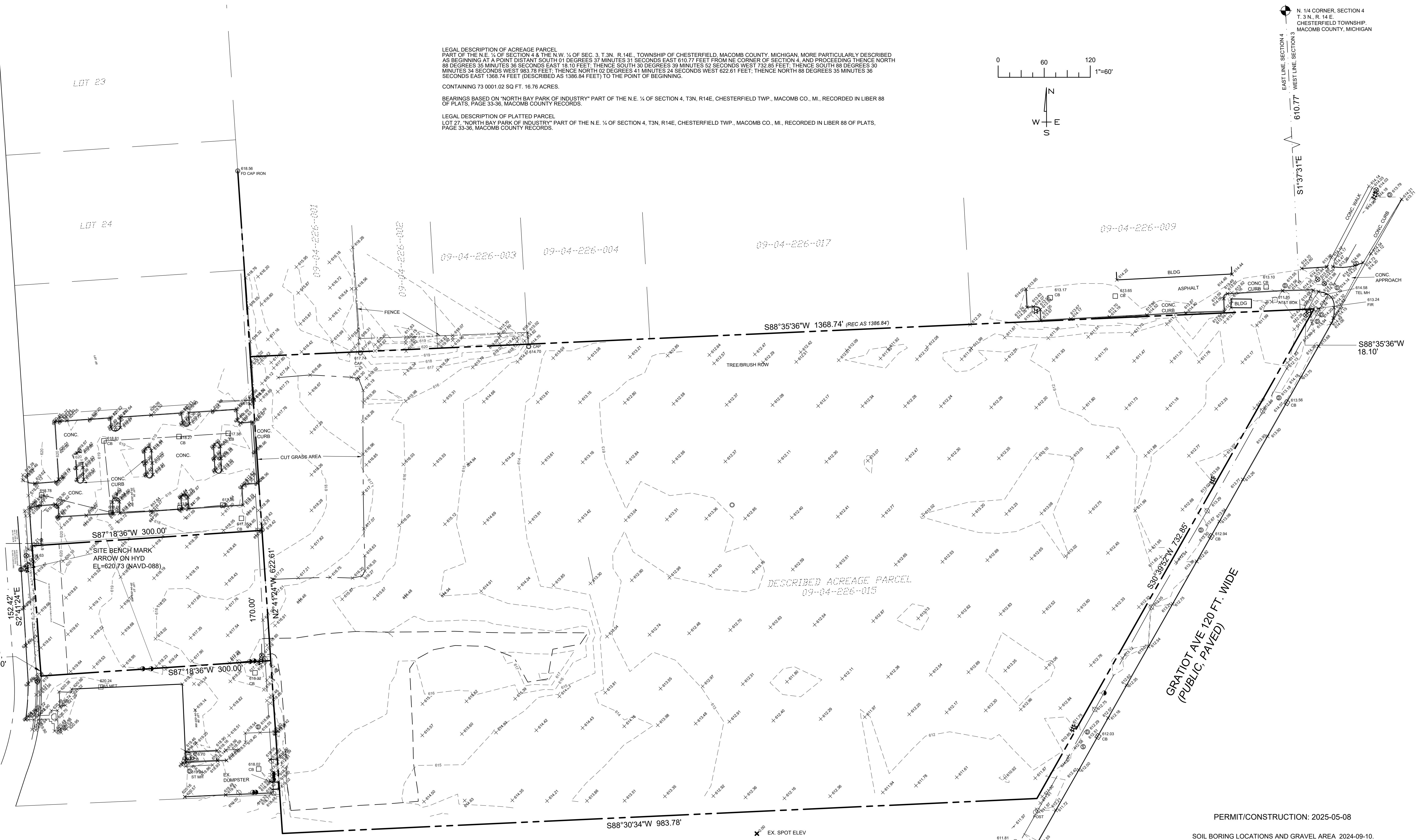


N. BAY DRIVE 70 FT. WIDE
(PUBLIC, PAVED)

L=17.57'
R=385.00'

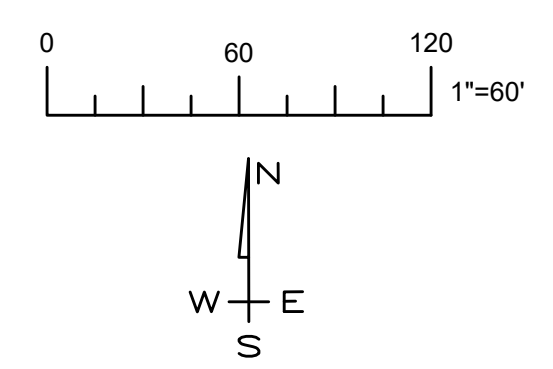


LEGAL DESCRIPTION OF ACREAGE PARCEL
PART OF THE N.E. 1/4 OF SECTION 4 & THE N.W. 1/4 OF SEC. 3, T.3N, R.14E, TOWNSHIP OF CHESTERFIELD, MACOMB COUNTY, MICHIGAN, MORE PARTICULARLY DESCRIBED
AS BEGINNING AT A POINT DISTANT SOUTH 01 DEGREES 37 MINUTES 31 SECONDS EAST 610.77 FEET FROM NE CORNER OF SECTION 4, AND PROCEEDING THENCE NORTH
88 DEGREES 35 MINUTES 36 SECONDS EAST 18.10 FEET; THENCE SOUTH 30 DEGREES 39 MINUTES 52 SECONDS WEST 732.85 FEET; THENCE SOUTH 88 DEGREES 30
MINUTES 34 SECONDS WEST 983.78 FEET; THENCE NORTH 02 DEGREES 41 MINUTES 24 SECONDS WEST 622.61 FEET; THENCE NORTH 88 DEGREES 35 MINUTES 36
SECONDS EAST 1386.74 FEET (DESCRIBED AS 1386.84 FEET) TO THE POINT OF BEGINNING.

CONTAINING 73 0001.02 SQ FT, 16.76 ACRES.

BEARINGS BASED ON "NORTH BAY PARK OF INDUSTRY" PART OF THE N.E. 1/4 OF SECTION 4, T3N, R14E, CHESTERFIELD TWP., MACOMB CO., MI., RECORDED IN LIBER 88
OF PLATS, PAGE 33-36, MACOMB COUNTY RECORDS.

LEGAL DESCRIPTION OF PLATTED PARCEL
LOT 27, "NORTH BAY PARK OF INDUSTRY" PART OF THE N.E. 1/4 OF SECTION 4, T3N, R14E, CHESTERFIELD TWP., MACOMB CO., MI., RECORDED IN LIBER 88 OF PLATS,
PAGE 33-36, MACOMB COUNTY RECORDS.



N. 1/4 CORNER, SECTION 4
T. 3 N., R. 14 E.
CHESTERFIELD TOWNSHIP
MACOMB COUNTY, MICHIGAN

EAST LINE, SECTION 4
WEST LINE, SECTION 3
610.77' S1°37'31"E

DESCRIBED ACREAGE PARCEL
09-04-226-015

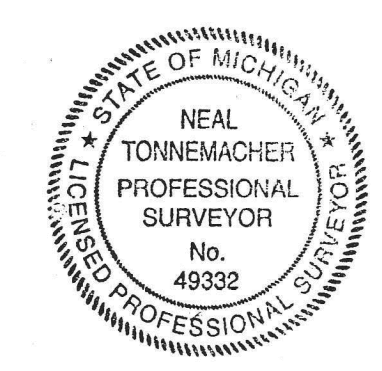
GRATIOT AVE 120 FT. WIDE
(PUBLIC, PAVED)

- EX. SPOT ELEV
- EX. CATCH BASIN
- EX. STORM SEWER MANHOLE
- EX. SAN. SEWER MANHOLE
- EX. GATE VALVE IN WELL
- EX. HYDRANT
- EX. WATER SHUT OFF
- EX. LIGHT POLE
- EX. UTILITY POLE
- EX. GUY ANCHOR
- PROPOSED SOIL BORING LOCATION
- EX. OVERHEAD WIRE(S)

