FORBES ASSOCIATES ARCHITECTS 816 East 4th Street, Royal Oak, MI 48067 ● www.ghfaa.com ● 248.542.7866

Belle Isle Athletic Shelter
HVAC and Fire Protection Improvements

751/24078.SMD
G.H. Forbes Associates Architects
Addendum 002
9.12.2025

Questions and Answers:

1. Is Control Solutions, Inc. an approved control system installer per spec 230933 2.1.A?

Response: Yes, Control Solutions, Inc. is an approved control system installer.

2. Commissioning is referenced in the Mechanical section (20 05 00--part 3.7) of the specifications. However, there is no commissioning specifications showing the scope of work for commissioning. What equipment/systems will be commissioned as part of the project?

Response: Section 3.7 has been deleted from Mechanical Specification 20 05 00. This was included in case the commissioning requirements of the updated Michigan Energy Code applied (ASHRAE 90.1 2019 Section 4.2.5.2). The building is under 10,000 sqft of conditioned space and thus exempt per exception 1.

3. Can demolition of the locker rooms and hallway ceiling be quoted as a complete demo instead of cutting and patching the existing.

Response: Yes, replacing the locker and hallway ceiling suspended plaster entirely with a new painted gypsum board ceiling is acceptable. The wood ceiling is assumed to be original and the preference is to keep existing material where possible and patch with new to match.

4. On drawing AD-103 under note 4 it states to remove combustible wood supports. Can you confirm they will need to be removed? They did not appear visible during the walkthrough.

Response: "Combustible wood supports" was removed from the note. This only applied to above the furnace room where a wood panel on the stairs is visible and was addressed in addendum 1 by note 6 on page AD-102.

5. Can you please provide the size, weight, mounting configurations of the light fixtures to ensure proper back box and supports are quoted.

Response: 18" diameter x 13.38" height, weight is 2.42 lbs, mount type is flushmount, see snip of fixture below.

6. Open Recreational Space – Electrical Switches currently shows 2 single pole switches. Should it be a S3 (3ways)?

Response: PBA was unable to verify during design as light switches did not operate. Yes, they should be existing 3-way switches but if not, new ones will need to be provided.

7. Do you want a dimmer in the recreation space there is not currently one shown. Being that there are 15 300w equivalent LED fixtures going in it will be very bright in the space. The occupancy sensor will not control light level only on/off.

Response: Dimming is not required in the space.

8. The drawings only indicate a wet pipe sprinkler system for the first and second floor. Is the Attic constructed with combustible materials and will mechanical equipment be in the

Attic. If the Attic is constructed with combustible materials it needs to be protected as well and if it is not heated, we would need to install a dry system. Can you clarify whether we are quoting additional sprinklers in the Attic space?

Response: There is no mechanical equipment in the attic. No sprinklers are to be installed for the attic.

9. What Fire Alarm company will the owner want to use for material, and programming/startup?

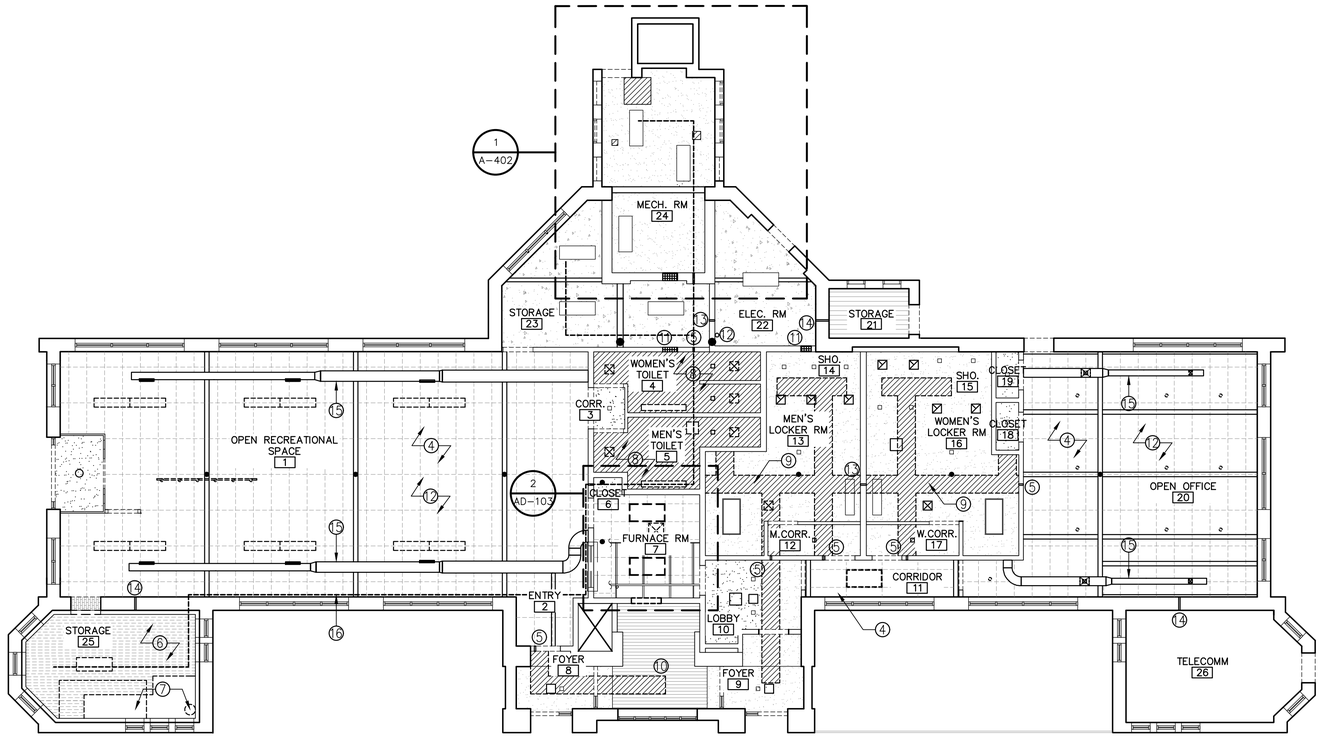
Response: DNR has no preference for material, programming, or startup but they must meet the requirements of Specification Section 28 31 00.

