

BENCHMARKS	
BM#1	ELEV 616.82
CHISEL MARK 26.4 FEET	
RIGHT OF STA 4+81	
BM#2	ELEV 605.44
CHISEL MARK SW COR.	
W. PARKWAY & MEADOWPARK	

PROJECT BMPs

- RIPRAP AT CULVERT ENDS
- SEED AND MULCH
- SEED AND MULCH BLANKET ON SLOPES
- NATIVE SEED ON FLOOD SHELF
- INSTALL INLET FILTERS IN CATCH BASINS
- EROSION CONTROL SILT FENCE



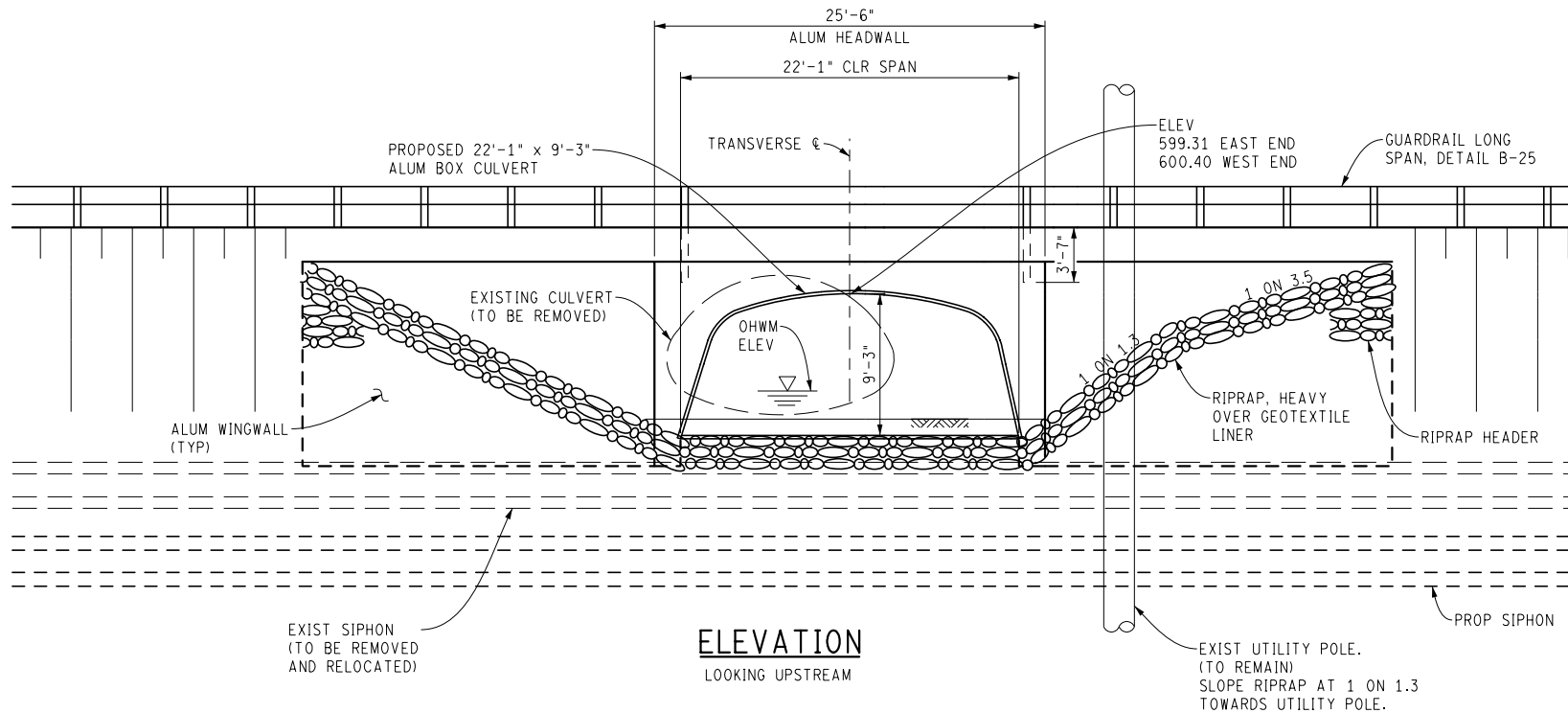
Storm drains with headwall and riprap tied into existing structures.

SOIL EROSION AND SEDIMENTATION	
(26)	EROSION CONTROL SILT FENCE
(55)	EROSION CONTROL FILTER BAG (BYPASS PUMPING)
(3)	SEED AND MULCH
(33)	SEED AND MULCH BLANKET

NOTE:
STAGING AND STOCKPILING OF MATERIALS WILL BE IN WEST PARKWAY ROAD.