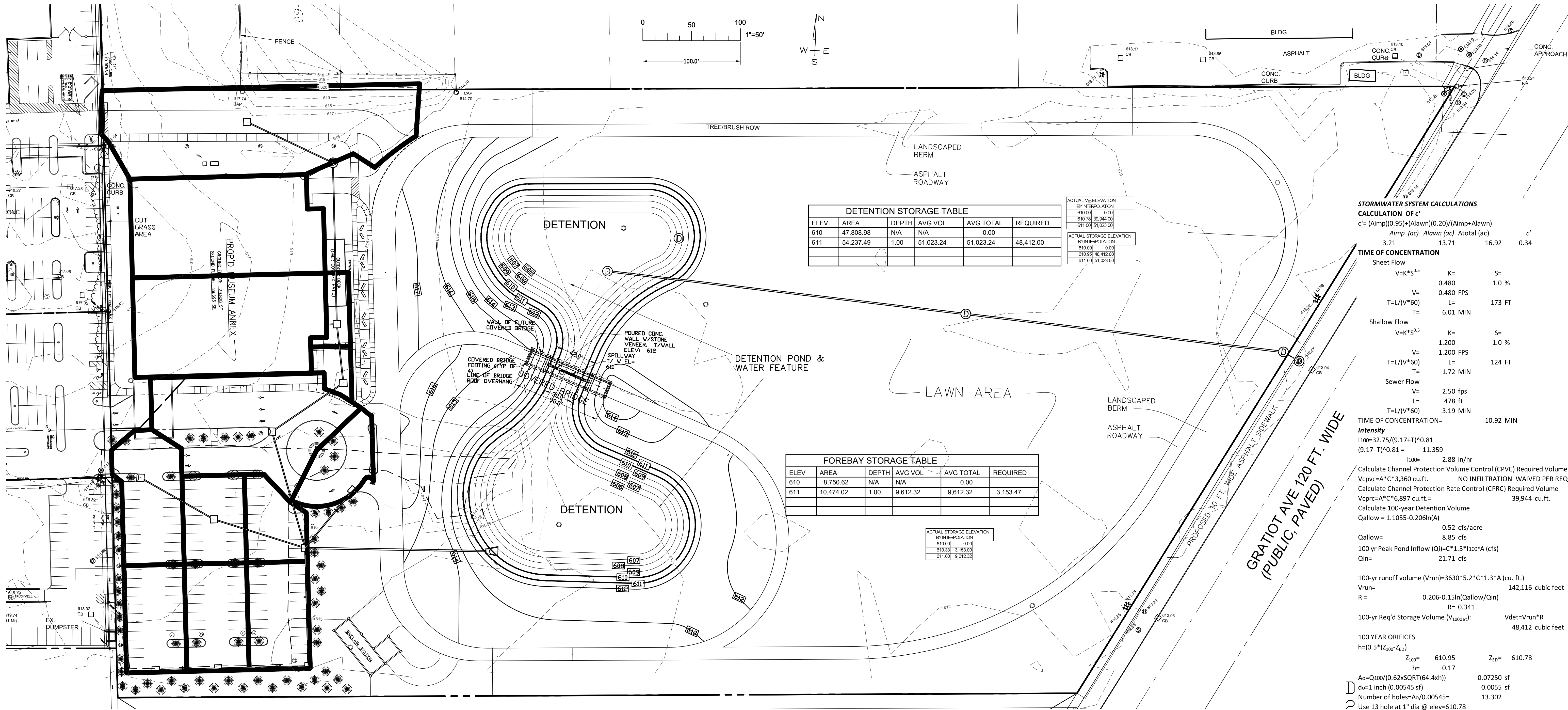
PERMIT/CONSTRUCTION: 2025-05-08
SOIL BORING LOCATIONS AND GRAVEL AREA 2024-09-10.

WE HEREBY CERTIFY THAT WE HAVE SURVEYED THE HEREON
DESCRIBED SITE AND THAT ALL MEASUREMENTS AS SHOWN ON
THE PLAN ARE CORRECT, AND THAT THERE ARE NO
ENCROACHMENTS, UNLESS OTHERWISE SHOWN.

Handwritten signature



NO TITLE COMMITMENT HAS BEEN PROVIDED.
HERE MAY BE EASEMENTS ON SITE.
ANY EASEMENTS CAN BE ADDED UPON RECEIPT OF A CURRENT TITLE COMMITMENT.



DETENTION STORAGE TABLE					
ELEV	AREA	DEPTH	AVG VOL	AVG TOTAL	REQUIRED
610	47,808.98	N/A	N/A	0.00	
611	54,237.49	1.00	51,023.24	51,023.24	48,412.00

ACTUAL V ₆ ELEVATION	
BY INTERPOLATION	
610.00	0.00
610.75	38,944.00
611.00	51,023.00

ACTUAL STORAGE ELEVATION	
BY INTERPOLATION	
610.00	0.00
610.98	48,412.00
611.00	51,023.00

FOREBAY STORAGE TABLE					
ELEV	AREA	DEPTH	AVG VOL	AVG TOTAL	REQUIRED
610	8,750.62	N/A	N/A	0.00	
611	10,474.02	1.00	9,612.32	9,612.32	3,153.47

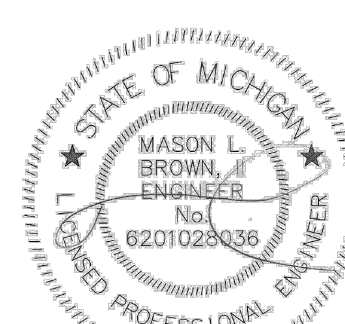
ACTUAL STORAGE ELEVATION	
BY INTERPOLATION	
610.00	0.00
610.50	3,153.00
611.00	9,612.32

STORMWATER SYSTEM CALCULATIONS
CALCULATION OF C'
 $C' = (Aimp)(0.95) + (Alawn)(0.20) / (Aimp + Alawn)$

Aimp (ac)	Alawn (ac)	Atotal (ac)	C'
3.21	13.71	16.92	0.34

TIME OF CONCENTRATION
Sheet Flow
 $V = K \cdot S^{0.5}$
 $K = 0.480$
 $S = 1.0 \%$
 $V = 0.480$ FPS
 $T = L / (V \cdot 60)$
 $L = 173$ FT
 $T = 6.01$ MIN
Shallow Flow
 $V = K \cdot S^{0.5}$
 $K = 1.200$
 $S = 1.0 \%$
 $V = 1.200$ FPS
 $T = L / (V \cdot 60)$
 $L = 124$ FT
 $T = 1.72$ MIN
Sewer Flow
 $V = 2.50$ fps
 $L = 478$ ft
 $T = L / (V \cdot 60)$
 $T = 3.19$ MIN
TIME OF CONCENTRATION = 10.92 MIN

Intensity
 $I_{100} = 32.75 / (9.17 + T)^{0.81}$
 $I_{100} = 11.359$
 $I_{100} = 2.88$ in/hr
Calculate Channel Protection Volume Control (CPVC) Required Volume
 $V_{cpvc} = A \cdot C \cdot 3,360$ cu.ft. NO INFILTRATION WAIVED PER REQ'TS
Calculate Channel Protection Rate Control (CPRC) Required Volume
 $V_{cprc} = A \cdot C \cdot 6,897$ cu.ft. = 39,944 cu.ft.
Calculate 100-year Detention Volume
 $Q_{allow} = 1.1055 - 0.206 \ln(A)$
 $Q_{allow} = 0.52$ cfs/acre
 $Q_{allow} = 8.85$ cfs
100 yr Peak Pond Inflow (Q_i) = $C \cdot 1.3 \cdot 100 \cdot A$ (cfs)
 $Q_{in} = 21.71$ cfs
100-yr runoff volume (V_{run}) = $3630 \cdot 5.2 \cdot C \cdot 1.3 \cdot A$ (cu. ft.)
 $V_{run} = 142,116$ cubic feet
 $R = 0.206 - 0.15 \ln(Q_{allow} / Q_{in})$
 $R = 0.341$
100-yr Req'd Storage Volume (V_{100det}):
 $V_{det} = V_{run} \cdot R$
 $V_{det} = 48,412$ cubic feet
100 YEAR ORIFICES
 $h = (0.5 \cdot (Z_{100} - Z_{ed}))$
 $Z_{100} = 610.95$
 $h = 0.17$
 $Z_{ed} = 610.78$
 $A_o = Q_{100} / (0.62 \cdot \sqrt{2gh})$
 $d_o = 1$ inch (0.00545 sf)
Number of holes = $A_o / 0.00545 = 13.302$
Use 13 hole at 1" dia @ elev=610.78
Q_{ED} YEAR ORIFICES
 $h = Z_{ed} - Z_{OUTLET}$
 $Z_{ed} = 610.78$
 $h = 2.10$
 $Z_{OUTLET} = 608.68$
 $A_o = Q_{ED} / (0.62 \cdot \sqrt{2gh})$
 $d_o = 1$ inch (0.00545 sf)
Number of holes = $A_o / 0.00545 = 5.883$
Use 6 holes at 1" dia @ elev=608.68
FOREBAY
 $V_f = 3630 \cdot C \cdot A \cdot 0.15 = 3153.47$ cubic feet
FOREBAY OUTLET RATE = Q_{ED}
 $V_{ED} = 3630 \cdot C \cdot A \cdot 1.9 = 39,943.98$ cubic feet
 $Q_{ED} = V_{ED} / 48 \text{ HRS} / 60 / 60 = 0.23$ cfs
USE 6" PVC @ 2.18% Q=0.90 CFS
Q_{ED} YEAR ORIFICES
 $h = Z_{ed} - Z_i$
 $Z_{ed} = 610.78$
 $h = 0.45$
 $Z_i = 610.33$
 $A_o = Q_{ED} / (0.62 \cdot \sqrt{2gh})$
 $d_o = 1$ inch (0.00545 sf)
Number of holes = $A_o / 0.00545 = 12.708$
Use 13 holes at 1" dia @ elev=610.33
use Z_i to maintain 3 ft. permanent water level.