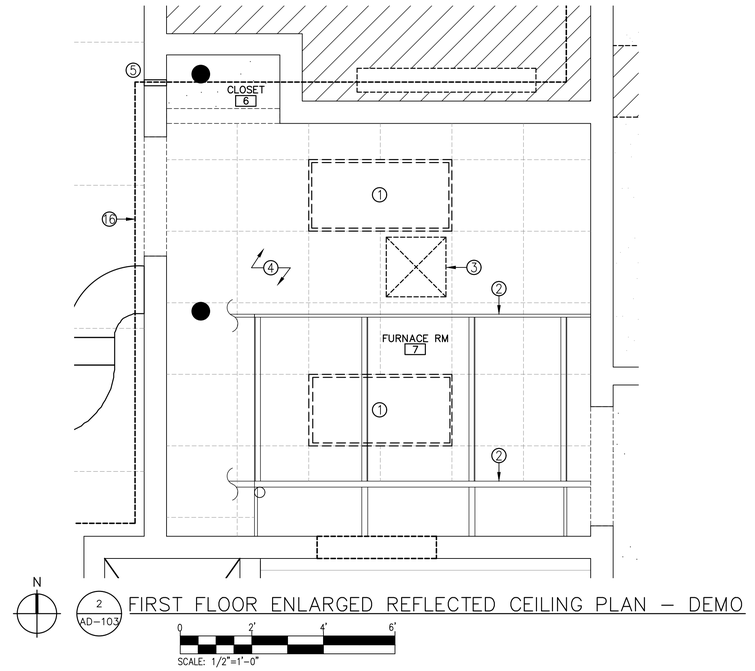
Clarifications:

1. M-001:
    a. Updated to include Sheet M-704.

2. M-704:
    a. New sheet with ventilation and air balance calculations to address a LARA review comment.

END





GENERAL NOTES:

1. HAZARDOUS MATERIALS ARE KNOWN TO BE PRESENT WITHIN THE PROJECT AREA. REFER TO HAZARDOUS MATERIALS REPORT INCLUDED IN APPENDIX A.
2. THERE IS EXISTING LEAD PAINT THROUGHOUT THE BUILDING. REFER TO SPECIFICATION 02 83 00. CONTRACTORS PERFORMING REPLACEMENT ACTIVITIES THAT WILL DISTURB LEAD BASED PAINT OR LEAD CONTAINING PAINT ARE REQUIRED TO COMPLY WITH MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION LEAD IN CONSTRUCTION STANDARD (PART 602). SURFACES SHALL BE CLEANED OF LEAD DEBRIS AFTER CORING, CUTTING, AND DEMOLITION ACTIVITIES. ADDITIONALLY, TOXIC CHARACTERISTIC LEACHING PROCEDURE (TCLP) SAMPLING FOR LEAD SHOULD BE PERFORMED ON CONSTRUCTION WASTE TO DETERMINE PROPER DISPOSAL.
3. CONTRACTOR TO REUSE EXISTING PIPE/DUCT OPENINGS WHERE AVAILABLE TO AVOID NEW WALL PENETRATIONS.

LEGEND:

- DOOR HEADER TO REMAIN
- WALL AND GLAZING TO REMAIN
- CEILING HATCH TO REMAIN
- HVAC GRILLE TO REMAIN
- LIGHT TO REMAIN
- COLUMN AND BEAM TO REMAIN
- REMOVE CEILING GRID AND TILE
- EXPOSED DUCT TO REMAIN
- REMOVE LIGHT
- WOOD PLANK CEILING TO REMAIN
- REMOVE WOOD PLANK CEILING
- PLASTER CEILING TO REMAIN
- REMOVE CEILING
- REMOVE HVAC GRILLE
- EXISTING COLUMN TO REMAIN

KEY NOTES:

