample Location | Material Description                                     |
|---------------|-----------|-----------------|----------------------------------------------------------|
| PC1           |           | EA1             | Brown on Metal - Entry/exit storefront framing doors     |
| PC2           |           | EA3             | Lt. Cream on Wood - Veranda supports                     |
| PC3           |           | EA3             | Lt. Cream on Wood - Fascia boards/trim                   |
| PC4           |           | EA4             | Brown on Metal - Window lintel/i-beam                    |
| PC5           |           | EA1             | Black on Metal - Fence/gate railing                      |
| PC6           |           | EA3             | Lt. Sage Green on Concrete - Concrete siding at verandas |
| PC7           |           | EA3             | Brown on Metal - Lower level window framing              |
| PC8           |           | EA1             | Brown on Wood - Upper level window framing               |

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

|                                      |                         |                                |            |
|--------------------------------------|-------------------------|--------------------------------|------------|
| Method of Shipment                   | Lab Location            | Sample Condition Upon Receipt: |            |
| Relinquished by: <i>Anthony Rich</i> | Date/Time: 6-7-23/12:00 | Received by:                   | Date/Time: |
| Relinquished by:                     | Date/Time:              | Received by:                   | Date/Time: |

'23 JUN 8 AM 11:45

*Michael REX*

1 OF 3

403/917





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Additional Pages of the Chain of Custody are only necessary if needed for additional sample

Athletic Shelter (Lead)

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

| Sample Number | HA Number | Sample Location | Material Description                                                  |
|---------------|-----------|-----------------|-----------------------------------------------------------------------|
| PC9           |           | EA3             | Lt. Cream on Wood - Veranda ceilings/roof eaves                       |
| PC10          |           | FS28            | White on Wood - Upper level windows                                   |
| PC11          |           | FS28            | White on Wood - Upper level ceiling/wood walls                        |
| PC12          |           | FS28            | White on Concrete - Coarse concrete walls                             |
| PC13          |           | FS28            | White on Metal - Upper level structural members                       |
| PC14          |           | FS28            | Grey on Concrete - Upper level coating to floor                       |
| PC15          |           | FS26            | Lt. Yellow on Wallboard - Walls                                       |
| PC16          |           | FS26            | Grey on Wood - Wood floors at upper level                             |
| PC17          |           | EA5             | Lt. Grey on Metal - Doors/framing at verandas                         |
| PC18          |           | FS27            | Lt. Green on Wood - Transom above door to veranda                     |
| PC19          |           | FS27            | White on Wood - Windows at upper vestibules                           |
| PC20          |           | FS25            | White on Wood - Door framing at upper level stairway                  |
| PC21          |           | FS25            | White on Metal - Central stairs components                            |
| PC22          |           | FS25            | White on Plaster - Plaster wall at upper central stairs               |
| PC23          |           | FS9             | White on Wood - Wood walls at central stairs                          |
| PC24          |           | FS2             | Grey on Concrete - Lower level, coating to concrete floor             |
| PC25          |           | FS2             | Red on Metal - HVAC ducts                                             |
| PC26          |           | FS10            | White on Wallboard - Lower level vestibule                            |
| PC27          |           | FS2             | Yellow on Metal - Support columns                                     |
| PC28          |           | FS2             | Green on Wood - Serving counter support structure                     |
| PC29          |           | FS3             | Yellow on Wood - Wood ceiling                                         |
| PC30          |           | FS2             | Grey on Concrete - Lower level, coating (no flecks) to concrete floor |
| PC31          |           | FS4             | White on Metal - Column supports                                      |
| PC32          |           | FS16            | Lt. Cream on Concrete - Block walls                                   |
| PC33          |           | FS16            | Dk. Orange on Metal - Lockers in men's locker-room                    |
| PC34          |           | FS17            | Dk. Yellow on Metal - Lockers in women's locker-room                  |
| PC35          |           | FS31            | Dk. Red on Metal - Stair railing                                      |
| PC36          |           | FS31            | Dk. Red on Metal - Plumbing control valve                             |

|                                     |                              |                                 |                    |
|-------------------------------------|------------------------------|---------------------------------|--------------------|
| Method of Shipment:                 |                              | Sample Condition Upon Receipt:  |                    |
| Relinquished by: <i>[Signature]</i> | Date/Time: 6-7-23 / 10:00 AM | Received by: <i>[Signature]</i> | Date/Time: 404/917 |
| Relinquished by:                    | Date/Time:                   | Received by:                    | Date/Time:         |

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PHONE: (800) 220-3875  
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**Athletic Shelter (Lead)**

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

|                                    |                         |                                |                    |
|------------------------------------|-------------------------|--------------------------------|--------------------|
| Method of Shipment:                |                         | Sample Condition Upon Receipt: |                    |
| Requisitioned by: <i>Delany, D</i> | Date/Time: 6-7-23 10:44 | Received by:                   | Date/Time: 405/917 |
| Requisitioned by:                  | Date/Time:              | Received by:                   | Date/Time:         |

## **ATTACHMENT 2 – EXHIBIT**



— ASSUMED ACM, STACK/CHIMNEY SYSTEM

ASSUMED ACM, PIPE  
FLANGE, GASKETS &  
PIPE VALVE PACKINGS.