PERMIT/CONSTRUCTION: 2025-05-08

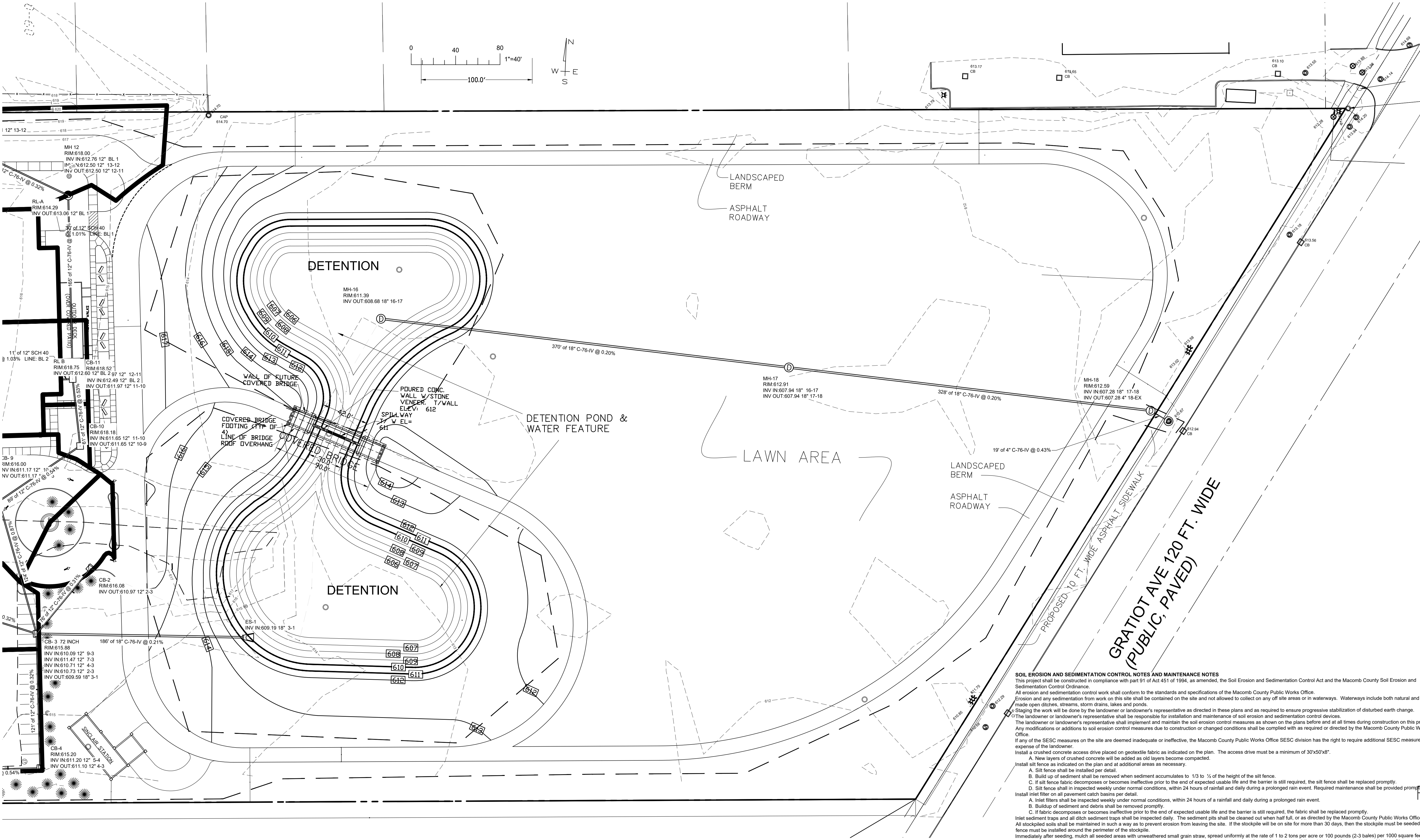
MASON BROWNS ASSOCIATES, LLC
CIVIL ENGINEERS & SURVEYORS
BLOOMFIELD HILLS, MICHIGAN 48304
(248) 225-9789 mason_brown@sbglobal.net

STAHL'S AUTOMOTIVE MUSEUM EXPANSION
STORMWATER MANAGEMENT CALCULATIONS & PLAN

STAHL'S AUTOMOTIVE FOUNDATION
Chesterfield, MI 48051 15300 BROADWAY RD
56516 North Bay Dr.

REVISIONS:	DESIGN: --	DRAWN: mb	CHECKED: mb

SCALE:
1"=50'
DATE:
12-06-2024
JOB NO.
15-048-H
SHEET



SOIL EROSION AND SEDIMENTATION CONTROL NOTES AND MAINTENANCE NOTES
This project shall be constructed in compliance with part 91 of Act 451 of 1994, as amended, the Soil Erosion and Sedimentation Control Act and the Macomb County Soil Erosion and Sedimentation Control Ordinance.
All erosion and sedimentation control work shall conform to the standards and specifications of the Macomb County Public Works Office.
Erosion and any sedimentation from work on this site shall be contained on the site and not allowed to collect on any off site areas or in waterways. Waterways include both natural and man made open ditches, streams, storm drains, lakes and ponds.
Staging the work will be done by the landowner or landowner's representative as directed in these plans and as required to ensure progressive stabilization of disturbed earth change.
The landowner or landowner's representative shall be responsible for installation and maintenance of soil erosion and sedimentation control devices.
The landowner or landowner's representative shall implement and maintain the soil erosion control measures as shown on the plans before and at all times during construction on this project. Any modifications or additions to soil erosion control measures due to construction or changed conditions shall be complied with as required or directed by the Macomb County Public Works Office.
If any of the SESC measures on the site are deemed inadequate or ineffective, the Macomb County Public Works Office SESC division has the right to require additional SESC measures at the expense of the landowner.
Install a crushed concrete access drive placed on geotextile fabric as indicated on the plan. The access drive must be a minimum of 30x50'x8".
A. New layers of crushed concrete will be added as old layers become compacted.
Install silt fence as indicated on the plan and at additional areas as necessary.
A. Silt fence shall be installed per detail.
B. Build up of sediment shall be removed when sediment accumulates to 1/3 to 1/2 of the height of the silt fence.
C. If silt fence fabric decomposes or becomes ineffective prior to the end of expected usable life and the barrier is still required, the silt fence shall be replaced promptly.
D. Silt fence shall be inspected weekly under normal conditions, within 24 hours of rainfall and daily during a prolonged rain event. Required maintenance shall be provided promptly.
Install inlet filter on all pavement catch basins per detail.
A. Inlet filters shall be inspected weekly under normal conditions, within 24 hours of a rainfall and daily during a prolonged rain event.
B. Buildup of sediment and debris shall be removed promptly.
C. If fabric decomposes or becomes ineffective prior to the end of expected usable life and the barrier is still required, the fabric shall be replaced promptly.
Inlet sediment traps and all ditch sediment traps shall be inspected daily. The sediment pits shall be cleaned out when half full, or as directed by the Macomb County Public Works Office.
All stockpiled soils shall be maintained in such a way as to prevent erosion from leaving the site. If the stockpile will be on site for more than 30 days, then the stockpile must be seeded. Silt fence must be installed around the perimeter of the stockpile.
Immediately after seeding, mulch all seeded areas with unweathered small grain straw, spread uniformly at the rate of 1 to 2 tons per acre or 100 pounds (2-3 bales) per 1000 square feet. This mulch should be anchored with disc type mulch anchoring tool or other means as approved by the Macomb County Public Works Office. Mulch matting may be used in lieu of loose mulch. If any deviating is needed, it shall be discharged through a filter bag over a well-vegetated area. The pump must discharge at a non-erosive velocity. If necessary, an approved energy dissipater may be used.
All dirt tracked onto any roadway shall be removed immediately. Streets and or parking areas will be scraped on a daily basis and swept at a minimum of once per week by the landowner or landowner's representative.
During dry periods, all disturbed areas shall be watered for dust control.
Permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within 5 calendar days after final grading or the final earth change has been completed. When it is not possible to permanently stabilize a disturbed area after earth change activity ceases, temporarily soil erosion control measures shall be implemented immediately. All temporary soil erosion control shall be maintained until permanent soil erosion control measures are implemented. All permanent soil erosion control measures will be implemented and established before a certificate of compliance is issued.
Final grade, establish vegetation and or landscape all disturbed areas not built or paved upon.
Remove all temporary soil erosion devices after permanent stabilization is established.
Soil Types: Loam and sandy Loam
Name of Nearest Watercourse: Fish Creek West
Distance to nearest watercourse in feet: 930
Name(s) and phone number(s) for the person(s) responsible for the maintenance of all temporary soil erosion control measures: Scott Culver 248-930-2312
Scott Culver 248-930-2312
Name(s) and phone number(s) for the person(s) responsible for the permanent soil erosion control measures: Scott Culver 248-930-2312
Approximate Start date: 04-15-2022
Approximate Completion date: 05-15-2025
Total Acres Disturbed = 3.2 acres

Soil Erosion Control Construction Sequence: (all dates are approximate)
15 Apr. 2025 : Install soil erosion control measures
16-19 Apr. 2025 : Grade site & start building construction
24-30 Apr. 2025 : Install Storm Sewer
1-3 Oct 2025 : Finish Grade Site
4-6 Oct 2025 : Install Base
7-30 Oct 2025 : Install Asphalt & Conc incl. Curing Time
12-15 May. 2026 : Remove soil erosion control measures & install sod

PERMIT/CONSTRUCTION: 2025-05-08

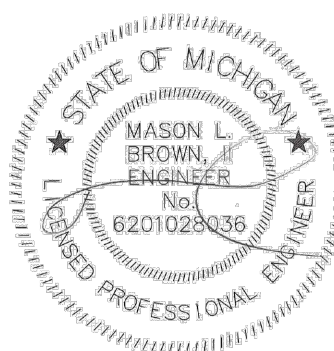
MASON BROWNS ASSOCIATES, LLC
CIVIL ENGINEERS & SURVEYORS
BLOOMFIELD HILLS, MICHIGAN 48304
(248) 225-9769 mason_brown@mbaengineers.net