1. ① REMOVE EXISTING FIXTURES.
2. ② EXISTING STAIR FRAMING TO REMAIN.
3. ③ REMOVE DIFFUSER.
4. ④ REMOVE CEILING TILE, GRID AND LIGHTING FIXTURES. FLUORESCENT LIGHT UNIT BALLASTS SHALL BE INSPECTED TO DETERMINE IF THEY CONTAIN PCB. IT SHALL BE ASSUMED TO CONTAIN PCB IF "NO PCB" IS NOT INDICATED ON THE LABEL. LIGHTS TO BE PROPERLY DISPOSED OF PER SPECIFICATION 02 80 00.
5. ⑤ CORE 6" CMU WALL FOR NEW SPRINKLER PIPE– REFER TO FIRE PROTECTION PLAN.
6. ⑥ REMOVE WOOD PLANK CEILING.
7. ⑦ REMOVE ABANDONED KITCHEN HOOD AND REMOVE AND PROPERLY DISPOSE OF FIRE SUPPRESSION SYSTEM PER SPECIFICATION 02 80 00.
8. ⑧ REMOVE PLASTER CEILING COMPLETE FOR NEW DUCTS AND SPRINKLER PIPING. REMOVE AND SALVAGE LIGHTS AND GRILLES FOR REINSTALLATION OR SUPPORT IN PLACE.
9. ⑨ CUT PLASTER CEILING FOR SPRINKLER PIPE INSTALLATION – REFER TO FIRE PROTECTION DRAWING. CONTRACTOR TO DETERMINE EXTENT OF DEMO NEEDED.
10. ⑩ CUT AND PATCH WOOD CEILING AS REQUIRED FOR NEW WORK.
11. ⑪ CORE 8" MASONRY WALL FOR NEW DUCT PENETRATIONS. PROVIDE GALVANIZED LINTEL. REFER TO SPECIFICATION 05 50 00.
12. ⑫ REMOVE AND PROPERLY DISPOSE OF SMOKE DETECTORS PER SPECIFICATION 02 80 00.
13. ⑬ CORE 8" CMU WALL FOR NEW SPRINKLER PIPE– REFER TO FIRE PROTECTION PLAN.
14. ⑭ CORE 18" BRICK WALL FOR NEW SPRINKLER PIPE– REFER TO FIRE PROTECTION PLAN.
15. ⑮ PREPARE RED EXPOSED DUCTS FOR NEW PAINT.
16. ⑯ REMOVE SPRINKLER PIPE COMPLETE.

1 ADDENDUM 2 09.12.2025

STATE OF MICHIGAN
DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
STATE FACILITIES ADMINISTRATION
DESIGN AND CONSTRUCTION DIVISION
ADAM P. LACH, RA, DIRECTOR

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PROJECT: BELLE ISLE ATHLETIC SHELTER HVAC REPLACEMENT AND FIRE PROTECTION IMPROVEMENTS