39ABC

FS31

FS

FS20

FS21

EA2

FS2

100

FS5

FS6

FS16

FS17

FS19

- FS24

FS23

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FS9  
[UNDER  
[AIRCASE)

FS12

FS10

1 (STAIRS)

"VERIZON"

FS22

INACCESSIBLE

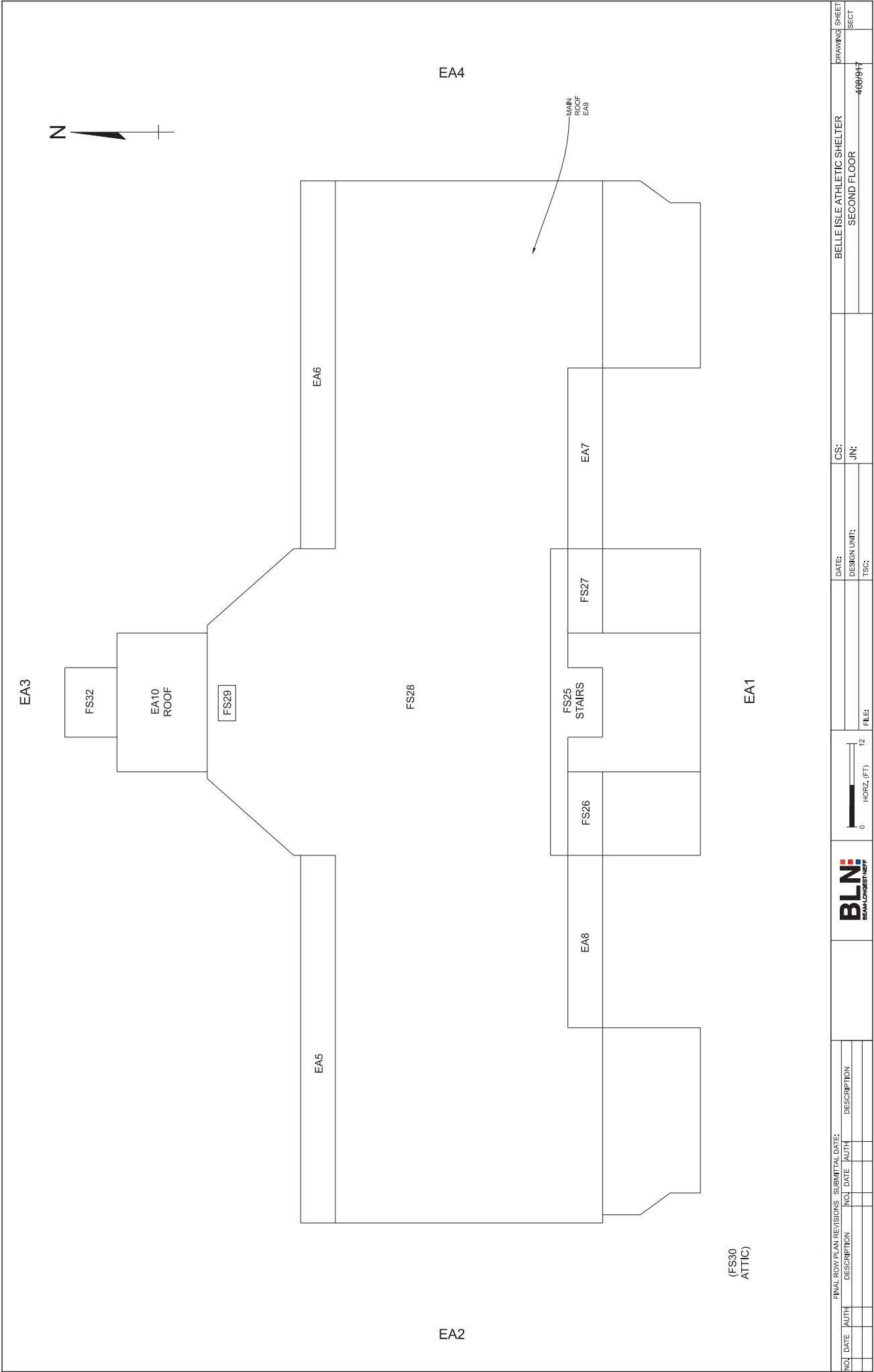
EA4

—27ABC

EA1

ASSUMED ACM, ROOF FLASHING SYSTEM  
ASSUMED ACM, FIRE-RATED DOORS

|                          |      |      |             |                |      |      |             |       |  |     |                             |               |     |             |      |
|--------------------------|------|------|-------------|----------------|------|------|-------------|-------|--|-----|-----------------------------|---------------|-----|-------------|------|
| FINAL ROW PLAN REVISIONS |      |      |             | SUBMITAL DATE: |      |      |             |       |  | CS: | BELLE ISLE ATHLETIC SHELTER | DRAWING SHEET |     |             |      |
| NO.                      | DATE | AUTH | DESCRIPTION | NO.            | DATE | AUTH | DESCRIPTION |       |  |     |                             |               | JN: | FIRST FLOOR | SECT |
|                          |      |      |             |                |      |      |             |       |  |     |                             |               |     |             |      |
|                          |      |      |             |                |      |      |             |       |  |     |                             |               |     |             |      |
|                          |      |      |             |                |      |      |             |       |  |     |                             |               |     |             |      |
|                          |      |      |             |                |      |      |             | FILE: |  |     |                             |               |     |             |      |



## **ATTACHMENT 3 – PHOTOGRAPHIC LOG**



**Photo 1:** View of the Athletic Shelter facing south.



**Photo 2:** View of assumed ACM roof flashing system.



**Photo 3:** View of assumed ACM pipe flange gaskets.



**Photo 4:** View of assumed ACM pipe valve packings.





**Photo 5:** View of assumed ACM chimney/stack system.



**Photo 6:** View of assumed ACM suspect material inside inaccessible electrical vault.



**Photo 7:** View of assumed ACM suspect material inside inaccessible Verizon space.