PLAN REVISION 1 6/24/2019

CITY OF DETROIT	0 VERT. (FT) 25	DATE: 6/18/18	DATUM: NAVD 88	WEST PARKWAY CULVERT	DRAWING SHEET
	0 HORZ. (FT) 25	CITY/TOWNSHIP: DETROIT	TRS: T 15, R 10E, SEC 33	OVER ASHCROFT-SHERWOOD DRAIN	
FILE:		COUNTY: WAYNE			1 OF 4

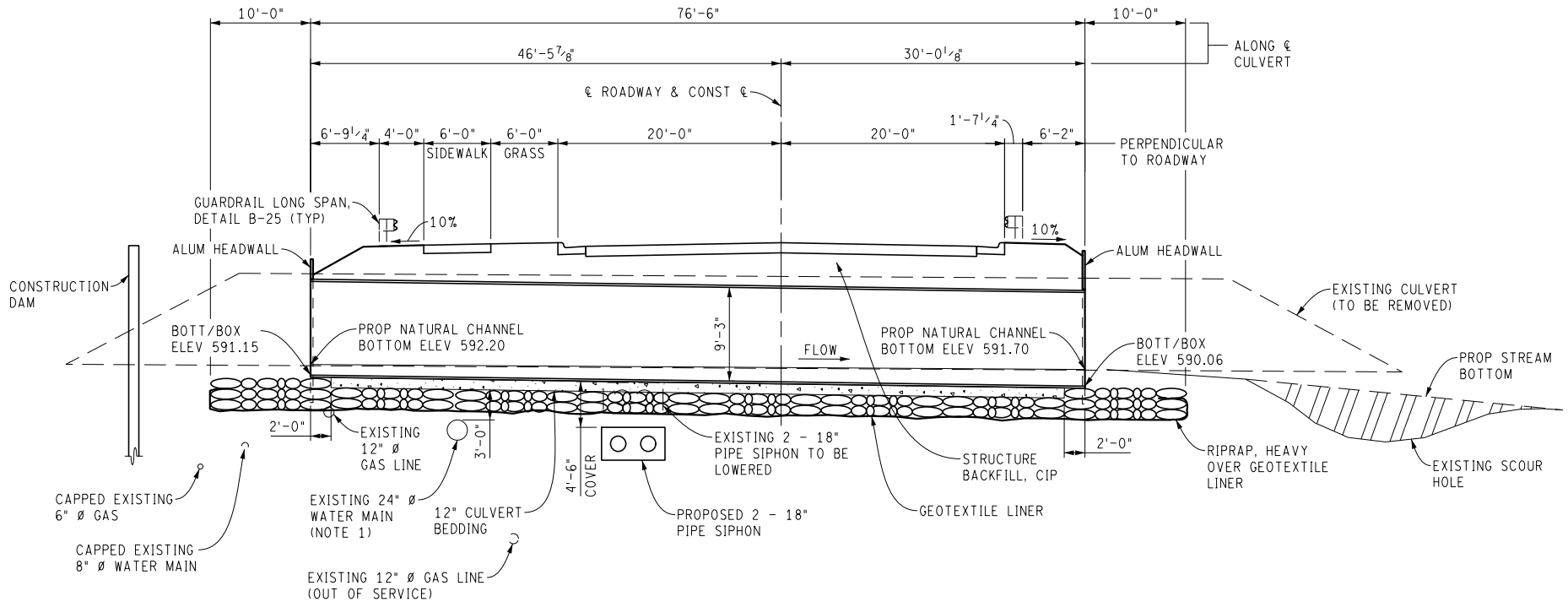


FLOOD DATA	Discharge (CFS)	EXISTING		3-SIDED CULV			VE: ALUMINUM BOX			
		WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	CHANGE IN WS U/S OF EXISTING STRUCTURE & PROPOSED	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	CHANGE IN WS U/S OF EXISTING STRUCTURE & VE	CHANGE IN WS U/S OF PROPOSED STRUCTURE & VE
50 YEAR	1500	605.92	9.03	605.7	9.68	-0.22	605.31	7.24	-0.61	-0.39
100 YEAR	1800	605.45	9.07	606.46	10.13	0.01	606.01	7.1	-0.44	-0.45

PLAN REVISION 1 6/24/2019

THE WATER SURFACE AND/OR ENERGY GRADE ELEVATIONS SHOWN ON THE ABOVE HYDRAULIC TABLE ARE TO BE USED FOR COMPARISON PURPOSES ONLY AND ARE NOT TO BE USED FOR ESTABLISHING A REGULATORY FLOODPLAIN. THE ELEVATIONS MAY BE USED PROVIDED THEY ARE VERIFIED WITH THE LAND AND WATER MANAGEMENT DIVISION, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY.