DESIGNED: DRAWN JRR; CHECKED TDS; APPROVED TDS

DATE: 08.07.2025

ISSUED FOR: CONSTRUCTION DOCUMENTS_REV; ADDENDUM 2

IDENTIFICATION NUMBER: FILE# 751/24078.SMD; A/E# 1411-14

SHEET NUMBER: 5 OF 42

DRAWING TITLE: FIRST FLOOR REFLECTED CEILING PLAN – DEMO

DRAWING NUMBER: AD-103

MECHANICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	COMPRESSED AIR
A(___#)	COMPRESSED AIR (SPECIFIC PSIG)
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AD	AREA DRAIN
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AMP	AMPERE
APD	AIR PRESSURE DROP
AR	ARGON
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS
ASR	AUTOMATIC SPRINKLER RISER
ATD	AIR TRANSFER DUCT
AUX	AUXILIARY
AV	ACID VENT
AVTR	ACID VENT THROUGH ROOF
AW	ACID WASTE
BAS	BUILDING AUTOMATION SYSTEM
BCU	BLOWER COIL UNIT
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BVC	BEVERAGE CONDUIT
BWV	BACKWATER VALVE
C	COMMON
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CB	CATCH BASIN
CC	COOLING COIL
CD	COLD DECK
CD	CONDENSATE DRAIN
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHW	CHILLED WATER
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	COOLING
CNDS	CONDENSATE
CNDS (___#)	CONDENSATE (SPECIFIC PSIG)
CO	CLEAN OUT
CO2	CARBON DIOXIDE
CONT	CONTINUATION OR CONTINUED
CONTR	CONTRACTOR
CONV	CONVECTOR
COP	COEFFICIENT OF PERFORMANCE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CSS	CLINICAL SERVICE SINK
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CW	DOMESTIC COLD WATER
CWF	DOMESTIC COLD WATER - FILTERED
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D&T	DRIP AND TRAP
DA	DISCHARGE AIR
DAT	DISCHARGE AIR TEMPERATURE
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DFU	DRAINAGE FIXTURE UNITS
DIA	DIAMETER
DMPR	DAMPER
D/N	DAY/NIGHT
DN	DOWN
DNZ	DOWNSPOUT NOZZLE
DS	DUCT SILENCER
DT	DRAIN TILE
DTC	DRAIN TILE CONNECTION
DWH	DOMESTIC WATER HEATER
DWG	DRAWING
(E)	EXISTING
E	EXHAUST GRILLE OR REGISTER
EA	EACH
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EXPANSION COMPENSATOR
ECUH	ELECTRIC CABINET UNIT HEATER
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EES	EMERGENCY EYE WASH / SHOWER
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
ERL	ENERGY RECOVERY LOOP
ERLR	ENERGY RECOVERY LOOP RETURN
ERLS	ENERGY RECOVERY LOOP SUPPLY
ERU	ENERGY RECOVERY UNIT
ESH	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FIRE PROTECTION
°F	DEGREES FAHRENHEIT
F&B	FACE AND BYPASS
F&T	FLOAT AND THERMOSTATIC
FA	FACE AREA
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FTD	FUNNEL FLOOR DRAIN
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASURING STATION
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FP	FIRE PUMP
FPTU	FAN POWERED (AIR) TERMINAL UNIT
FS	FLOOR SINK
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FT	FEET
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	NATURAL GAS
GA	GAUGE
GAL	GALLON
GRH	GRAVITY RELIEF HOOD
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GSAN	GREASE SANITARY WASTE
H	HYDROGEN
HB	HOSE BIBB
HC	HEATING COIL
HD	HOT DECK
HEPA	HIGH EFFICIENCY PARTICULATE ARRESTANCE
HL	HIGH LIMIT
HOA	HAND/OFF/AUTO
HP	HEAT PUMP
HP	HORSEPOWER
HPCW	HIGH PRESSURE DOMESTIC COLD WATER
HPHW	HIGH PRESSURE DOMESTIC HOT WATER
HPHWR	HIGH PRESSURE DOMESTIC HOT WATER RETURN
HPL	HEAT PUMP LOOP
HPLR	HEAT PUMP LOOP RETURN
HPLS	HEAT PUMP LOOP SUPPLY
HR	HOUR
HTG	HEATING
HV	CHILLER
HVAC	HEATING, VENTILATING, AIR CONDITIONING
HWH	HOT WATER HEATING
HWHR	HOT WATER HEATING RETURN
HWHS	HOT WATER HEATING SUPPLY
HW	DOMESTIC HOT WATER
HW(___)	DOMESTIC HOT WATER (SPECIFIC TEMP °F)
HWR	DOMESTIC HOT WATER RETURN
HX	HEAT EXCHANGER
HZ	HERTZ
IAQ	INDOOR AIR QUALITY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCHES
IR	INFRARED HEATER
IW	INDIRECT WASTE
JC	JANITOR'S CLOSET
JP	JOCKEY PUMP
KA	THOUSAND AMP
KW	KILOWATT
KWH	KILOWATT-HOUR
LAT	LEAVING AIR TEMPERATURE
LAB	LABORATORY
LAV	LAVATORY
LBS	POUNDS
LDB	LEAVING DRY BULB
LL	LOW LIMIT
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MEDICAL COMPRESSED AIR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MH	MANHOLE
MIL	1/1000th INCH
MIN	MINIMUM
MISC	MISCELLANEOUS
MMBH	MILLION BRITISH THERMAL UNITS PER HOUR
MOP	MAXIMUM OVERCURRENT PROTECTION
M/S	MOTOR STARTER
MTD	MOUNTED
MTR	MOTOR
MV	MANUAL AIR VENT
MVAC	MEDICAL VACUUM
N	NITROGEN
N2O	NITROUS OXIDE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NCTC	NORMALLY CLOSED TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NOTC	NORMALLY OPEN TIMED CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPCW	NON POTABLE COLD WATER
O	OXYGEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OB	OUTLET BOX
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER/CENTER TO CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD
ORC	OVERFLOW RAIN CONDUCTOR
ORD	OVERFLOW ROOF DRAIN
OS&Y	OUTSIDE SCREW AND YOKE
OV	OUTLET VELOCITY
OWS	OPERATOR WORKSTATION
PACU	PACKAGED AIR CONDITIONING UNIT
PBD	PARALLEL BLADE DAMPER
PC	PUMPED CONDENSATE
PCW	PROCESS COOLING WATER
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PD	PRESSURE DROP (FEET OF WATER)
PH	PERIMETER HEAT
PHR	PERIMETER HEAT RETURN
PHS	PERIMETER HEAT SUPPLY
PNL	PANEL
PPM	PARTS PER MILLION
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSAN	PUMPED SANITARY
PST	PUMPED STORM
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAUGE
PW	PURIFIED WATER
PWR	PURIFIED WATER RETURN
PWS	PURIFIED WATER SUPPLY
R	RETURN GRILLE OR REGISTER
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RC	RAIN CONDUCTOR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REQD	REQUIRED
REF	ROOF EXHAUST FAN
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RLFA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
RPDA	REDUCED PRESSURE BACKFLOW PREVENTION DETECTION ASSY
RPZA	REDUCED PRESSURE BACKFLOW PREVENTION ZONE ASSY
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
S	SUPPLY AIR DIFFUSER OR GRILLE
SA	SOUND ATTENUATOR
SA	SUPPLY AIR
SAN	SANITARY WASTE
SAT	SUPPLY AIR TEMPERATURE
SECT	SECTION
SCCR	SHORT CIRCUIT CURRENT RATING
SF	SUPPLY FAN
SH	SHOWER
SK	SINK
SMR	SNOW MELT RETURN
SMS	SNOW MELT SUPPLY
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SQFT	SQUARE FOOT/SQUARE FEET
S/S	START/STOP
SS	SERVICE SINK
ST	STORM
STD	STANDARD
STK	STACK
STM	STEAM
STM(___#)	STEAM (SPECIFIC PSIG)
S/W	SUMMER/WINTER
SW	SWITCH
T	TRANSFER GRILLE
TC	TEMPERATURE CONTROL
TC	TEMPERING COIL
TCP	TEMPERATURE CONTROL PANEL
TD	TRENCH DRAIN
TEMP	TEMPERATURE
TEMP	TEMPORARY
TH	TERMINAL HEATING
THA	TOTAL HEAT ABSORBED
THR	TERMINAL HEATING RETURN
THR	TOTAL HEAT REJECTED
THS	TERMINAL HEATING SUPPLY
TK	TANK
TMR	TIMER SWITCH
TPD	TEPID WATER
TSP	TOTAL STATIC PRESSURE
TU	(AIR) TERMINAL UNIT
TV	TURNING VANES
TW	TEMPERED WATER
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UON	UNLESS OTHERWISE NOTED
UR	URINAL
UV	UNIT VENTILATOR
V	VALVE
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER (MANUALLY ADJUSTABLE)
VOL	VOLUME
VFC	VARIABLE FREQUENCY CONTROLLER
VTR	VENT THROUGH ROOF
VTU	VENTURI TERMINAL UNIT
VUV	VERTICAL UNIT VENTILATOR
W	WASTE
W&V	WASTE AND VENT
WAGD	WASTE ANESTHETIC GAS DISPOSAL
WB	WET BULB
WC	WATER CLOSET
WC	WATER COLUMN
WG	WATER GAUGE
WH	WALL HYDRANT
WMSD	WASHING MACHINE SUPPLY AND DRAIN BOX
WPD	WATER PRESSURE DROP
WT	WEIGHT
XFMR	TRANSFORMER
ZVB	ZONE VALVE BOX