**Photo 8:** View of ACM exterior caulk - grey/beige, residual on Brick at NE window area. (27ABC).





**Photo 9:** View of ACM roofing material - residual black mastic on brick around flashing (near boiler room). (39ABC).



**Photo 10:** View of light cream paint on wood veranda supports.



**Photo 11:** View of light cream paint on wood fascia boards/trim.



**Photo 12:** View of brown paint on metal - window lintel/l-beam.





**Photo 13:** View of black paint on metal fence/gate.



**Photo 14:** View of light sage green paint on concrete.



**Photo 15:** View of brown paint on metal - lower level window framing.



**Photo 16:** View of brown paint on wood - upper level window framing.



**Photo 17:** View of cream paint on wood, veranda ceiling, and roof eaves.



**Photo 18:** View of white paint on wood - upper level windows.



**Photo 18:** View of white paint on wood - upper leveling ceiling and wood walls.



**Photo 19:** View of white paint on concrete.





**Photo 20:** View of white paint on metal – upper level structural members.



**Photo 21:** View of gray paint on concrete - upper level coating to floor.



**Photo 22:** View of light yellow paint on wallboard walls.



**Photo 23:** View of gray paint on wood - wood floors at upper level.

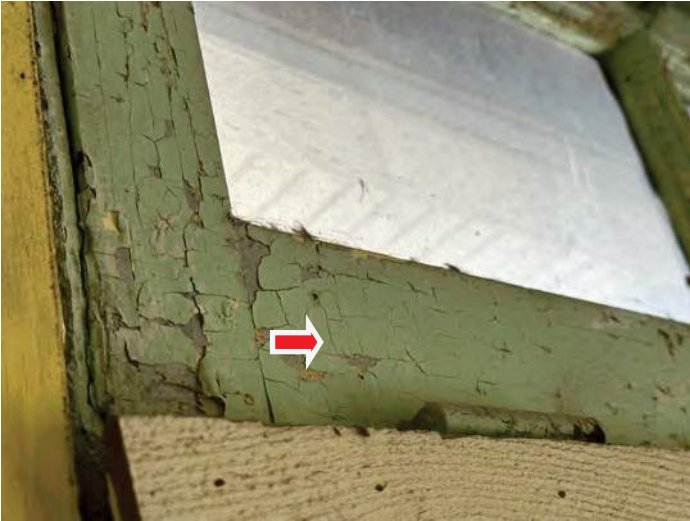


**Photo 24:** View of light green paint on wood - transom above door to veranda.



**Photo 25:** View of white paint on wood - windows at upper vestibules.



**Photo 26:** View of white paint on wood-door framing at upper level.



**Photo 27:** View of white paint on metal-central stair components.





**Photo 28:** View of white paint on wood—wood walls at ventral stairs.



**Photo 29:** View of grey paint on concrete-lower level, coating to concrete floor.



**Photo 30:** View of white paint on wallboard—lower level vestibules.



**Photo 31:** View of yellow paint on metal-support columns.



**Photo 32:** View of grey paint on metal-various mechanical/ electrical equipment housing.



**Photo 33:** View of light green paint on brick wall.



**Photo 34:** View of black paint on wooden loose doors stored in kitchen.





**Photo 1:** View of the Athletic Shelter facing south.



**Photo 2:** View of assumed ACM roof flashing system.



**Photo 3:** View of assumed ACM pipe flange gaskets.



**Photo 4:** View of assumed ACM pipe valve packings.