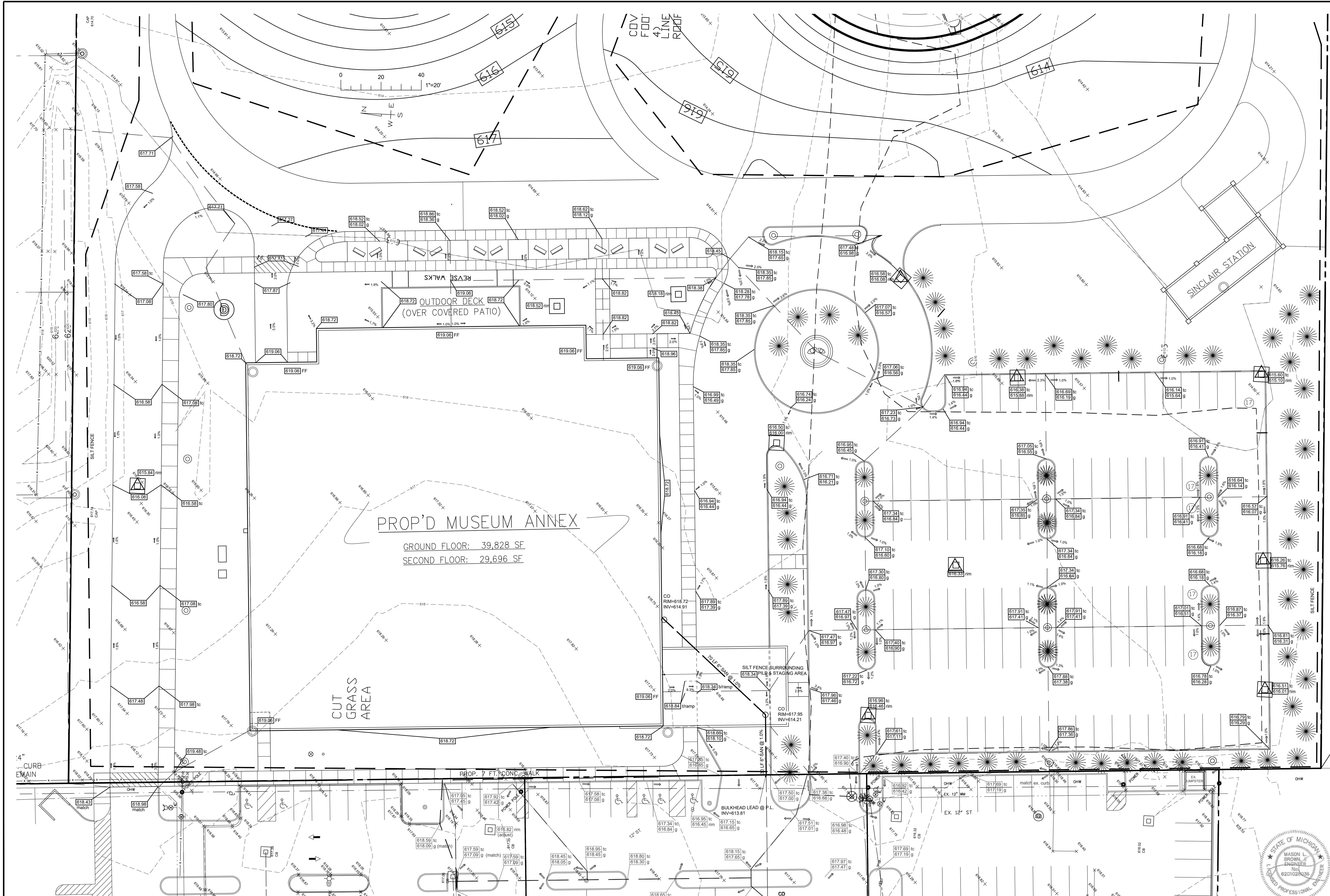
STAHL'S AUTOMOTIVE MUSEUM EXPANSION
STORM SEWER AND TRACK ELEVATIONS PLAN
FROM DETENTION SYSTEM TO OUTLET

STAHL'S AUTOMOTIVE FOUNDATION
Chesterfield, MI 48051 15300 BROADWAY RD
56516 North Boy Dr.

REVISIONS:
DESIGN: --
DRAWN: mb
CHECKED: mb
FIELD OK: net

SCALE:
1"=40'
DATE:
12-06-2024
JOB NO.
15-048-H
SHEET



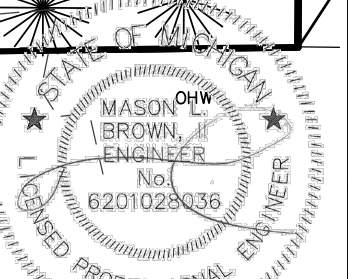


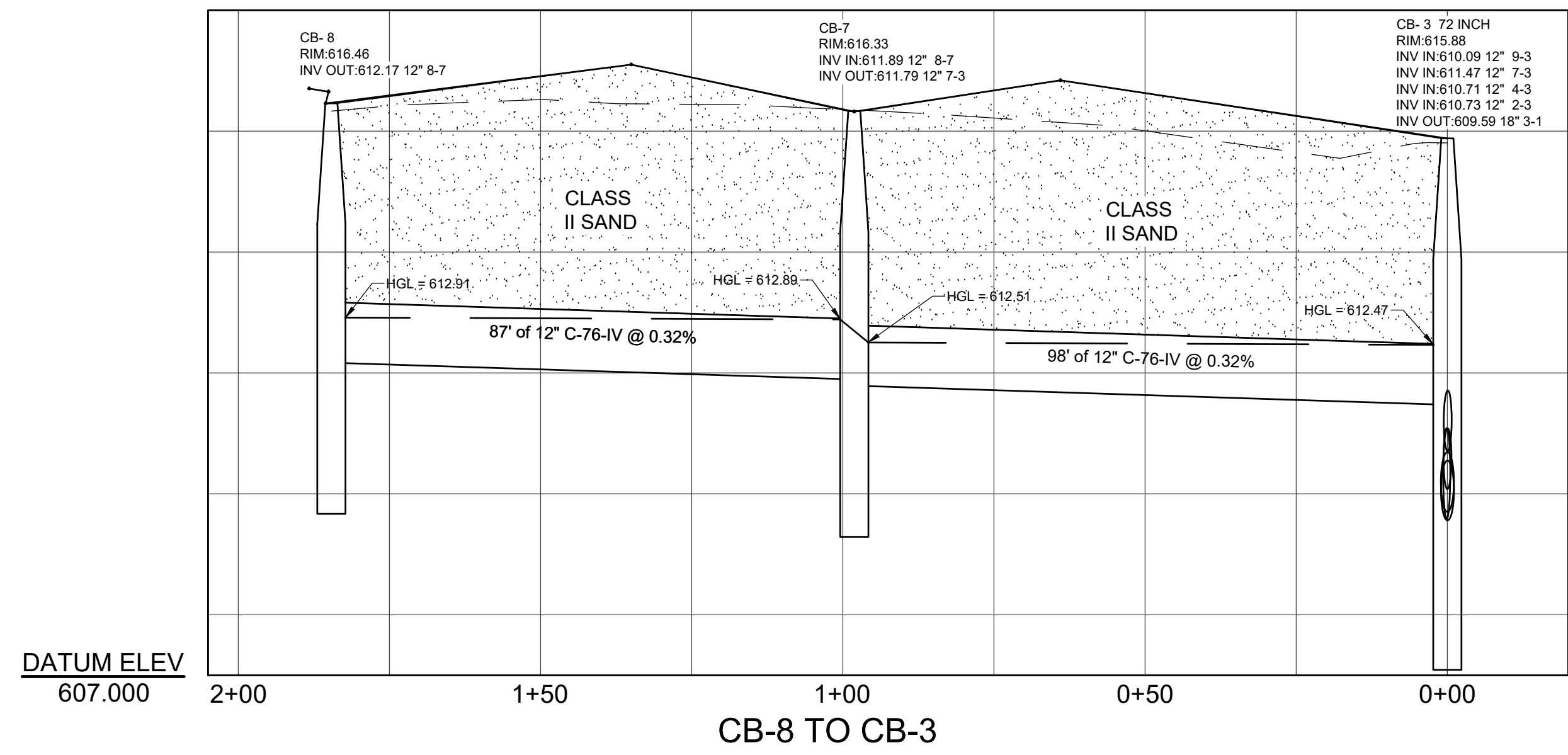
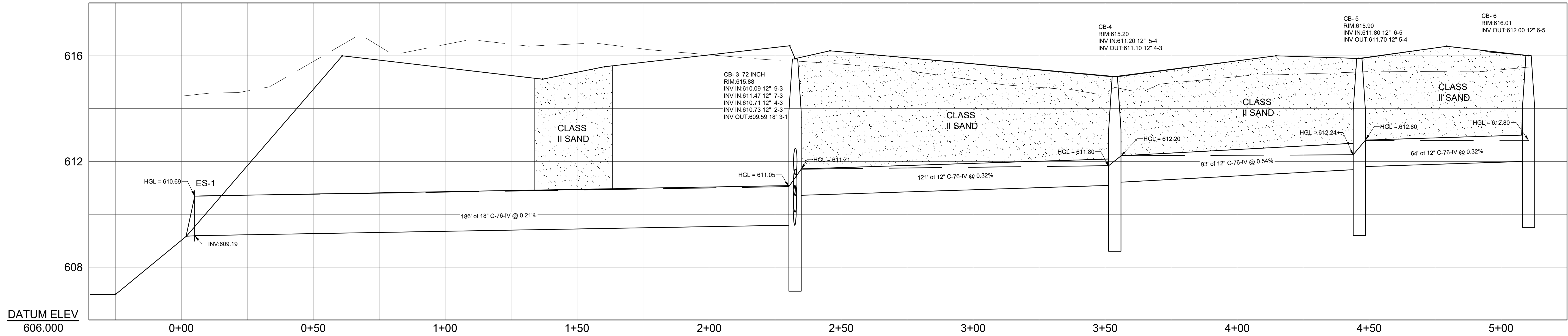
15-048 2024.DWG		DESIGN: --	REVISIONS:	STAHL'S AUTOMOTIVE FOUNDATION		STAHL'S AUTOMOTIVE MUSEUM EXPANSION GRADING & SOIL EROSION CONTROL PLAN		MASON BROWNS ASSOCIATES, LLC CIVIL ENGINEERS & SURVEYORS 2708 BRIDLE ROAD BLOOMFIELD HILLS, MICHIGAN 48304 (248) 225-9789 mason_brown@sbglobal.net	
FIELD CK: net		DRAWN: mb	CHECKED: MB	56516 North Bay Dr.		Chesterfield, MI 48051 15300 BROADWAY RD		THREE RIVERS, MI	
SCALE: 1"=20'		DATE: 12-06-2024	JOB NO. 15-048-H	SHEET 4		PERMIT/CONSTRUCTION: 2025-05-08			