TEMPERATURE CONTROL - PARTIAL SYMBOLS LIST

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CO2	CARBON DIOXIDE SENSOR	OS	OCCUPANCY SENSOR
CO	CARBON MONOXIDE SENSOR	PT	PRESSURE TRANSMITTER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	SP	STATIC PRESSURE SENSOR OR PROBE
FM	FLOW METER		VALVE - 2 WAY CONTROL VALVE
	GUARD FOR STAT OR SENSOR		VALVE - 3 WAY CONTROL VALVE
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)	T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)

NOTE: LIST OF ADDITIONAL SYMBOLS & ABBREVIATIONS ASSOCIATED WITH TEMPERATURE CONTROLS ARE IDENTIFIED ON TC DRAWINGS.

MECHANICAL SYMBOL LIST

PIPING SYMBOLS

SYMBOL	DESCRIPTION
AAV	AIR VENT - AUTOMATIC
MV	AIR VENT - MANUAL
BFP	BACKFLOW PREVENTER
	CATCH BASIN
	CIRCULATING PUMP
CO	CLEAN OUT - IN FLOOR
CO	CLEAN OUT - FLANGE
	DIRECTION OF FLOW
	DIRECTION OF PITCH - DOWN
	FINNED TUBE RADIATION
	FIRE PROTECTION - SIAMESE CONNECTION - FREE STANDING
	FIRE PROTECTION - SIAMESE CONNECTION - WALL MOUNTED
	FIRE PROTECTION - SPRINKLER HEAD, CONCEALED
	FIRE PROTECTION - SPRINKLER HEAD, PENDANT
	FIRE PROTECTION - SPRINKLER HEAD, UPRIGHT
	FIRE PROTECTION - SPRINKLER HEAD, SIDEWALL
	FLOOR DRAIN
	FLOOR DRAIN - ELEVATION
	FLOOR DRAIN - FUNNEL
	FLOOR DRAIN - FUNNEL, ELEVATION
	FLOW MEASURING DEVICE (FOR TEST AND BALANCING)
FS	FLOW SWITCH
FM	FLOW METER
HB	HOSE BIBB
MH	MANHOLE
	OPEN SITE DRAIN
	PIPE - ANCHOR
	PIPE - CAP OR PLUG
	PIPE - ELBOW DOWN
	PIPE - ELBOW UP
	PIPE - EXPANSION JOINT OR COMPENSATOR
	PIPE - FLANGE
	PIPE - HOSE AND BRAID FLEXIBLE CONNECTION
	PIPE - RUBBER FLEXIBLE CONNECTION
	PIPE - GUIDE
	PIPE - TEE DOWN
	PIPE - TEE UP
	PIPE - UNION
P/T	PRESSURE AND TEMPERATURE TEST PLUG
	PRESSURE GAUGE AND COCK
	REDUCER - CONCENTRIC
	REDUCER - ECCENTRIC
	ROOF/OVERFLOW DRAIN
	STEAM TRAP - FLOAT AND THERMOSTATIC
	STEAM TRAP - BUCKET
	STRAINER
	STRAINER WITH VALVE AND BLOW-OFF
	THERMOMETER
	TRAP
	VALVE - ANGLE
	VALVE - BALL
	VALVE - BUTTERFLY
0.5	VALVE - BALANCE (i.e. BALANCE VALVE TO 0.5 GPM)
0.5	VALVE - COMBINATION BALANCE & FLOW MEASURING (i.e. BALANCE VALVE TO 0.5 GPM)
	VALVE - CHECK
	VALVE - SPRING CHECK
	VALVE - GAS (MANUAL)
	VALVE - GLOBE
	VALVE - ISOLATION
	VALVE - NEEDLE
	VALVE - OS&Y
	VALVE - PLUG
	VALVE - PRESSURE REGULATING
	VALVE - PRESSURE REDUCING
	VALVE - PRESSURE RELIEF
	VALVE - PRESSURE & TEMPERATURE RELIEF
VTR	VENT THROUGH ROOF
WH	WALL HYDRANT
WM	WATER METER
GM	GAS METER

DOUBLE LINE PIPING SYMBOLS

SYMBOL	DESCRIPTION
	FLANGE
	FLEX CONNECTION
	STRAINER - BASKET
	STRAINER - Y TYPE
	VALVE - 2 WAY CONTROL
	VALVE - 3 WAY CONTROL
	VALVE - BUTTERFLY
	VALVE - CHECK
	VALVE - DETECTOR CHECK
	VALVE - OS&Y HORIZONTAL STEM
	VALVE - OS&Y VERTICAL STEM

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
TU-101	AIR TERMINAL UNIT
TU-101	AIR TERMINAL UNIT WITH HEATING COIL
VTU-101	VENTURI AIR TERMINAL UNIT
VTU-101	VENTURI AIR TERMINAL UNIT WITH HEATING COIL
	DAMPER - HORIZONTAL FIRE (EXISTING, NEW)
	DAMPER - HORIZONTAL FIRE / SMOKE (EXISTING, NEW)
	DAMPER - SMOKE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE / SMOKE (EXISTING, NEW)
BDD	DAMPER - BACK DRAFT
M	DAMPER - MOTORIZED
	DAMPER - VOLUME (MANUALLY ADJUSTABLE)
	DIFFUSER - BLANK OFF
	DIFFUSER - LINEAR SLOT
	DIFFUSER - SQUARE OR RECTANGULAR
	DUCT CROSS SECTION - SUPPLY
	DUCT CROSS SECTION - RETURN
	DUCT CROSS SECTION - EXHAUST
	DUCT - FLEXIBLE CONNECTION
	DUCT - FLEXIBLE DUCT
	DUCT TAKE-OFF - ROUND CONICAL
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR/ ROUND SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	INTAKE OR RELIEF HOOD
	REGISTER - RETURN OR EXHAUST
	REGISTER - RETURN WITH BOOT
	REGISTER - TRANSFER GRILLE
	ROOF EXHAUST FAN
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC
	UNIT HEATER - HORIZONTAL THROW
	UNIT HEATER - VERTICAL THROW