CITY OF DETROIT	0 VERT. (FT) 12 0 HORZ. (FT) 12	DATE: 6/18/18	DATUM: NAVD 88	WEST PARKWAY CULVERT	DRAWING	SHEET
		CITY/TOWNSHIP: DETROIT	TRS: T 1S, R 10E, SEC 33	OVER ASHCROFT-SHERWOOD DRAIN	2 OF 4	
FILE:		COUNTY: WAYNE				



SECTION A-A

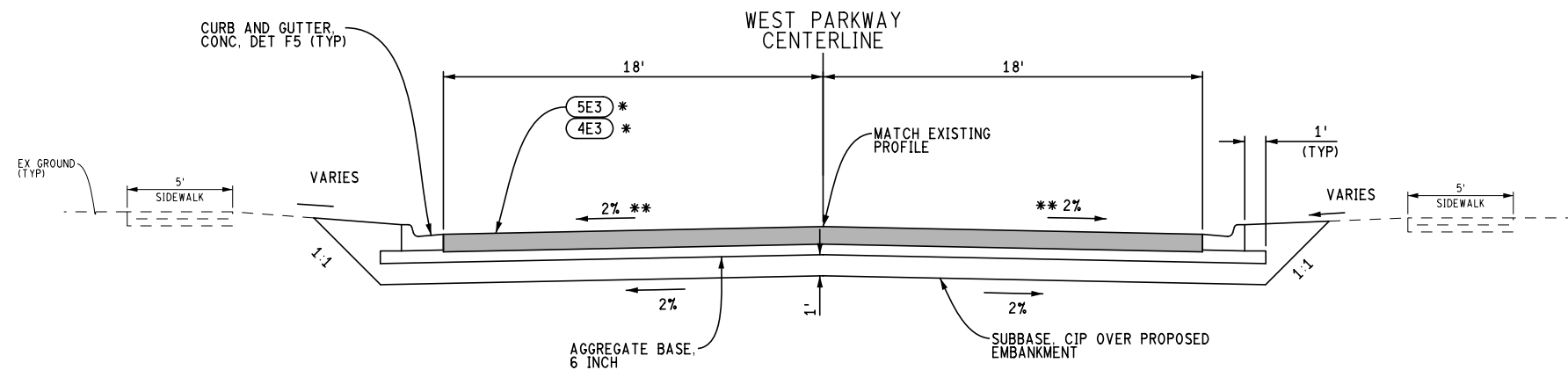
ALONG & CULVERT LOOKING NORTH

NOTE 1:

TOP OF 24" WATER MAIN ELEV 586.72
 BASED ON 18.72' BELOW BENCH MARK #2.

PLAN REVISION 1 6/24/2019

CITY OF DETROIT		DATE: 6/18/18	DATUM: NAVD 88	WEST PARKWAY CULVERT	DRAWING	SHEET
		CITY/TOWNSHIP: DETROIT	TRS: T 1S, R 10E, SEC 33	OVER ASHCROFT-SHERWOOD DRAIN	3 OF 4	
FILE:		COUNTY: WAYNE				



- * HMA, 5E3 OVER HMA, 4E3
MATCH EXISTING PAVEMENT DEPTH
- ** VARY TO TRANSITION INTO
EXISTING PAVT

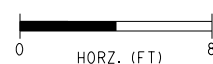
PROPOSED TYPICAL SECTION
SECTION APPLIES TO:
STA -1+78 TO STA 3+80

QUANTITIES		
Curb and Gutter, Rem	687	FT
Pavt, Rem	1374	SYD
Embankment, CIP	569	CYD
Aggregate Base, 6 inch	1603	SYD
Subbase, CIP (12 INCH)	560	CYD
HMA, 4E3	280	TON
HMA, 5E3	290	TON
Curb and Gutter, Conc, Det F5	688	FT
Mulch	229	SYD
Seeding, Mixture CR	70	LB
Topsoil	40	CYD