Line No.	Line ID	Inlet ID	Dmg	Runoff	Incr	Total	Tc	I - s	Total	Capac	Line	Length	Slope	Vel	Pipe	HGL	HGL	Invert	Invert	GndElev	Rim	Cover	Cover
			Area	Coeff	Ca	Cx																	
			(ac)	(C)			(min)		(cfs)	(cfs)	(in)	(ft)	(%)	(ft/s)	(min)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
14	2-3	CB-2	0.11	0.50	0.06	0.06	15.0	2.40	0.13	2.00	12	76	0.31	0.17	7.57	612.00	612.00	610.97	610.73	616.88	5.88	4.11	4.15
13	6-5	CB- 6	0.16	0.95	0.15	0.15	15.0	2.40	0.36	2.01	12	64	0.32	0.49	2.35	612.80	612.80	612.01	611.80	616.85	5.90	3.01	3.10
12	5-4	CB- 5	0.16	0.95	0.15	0.30	17.4	2.23	0.67	2.61	12	93	0.54	1.20	1.70	612.24	612.20	611.70	611.20	616.83	5.20	3.20	3.00
11	4-3	CB-4	0.16	0.95	0.15	0.45	19.1	2.12	0.95	2.01	12	121	0.32	1.22	1.52	612.08	612.00	611.10	610.71	615.20	5.88	3.10	4.17
10	8-8	CB- 8	0.20	0.95	0.19	0.19	15.0	2.40	0.45	2.01	12	87	0.32	0.64	2.54	612.91	612.89	612.17	611.89	616.63	5.33	3.29	3.44
9	7-3	CB-7	0.13	0.95	0.13	0.31	17.5	2.21	0.69	2.02	12	98	0.32	1.01	1.75	612.51	612.47	611.79	611.47	616.83	5.88	3.54	3.41
8	BL 2	RL B	0.45	0.95	0.43	0.43	15.0	2.40	1.03	3.62	12	11	1.03	1.31	0.14	614.65	614.64	612.00	612.49	617.88	5.82	5.15	5.03
7	13-12	CB-13	0.62	0.50	0.31	0.31	15.0	2.40	0.74	2.01	12	98	0.32	0.95	1.72	615.12	615.08	612.83	612.52	615.88	6.00	2.01	4.28
6	BL 1	RL-A	0.45	0.95	0.43	0.43	15.0	2.40	1.03	3.57	12	30	1.01	1.31	0.38	615.10	615.08	613.06	612.76	614.28	6.00	0.23	4.24
5	12-11	MH 12	0.00	0.00	0.00	0.74	16.7	2.27	1.67	2.02	12	165	0.32	1.23	1.25	615.01	614.64	612.52	611.99	618.03	5.82	4.48	5.53
4	11-10	CB-11	0.05	0.30	0.01	1.18	18.0	2.18	2.57	2.59	12	61	0.53	3.28	0.30	614.39	614.07	611.99	611.67	618.52	6.18	5.53	5.51
3	10-9	CB-10	0.04	0.42	0.02	1.19	18.3	2.16	2.59	2.93	12	89	0.68	3.29	0.43	613.85	613.38	611.67	611.07	618.86	6.00	5.51	3.93
2	9-2	CB- 9	0.42	0.85	0.36	1.55	18.7	2.14	3.31	3.32	12	124	0.87	4.24	0.48	612.97	612.00	612.00	610.92	618.85	5.88	3.00	3.96
1	3-1	CB- 3	0.11	0.95	0.10	24.7	22.6	1.92	4.76	4.84	18	192	0.21	2.70	1.07	611.83	611.46	610.30	609.98	618.83	5.88	4.01	0.29