DOUBLE LINE DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	DUCT TAKE-OFF - ROUND CONICAL
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR SHORT RADIUS WITH SPLITTER VANES
	ELBOW - ROUND
	ELBOW - RECTANGULAR SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC

MECHANICAL DRAWING INDEX

	SHEET NO.	SHEET TITLE
	M-001	MECHANICAL STANDARDS AND DRAWING INDEX
	MD-401	FIRST FLOOR MECHANICAL - DEMOLITION
	M-401	FIRST FLOOR MECHANICAL - NEW WORK
	M-402	SECOND FLOOR MECHANICAL - NEW WORK
	M-501	ENLARGED MECHANICAL PLANS
	M-601	MECHANICAL DETAILS
	M-701	MECHANICAL SCHEDULES
	M-702	MECHANICAL SCHEDULES
	M-703	MECHANICAL SCHEDULES
2	M-704	MECHANICAL SCHEDULES
	M-801	TEMPERATURE CONTROL STANDARDS AND GENERAL NOTES
	M-802	TEMPERATURE CONTROLS

STANDARD METHODS OF NOTATION

S-1 10# 350-4	SUPPLY DIFFUSER WITH SCHEDULE TAG "1". 10" DIAMETER NECK SIZE 350 CFM TYPICAL FOR 4
R-1 22x22 640-2	RETURN REGISTER WITH SCHEDULE TAG "1", 22"x 22" NECK SIZE 640 CFM TYPICAL FOR 2 EXHAUST REGISTER E DESIGNATION SIMILAR.
TU-101	AIR TERMINAL UNIT WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN
VTU-101	VENTURI AIR TERMINAL WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN
(2)WC-1 FD-1	PLUMBING FIXTURE UNIT IDENTIFICATION TAG WATER CLOSET TYPE "1" TYPICAL FOR 2
8	PIPE DIAMETER NOTATION ALL SIZES IN INCHES
8Ø 22x10 / 18x14Ø	DUCT SIZE NOTATION ALL SIZES IN INCHES
	OVAL DUCT RECTANGULAR DUCT
1	CONSTRUCTION KEY NOTE (NUMBER) OR DEMOLITION KEY NOTE (LETTER)
EF-1	EQUIPMENT DESIGNATION, (i.e. EXHAUST FAN NUMBER 1)
HW-1	PIPING RISER DESIGNATION (i.e. HOT WATER RISER NUMBER 1)
	NEW SYSTEM COMPONENT EXISTING SYSTEM COMPONENT TO REMAIN POINT OF NEW CONNECTION SYMBOL
1 / M5.1	SECTION OR PLAN NUMBER SHEET WHERE SECTION IS DRAWN
	AREA OF ENLARGEMENT
1 / M5.1	PLAN NUMBER SHEET WHERE ENLARGED PLAN IS DRAWN
1 / M5.1	SECTION OR PLAN NUMBER SHEET WHERE SECTION IS CUT OR ENLARGED PLAN IS REFERENCED
SHEET M1.0 SHEET M1.1	MATCH LINE
	HEAVY LINE WEIGHT INDICATES NEW WORK
	LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT OR REFERENCED INFORMATION
	GRAY LINE INDICATES BACKGROUND INFORMATION
	DASHED LINES INDICATE PIPING ROUTED BELOW SLAB OR GRADE
	HATCH MARKS INDICATE EQUIPMENT OR MATERIALS TO BE DISCONNECTED AND REMOVED.

SECTION OR ENLARGED PLAN

SCALE: 1/8" = 1' - 0"

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
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FORBES

PROJECT
BELLE ISLE ATHLETIC SHELTER HVAC REPLACEMENT AND FIRE PROTECTION IMPROVEMENTS

DESIGNED	
DRAWN	ACF
CHECKED	ACF
APPROVED	ACF
DATE	09.12.2025
ISSUED FOR	ADDENDUM 2
IDENTIFICATION NUMBER	FILE# 751/24078.SMD A/E# 1411-14
SHEET NUMBER	OF 42 .
DRAWING TITLE	MECHANICAL STANDARDS AND DRAWING INDEX
DRAWING NUMBER	M-001

VENTILATION & AIR BALANCE CALCULATION

PROJ. NAME: Belle Isle Athletic Shelter — PROJ#:

DATA FROM LOADS

Room #	Architectural Room Name	Area (Sq. Ft) Ac*	Space Height (Ft.)	Max Cooling Design (CFM)	Min Af Full Occupancy (CFM)	Space Volume (Cu. Ft.)	Load (CFM/ Sq. Ft)
	7 RECREATION OFFICE	147	9.0	145		1,319	1.0
	10 LOBBY	114	9.0	108		1,024	0.9
	11 CORRIDOR	84	9.0	99		760	1.2
	22 OPEN OFFICE AREA	721	9.0	731		6,486	1.0
	22.1 CLOSET	47	9.0	46		426	1.0
	13 MENS LOCKER ROOM	300	9.0	50		2,697	0.2
	18 WOMENS LOCKER ROOM	322	9.0	50		2,898	0.2
BUILDING TOTALS:		1,734		1,229		15,609	0.7