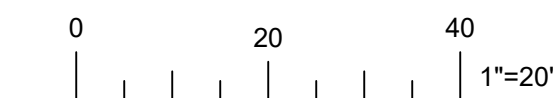
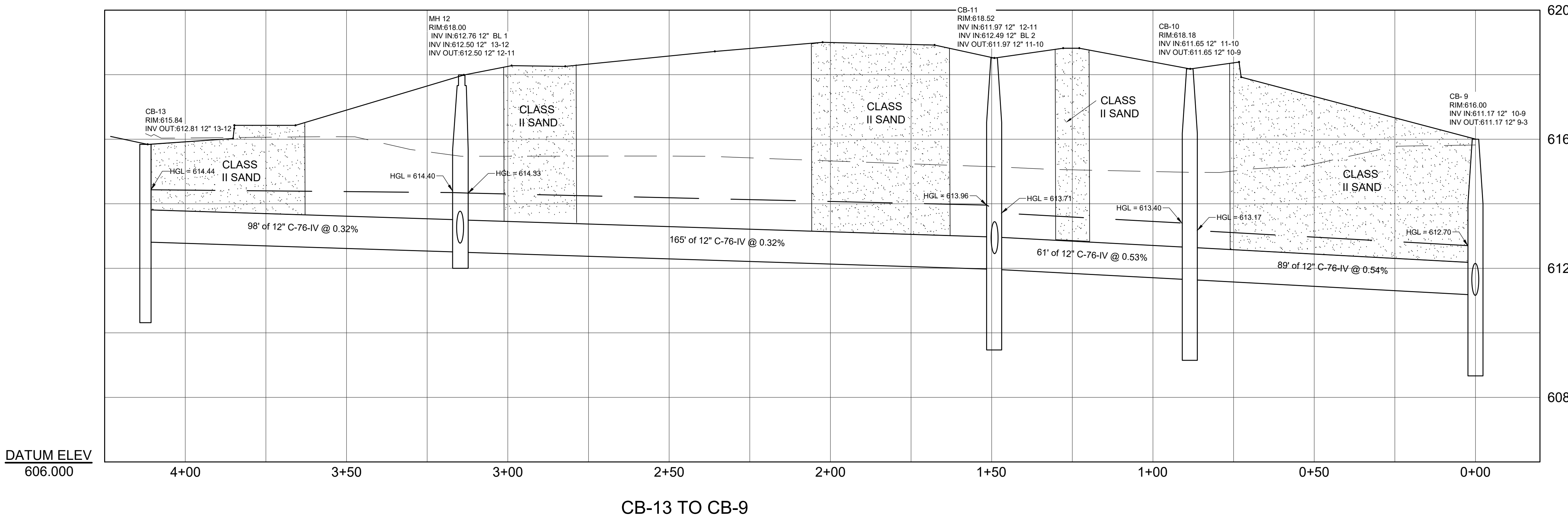
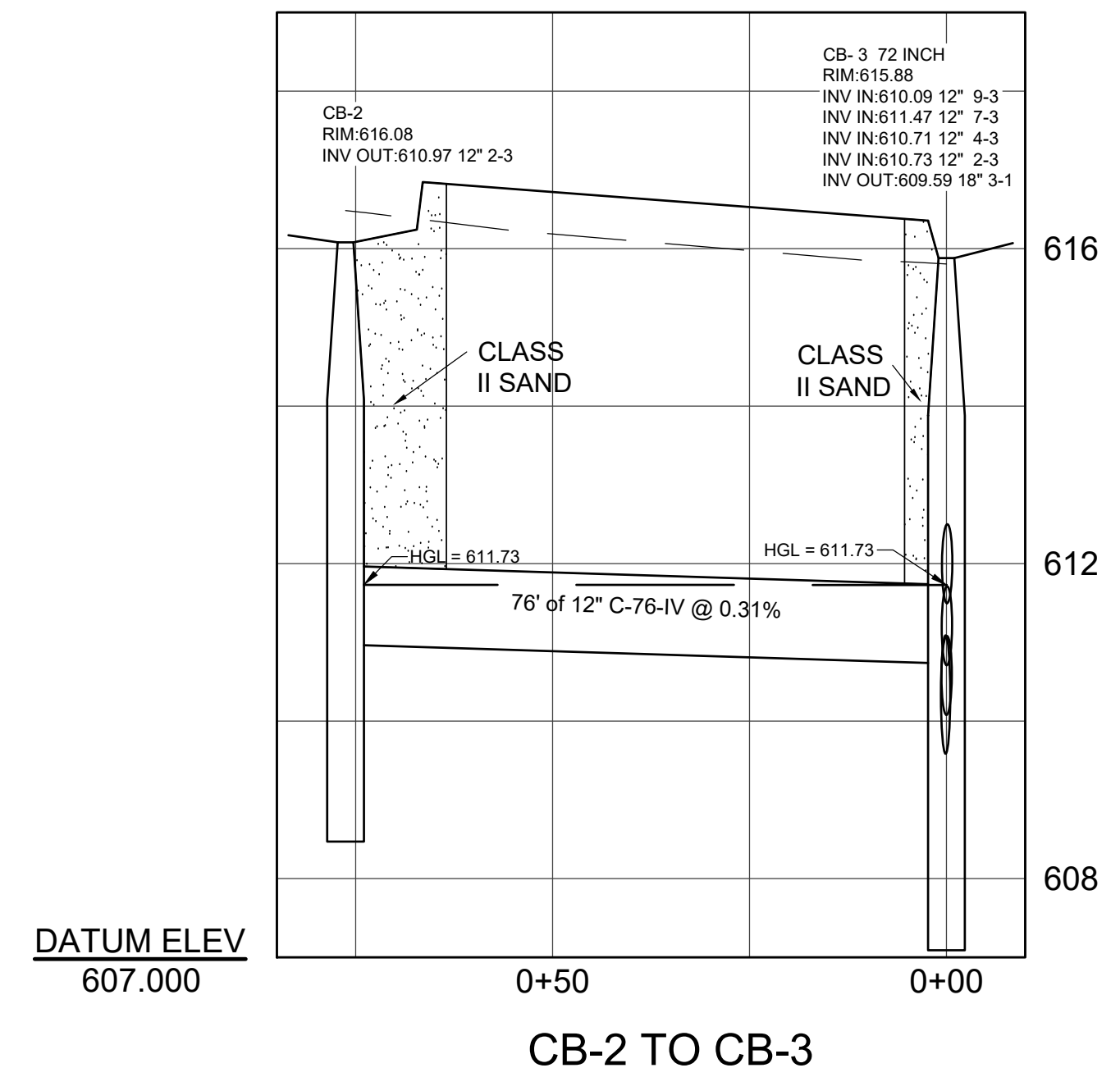
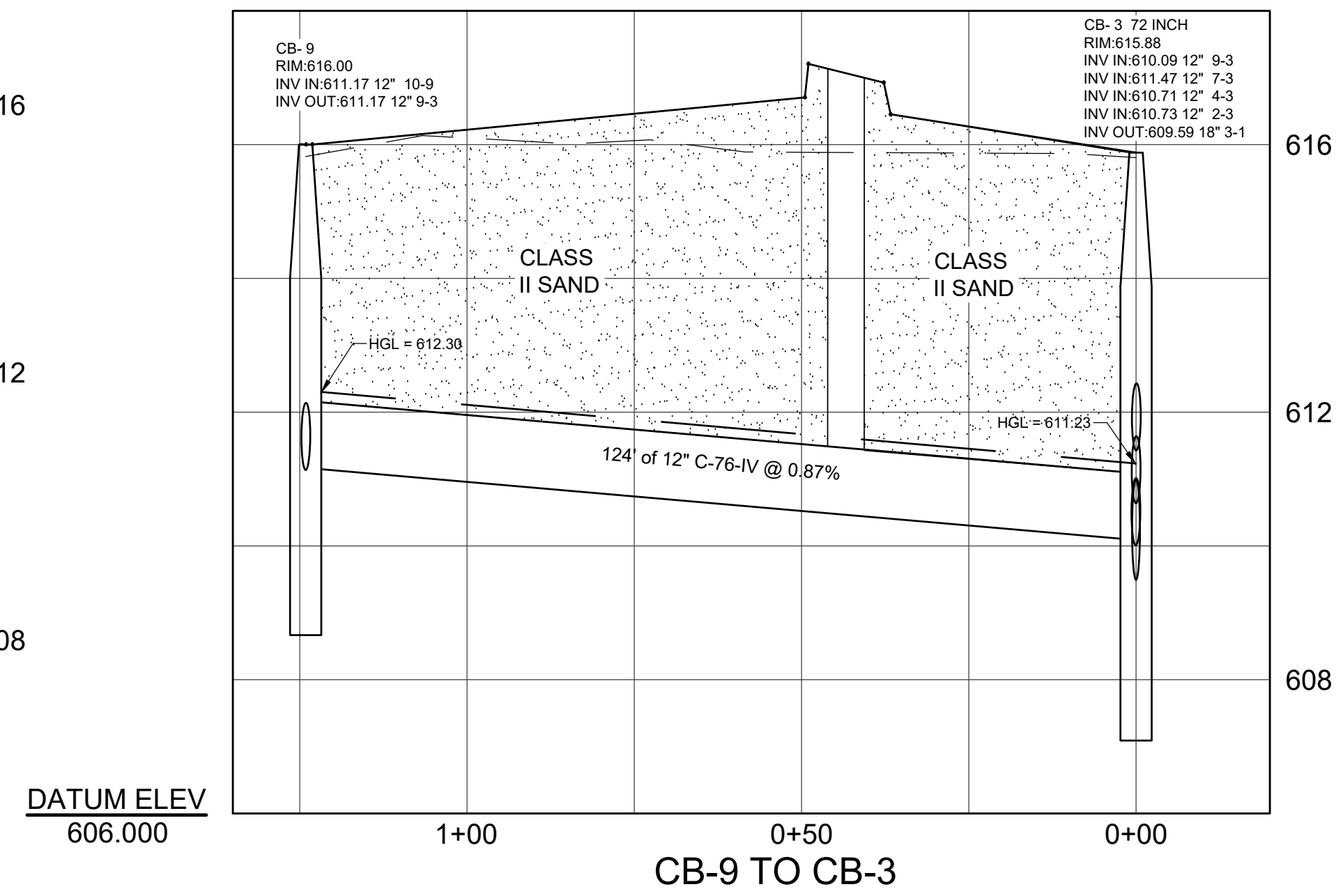
NOTES: Intensity = $31.66 / (\text{Inlet time} + 9.17)^{0.81}$ -- Return period = 10 Yrs. ; ** Critical depth

USE PIPE CROWN AT FOREBAY (PIPE IS FLOWING FULL)
INV = 609.96, CROWN = 611.46

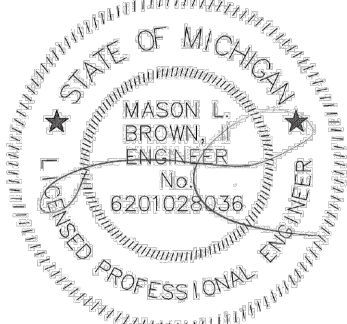
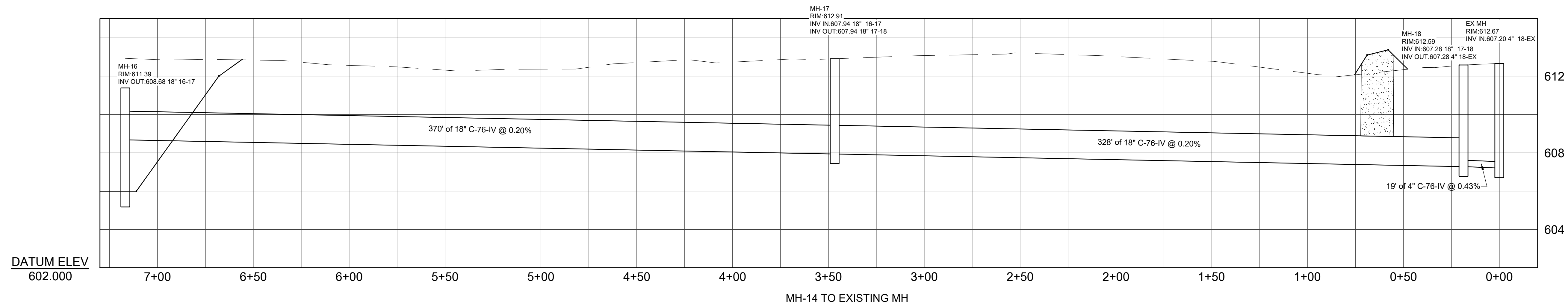
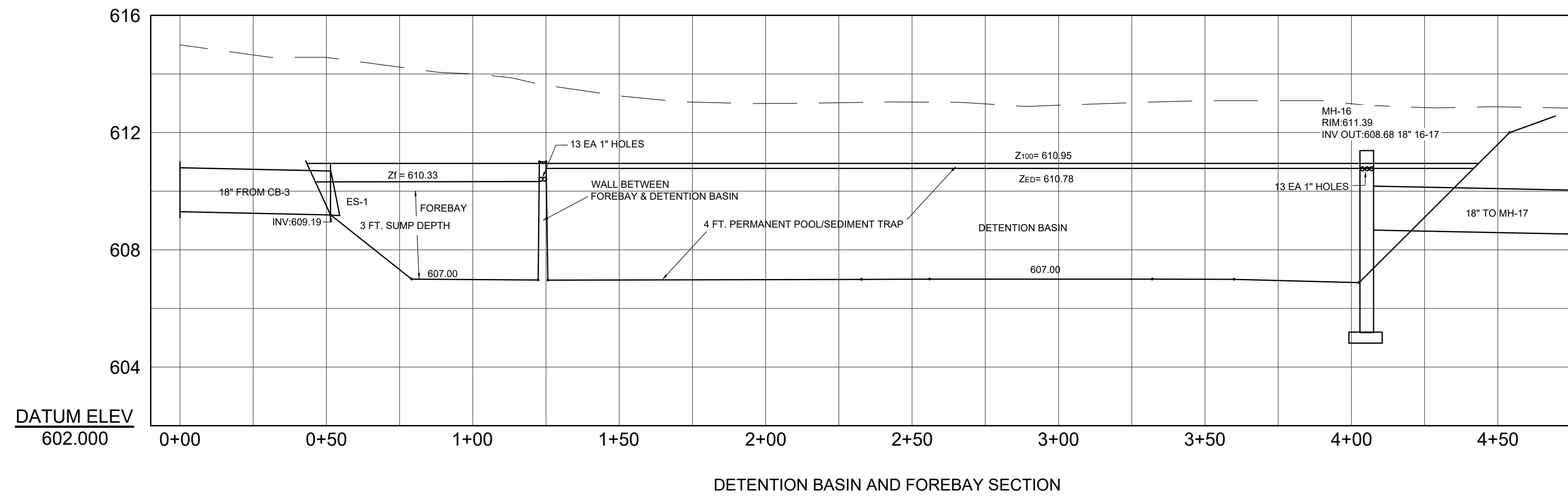