DIVERSIFIED TOTALS: — NO DIVERSITY ON THIS UNIT

VENTILATION CODES

Room Name (Use) per Code	Total Min Ac/Hr	Outdoor Air: Min Ac/Hr	People/ 1000 Sq.Ft	Min CFM/Pers Rp*	Min CFM/Sq.Ft Ra*	Exhaust Air: Min CFM/Sq.Ft	Exhaust Air: Min CFM	Offset (+,-,=)	SA Req'd in Room? (N or Blank)	EA? (E or Blank)	FPB (Y or Blank)	CO2 Sensor? (Y or Blank)	Cont Vol? (C or Blank)	OA People Rp* x Pz*	OA Sq.Ft Ra* x Az*
Office spaces (MMC)			5	5	0.06									4	9
Main Entry Lobbies (MMC)			10	5	0.06			+						6	7
Corridors (MMC)			5	5	0.06			+						2	5
Office spaces (MMC)			5	5	0.06									18	43
Storage room (MMC)					0.12										6
Toilet Room (Public)							150			E					
Toilet Room (Public)							150			E					
														29	70

PEOPLE

Total People Per Code	Total People Over-Ride	Total People Pz*
0.7		0.7
1.1		1.1
0.4		0.4
3.6		3.6
6		6

OUTSIDE AIR

Air Dis Eff Ez* Leave blank for: 0.8	Breathing Zone OA Req'd Voz*	Calc Add'l OA from AC/HR	Lowest SA @ Full Occ Vps*	Min Occ Zp*	Override Min Occ Zp*	MMC Ev	ASHRAE Evz
	16		16	1.00	0.15	1.00	1.65
	16		16	1.00	0.15	1.00	1.65
	9		9	1.00	0.15	1.00	1.65
	77		77	1.00	0.15	1.00	1.65
	7		7	1.00	0.15	1.00	1.65
	124		124				

0.15

Diversity/Safety

Occupant Diversity (*D)	100%
Supply Air Diversity	100%
AHU and Duct Leakage (TYP 5%)	5%

Final Results

Based on Exhaust Compensation

MAX	SA CFM	1294
	OA CFM	480
	OA %	37%
MIN	SA CFM	867
	OA CFM	390
	OA %	44%

PROJECT NAME:	Belle Isle Athletic Shelter	SYSTEM:	F-3 / ERV
PROJECT #:	2024.0164	DATE:	7/14/2025
APPLICABLE CODES:		ENGINEER:	ACF
IMC/MMC	2015	APPROVED:	ACF
ASHRAE 62.1	2013		
ASHRAE 90.1	2013		
LEED PROJECT? (Y OR N)	N		
100% OA Unit? (Y OR N)	N		

DATA FROM LOADS

Room #	Architectural Room Name	Area (Sq. Ft) Ac*	Space Height (Ft.)	Max Cooling Design (CFM)	Min Af Full Occupancy (CFM)	Space Volume (Cu. Ft.)	Load (CFM/ Sq. Ft)
	UPSTAIRS: YOGA/EXERCISE ROOM	3,777	9.0	4,496		33,994	1.2
BUILDING TOTALS:		3,777		4,496		33,994	1.2

DIVERSIFIED TOTALS: 4,018

VENTILATION CODES

Room Name (Use) per Code	Total Min Ac/Hr	Outdoor Air: Min Ac/Hr	People/ 1000 Sq.Ft	Min CFM/Pers Rp*	Min CFM/Sq.Ft Ra*	Exhaust Air: Min CFM/Sq.Ft	Exhaust Air: Min CFM	Offset (+,-,=)	SA Req'd in Room? (N or Blank)	EA? (E or Blank)	FPB (Y or Blank)	CO2 Sensor? (Y or Blank)	Cont Vol? (C or Blank)	OA People Rp* x Pz*	OA Sq.Ft Ra* x Az*
Health club/aerobics room (MMC)			40	20	0.06									500	227
														500	227

PEOPLE

Total People Per Code	Total People Over-Ride	Total People Pz*
151.1	25	25.0
151	25	25

OUTSIDE AIR

Air Dis Eff Ez* Leave blank for: 0.8	Breathing Zone OA Req'd Voz*	Calc Add'l OA from AC/HR	Lowest SA @ Full Occ Vps*	Min Occ Zp*	Override Min Occ Zp*	MMC Ev	ASHRAE Evz
	908		908	1.00	0.30	0.85	1.50
	908		908				

0.3

Diversity/Safety

Occupant Diversity (*D)	100%
Supply Air Diversity	89%
AHU and Duct Leakage (TYP 5%)	5%

Final Results

Based on ASHRAE 62.1-2013 Appendix A

MAX	SA CFM	4219
	OA CFM	484
	OA %	11%
MIN	SA CFM	3179
	OA CFM	484
	OA %	15%

PROJECT NAME:	Belle Isle Athletic Shelter	SYSTEM:	F-1 / ERV
PROJECT #:	2024.0164	DATE:	7/14/2025
APPLICABLE CODES:		ENGINEER:	ACF
IMC/MMC	2015	APPROVED:	ACF
ASHRAE 62.1	2013		
ASHRAE 90.1	2013		
LEED PROJECT? (Y OR N)	N		
100% OA Unit? (Y OR N)	N		