CB-6 TO ES-1



PERMIT/CONSTRUCTION: 2025-05-08



PERMIT/CONSTRUCTION: 2025-05-08

MASON BROWNS ASSOCIATES, LLC
CIVIL ENGINEERS & SURVEYORS
2708 BRIDLE ROAD
BLOOMFIELD HILLS, MICHIGAN 48304
(248) 225-9789 mason_brown@mbaengineers.net

STAHL'S AUTOMOTIVE MUSEUM EXPANSION
STORM SEWER PROFILES
AND DETENTION/FOREBAY SECTION
THREE RIVERS, MI
15300 BROADWAY RD

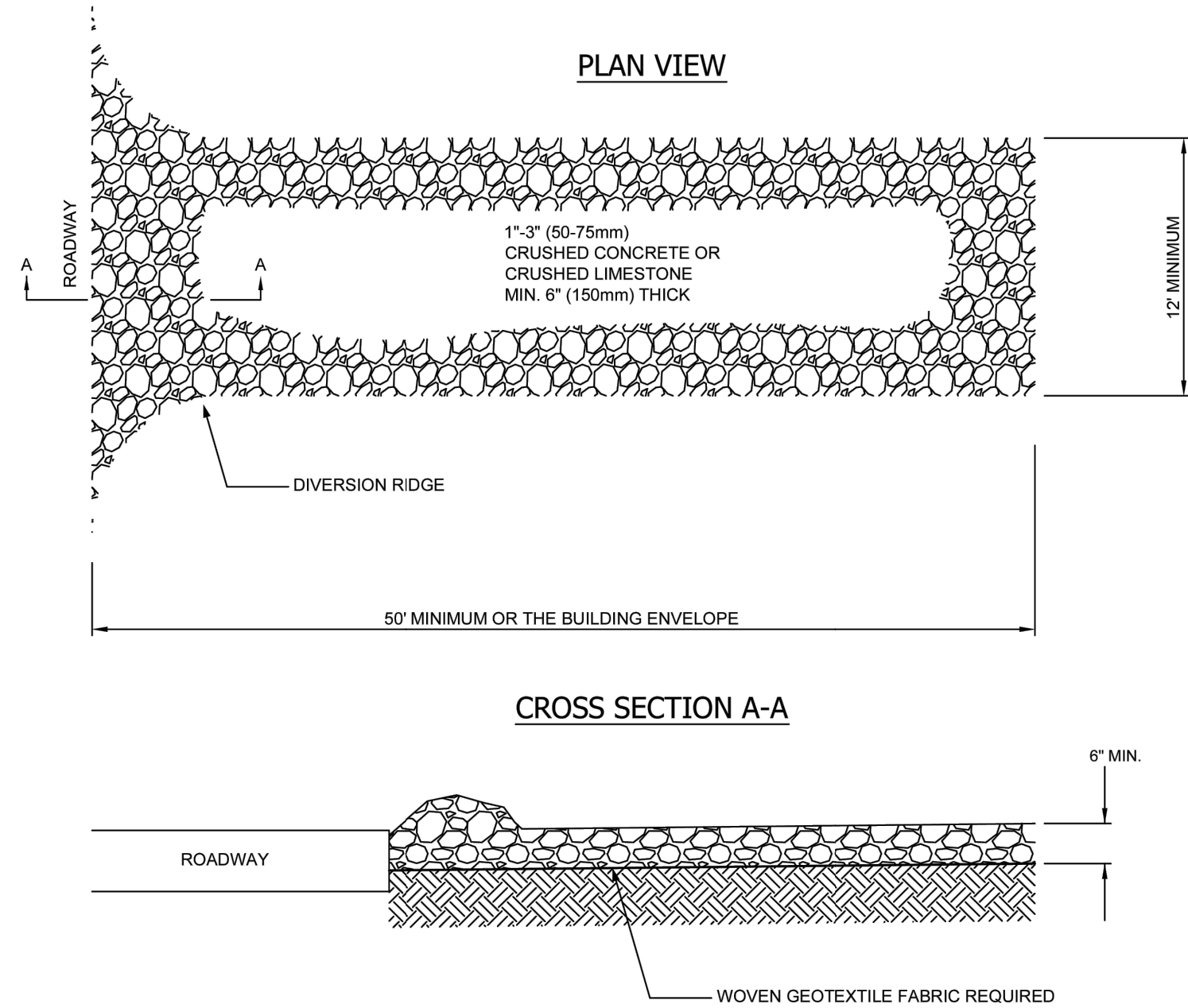
STAHL'S AUTOMOTIVE FOUNDATION
56516 North Bay Dr.
Chesterfield, MI 48051

15-048 2024.DWG	DESIGN: --	REVISIONS:
FIELD CK: net	DRAWN: mb	
	CHECKED: mb	

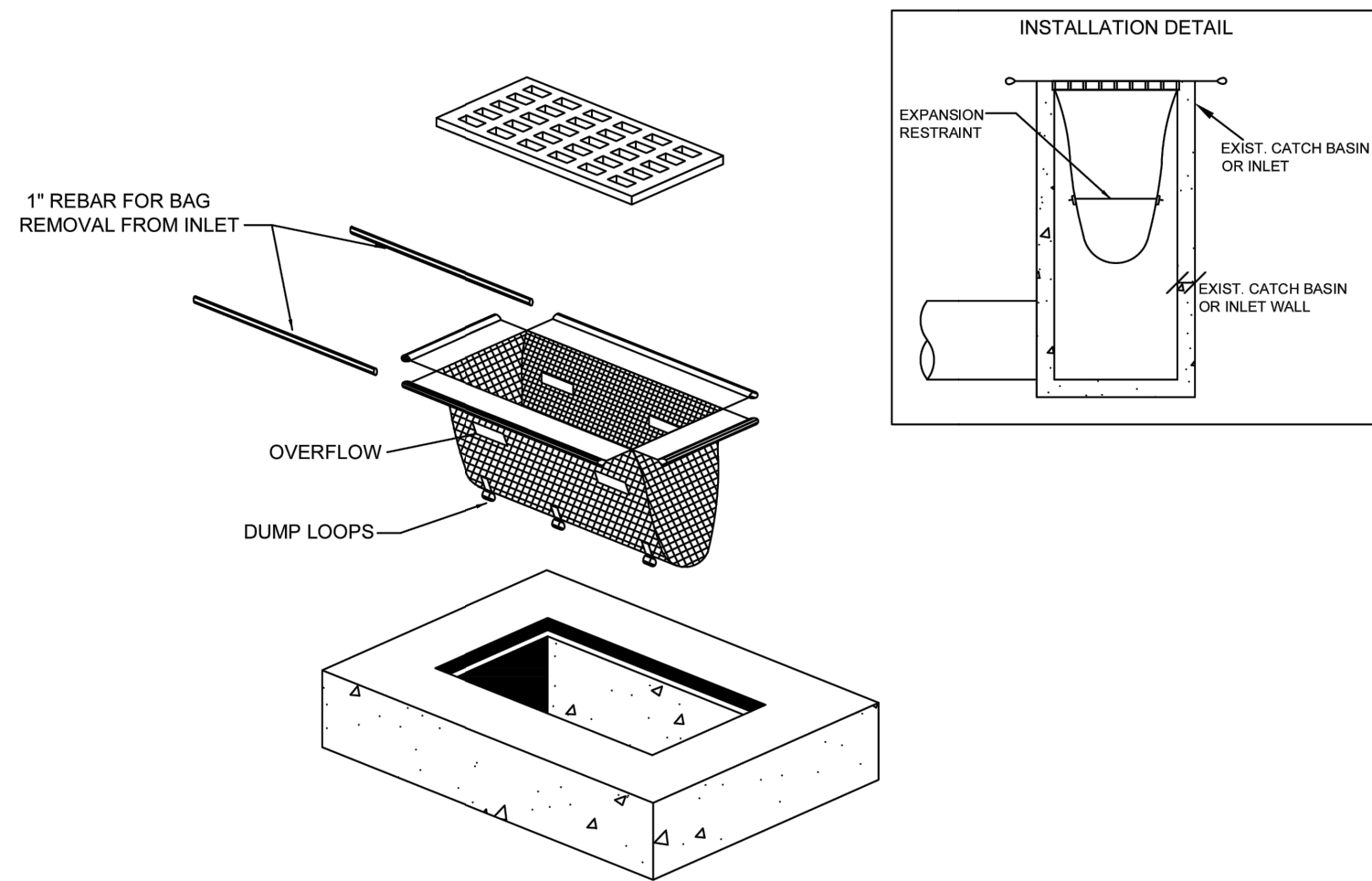
SCALE:
1"=20'
DATE:
12-06-2024
JOB NO.
15-048-H