DATA FROM LOADS

Room #	Architectural Room Name	Area (Sq. Ft) Ac*	Space Height (Ft.)	Max Cooling Design (CFM)	Min Af Full Occupancy (CFM)	Space Volume (Cu. Ft.)	Load (CFM/ Sq. Ft)
	ABANDONED KITCHEN/STORAGE	273	9.0	344		2,455	1.3
	1 EXERCISE ROOM	1,599	9.0	2,306		14,388	1.4
	4 WOMENS TOILET	110	9.0	91		991	0.8
	5 MENS TOILET	116	9.0	100		1,046	0.9
BUILDING TOTALS:		2,098		2,841		18,880	1.4

DIVERSIFIED TOTALS:

VENTILATION CODES

Room Name (Use) per Code	Total Min Ac/Hr	Outdoor Air: Min Ac/Hr	People/ 1000 Sq.Ft	Min CFM/Pers Rp*	Min CFM/Sq.Ft Ra*	Exhaust Air: Min CFM/Sq.Ft	Exhaust Air: Min CFM	Offset (+,-,=)	SA Req'd in Room? (N or Blank)	EA? (E or Blank)	FPB (Y or Blank)	CO2 Sensor? (Y or Blank)	Cont Vol? (C or Blank)	OA People Rp* x Pz*	OA Sq.Ft Ra* x Az*
Storage room (MMC)					0.12										33
Health club/aerobics room (MMC)			40	20	0.06			+						300	96
Toilet Room (Public)							175			E					
Toilet Room (Public)							175			E					
														300	129

PEOPLE

Total People Per Code	Total People Over-Ride	Total People Pz*
63.9	15	15.0
64	15	15

OUTSIDE AIR

Air Dis Eff Ez* Leave blank for: 0.8	Breathing Zone OA Req'd Voz*	Calc Add'l OA from AC/HR	Lowest SA @ Full Occ Vps*	Min Occ Zp*	Override Min Occ Zp*	MMC Ev	ASHRAE Evz
	41		41	1.00	0.20	0.95	1.60
	495		495	1.00	0.20	0.95	1.60
							1.60
							1.60
	536		536				

0.2

Diversity/Safety

Occupant Diversity (*D)	100%
Supply Air Diversity	100%
AHU and Duct Leakage (TYP 5%)	5%

Final Results

Based on 2015 IMC/MMC Table 403.3.1.1,2.3.2

MAX	SA CFM	3160
	OA CFM	536
	OA %	17%
MIN	SA CFM	2971
	OA CFM	536
	OA %	18%

PROJECT NAME:	Belle Isle Athletic Shelter	SYSTEM:	F-2 / ERV
PROJECT #:	2024.0164	DATE:	7/14/2025
APPLICABLE CODES:		ENGINEER:	ACF
IMC/MMC	2015	APPROVED:	ACF
ASHRAE 62.1	2013		
ASHRAE 90.1	2013		
LEED PROJECT? (Y OR N)	N		
100% OA Unit? (Y OR N)	Y		

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PBA Project No.: 2024.0164

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PROJECT: BELLE ISLE ATHLETIC SHELTER HVAC REPLACEMENT AND FIRE PROTECTION IMPROVEMENTS

DESIGNED	DATE	ISSUED FOR
DRAWN . CHECKED . APPROVED .	09.12.2025	ADDENDUM 2

IDENTIFICATION NUMBER: FILE# 751/24078.SMD A/E# 1411-14

SHEET NUMBER: ----OF 42

DRAWING TITLE: MECHANICAL SCHEDULES

DRAWING NUMBER: M-704

2

SECTION 20 05 00 - MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL 1
1.1 RELATED DOCUMENTS 1
1.2 SUMMARY 1
1.3 INDUSTRY STANDARDS 2
1.4 PERFORMANCE REQUIREMENTS 3
1.5 QUALITY ASSURANCE 3
1.6 CODES, PERMITS AND FEES 4
1.7 DRAWINGS 4
1.8 MATERIAL AND EQUIPMENT MANUFACTURERS 5
1.9 INSPECTION OF SITE 5
1.10 ITEMS REQUIRING PRIOR APPROVAL 6
1.11 ACTION SUBMITTALS 6
1.12 INFORMATIONAL SUBMITTALS 6
1.13 CLOSEOUT SUBMITTALS 7
1.14 INSTRUCTION OF OWNER PERSONNEL 8
1.15 WARRANTY 9
PART 2 - PRODUCTS (NOT APPLICABLE) 9
PART 3 - EXECUTION 9
3.1 MECHANICAL DEMOLITION WORK 9
3.2 REFRIGERANT HANDLING 10
3.3 WORK IN EXISTING BUILDINGS 10
3.4 TEMPORARY SERVICES 11
3.5 WORK INVOLVING OTHER TRADES 11
3.6 ACCEPTANCE PROCEDURE 11

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.
2. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
3. AGA - American Gas Association; www.aga.org.
4. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
5. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
6. ANSI - American National Standards Institute; www.ansi.org.
7. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
8. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
9. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
10. ASTM - ASTM International; www.astm.org.
11. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
12. CSI - Construction Specifications Institute (The); www.csiresources.org.
13. ICC - International Code Council; www.iccsafe.org.
14. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
15. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
16. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org
17. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
18. NEBB - National Environmental Balancing Bureau; www.nebb.org.
19. NECA - National Electrical Contractors Association; www.necanet.org.
20. NEMA - National Electrical Manufacturers Association; www.nema.org.
21. NETA - InterNational Electrical Testing Association; www.netaworld.org.
22. NFPA - National Fire Protection Association; www.nfpa.org.
23. NSF - NSF International; www.nsf.org.
24. NSPE - National Society of Professional Engineers; www.nspe.org.
25. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
26. UL - Underwriters Laboratories Inc.; 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.

END OF SECTION 20 05 00