SHEET
7

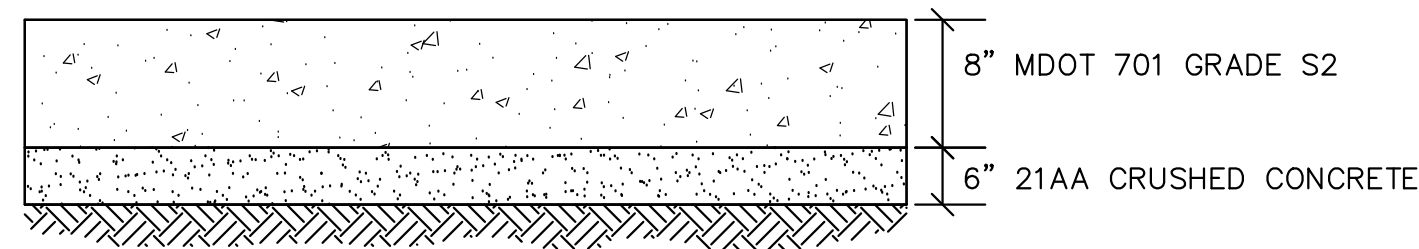
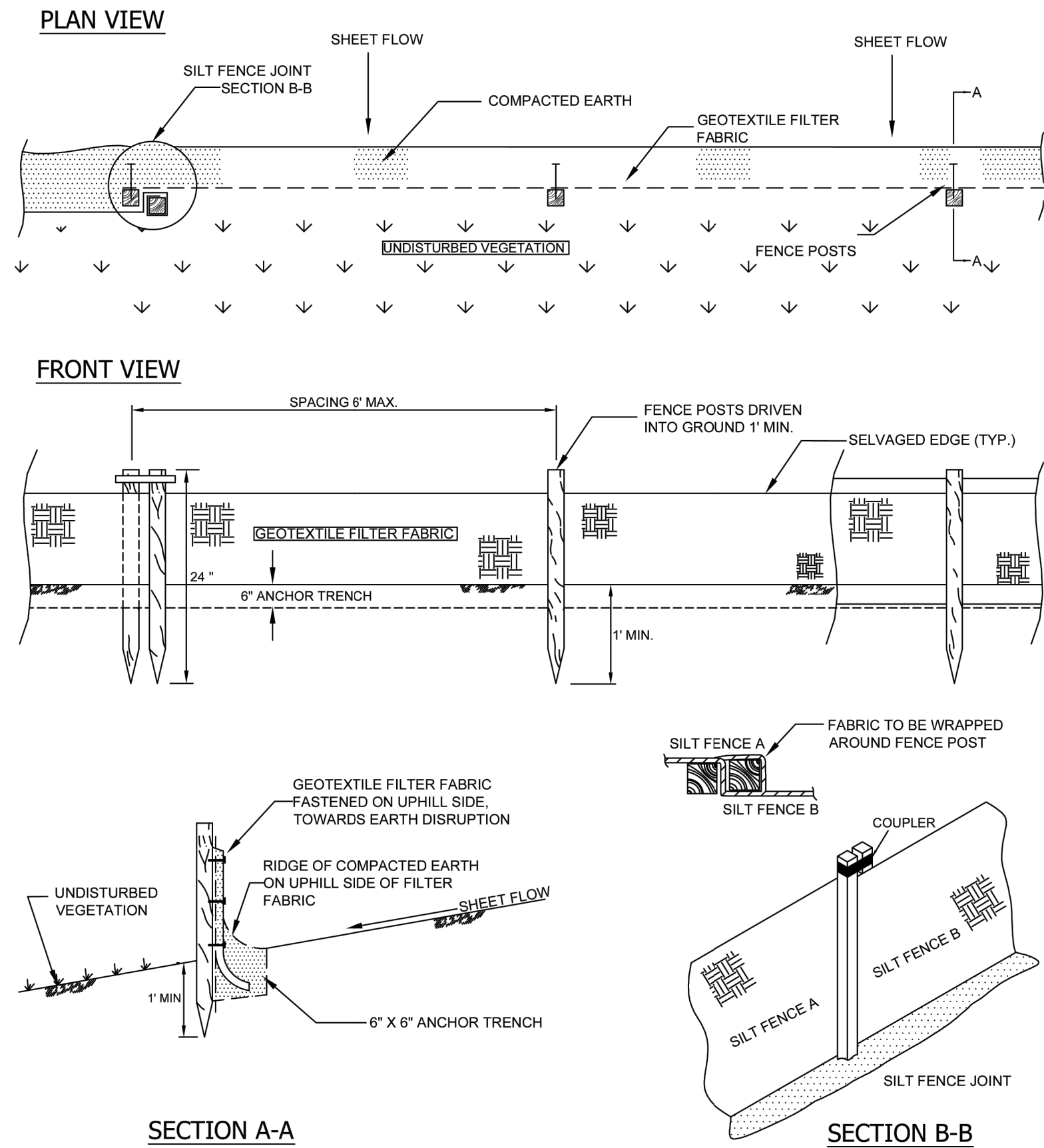
TEMPORARY STONE ACCESS DRIVE
(SESC-12)



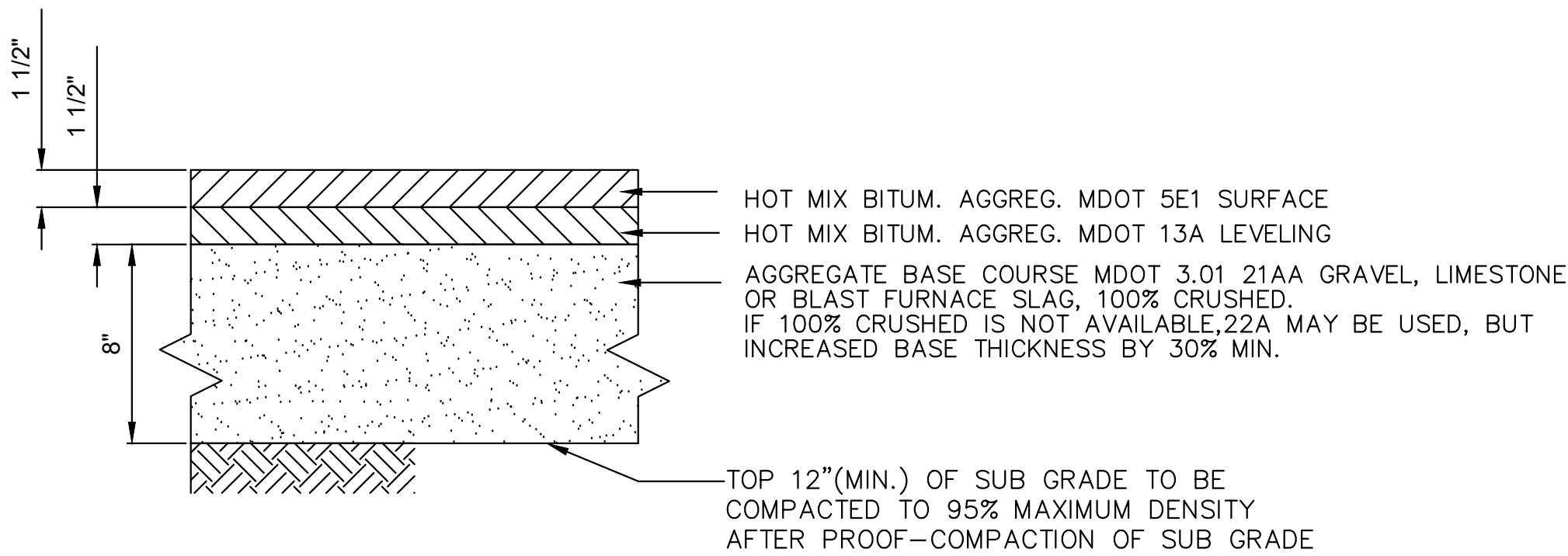
SACK TYPE INLET FILTER
(SESC-3)



SILT FENCE WITHOUT SUPPORT FENCE
(SESC-6)

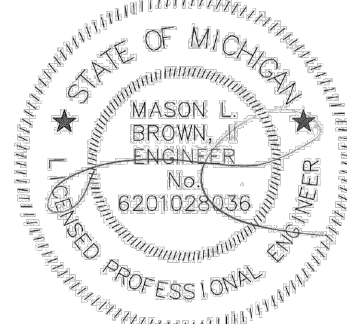


CONCRETE PAVING DETAIL PARKING LOT AND DRIVEWAYS
N.T.S.



ASPHALT PAVING DETAIL
N.T.S.

PERMIT/CONSTRUCTION: 2025-05-08



MASON BROWNS ASSOCIATES, LLC

CIVIL ENGINEERS & SURVEYORS

2708 BRIDLE ROAD

BLOOMFIELD HILLS, MICHIGAN 48304

(248) 225-9789 mason_brown@sbglobal.net

STAHL'S AUTOMOTIVE MUSEUM EXPANSION

SOIL EROSION CONTROL DETAILS

STAHL'S AUTOMOTIVE FOUNDATION

56516 North Boy Dr.

Chesterfield, MI 48051

Chesterfield, MI 48051

REVISIONS:

DESIGN: --

15-048 2024.DWG

SCALE:

NONE

DATE:

12-06-2024

JOB NO.

15-048-H

SHEET

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