FINAL ROW PLAN REVISIONS		(SUBMITTAL DATE:)	
NO.	DATE	AUTH	DESCRIPTION
1	4/24/19	JMS	REVISED CULVERT LOCATION

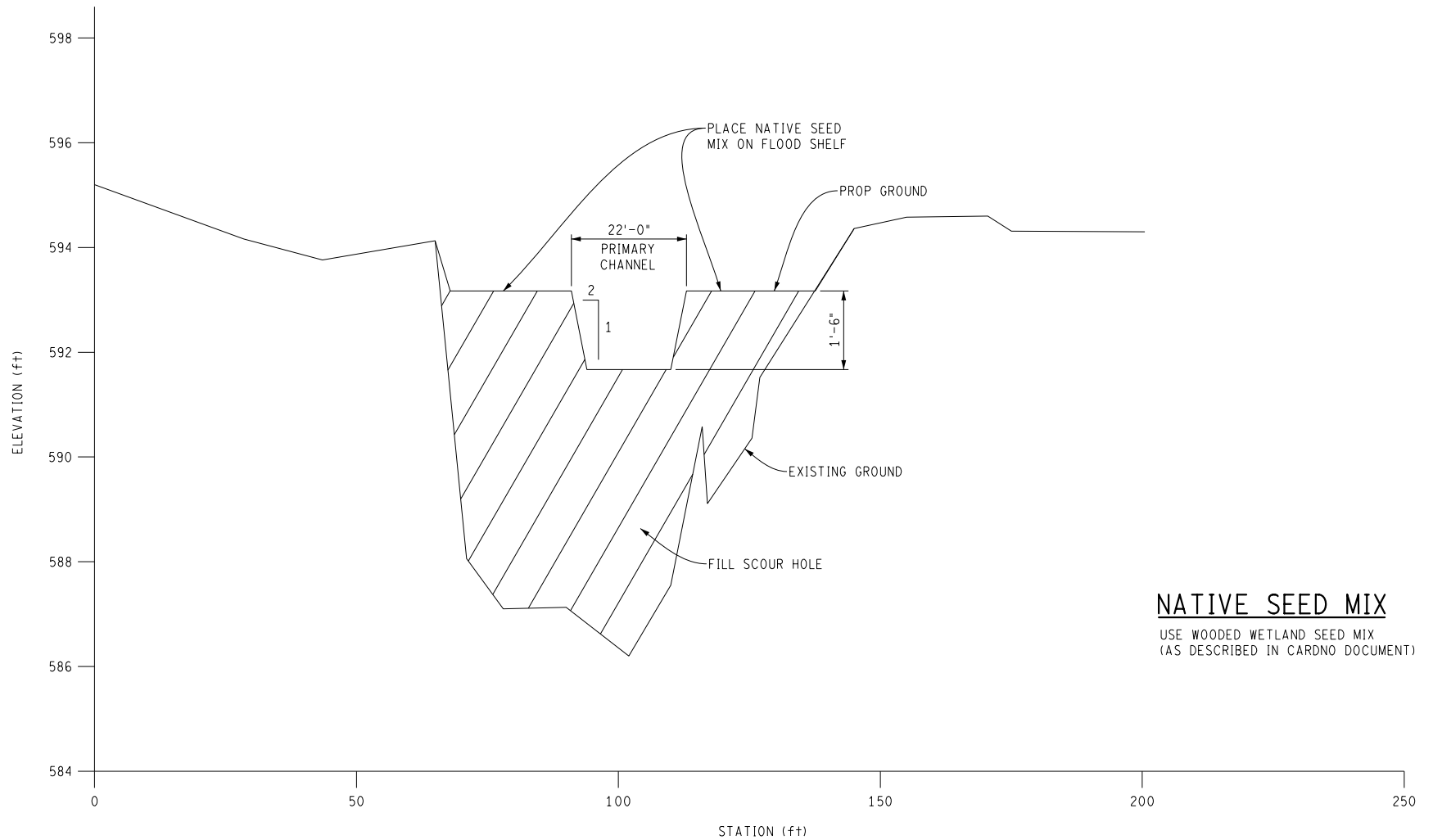


Z CONTRACTORS
50500 DESIGN LANE
SHELBY TWP, MI



DATE: 03/21/2019	JN:
FILE:	

WEST PARKWAY CULVERT	DRAWING	SHEET
PROPOSED SIPHON SHEET 3 OF 3		
ROAD TYPICAL AND QUANTITIES		



NATIVE SEED MIX
 USE WOODED WETLAND SEED MIX
 (AS DESCRIBED IN CARDNO DOCUMENT)

SECTION THROUGH SCOUR HOLE
 (DOWNSTREAM)

PLAN REVISION 1

CITY OF DETROIT	0 VERT. (FT) 3 0 HORZ. (FT) 30 	DATE: 6/18/18	DATUM: NAVD 88	WEST PARKWAY CULVERT	DRAWING	SHEET
		CITY/TOWNSHIP: DETROIT	TRS: T 1S, R 10E, SEC 33	OVER ASHCROFT-SHERWOOD DRAIN	4 OF 4	
FILE:		COUNTY: WAYNE				

BENCHMARKS

BM#1 ELEV=616.82
CHISEL MARK 26.4 FEET
RIGHT OF STA 4+81

BM#2 ELEV=605.44
CHISEL MARK SW COR.
W. PARKWAY & MEADOWPARK

WITNESSES

WITNESSES TO CP#2 EAST-W. PARKWAY, NORTH HAZELTON
55' FRONT LIGHTPOLE NORTH

CP#86 SW COR. W. PARKWAY & MEADOWPARK
5' N FIRE HYDRANT
7' W CURB LINE
30' S. SOUTH CURB LINE OF MEADOWPARK

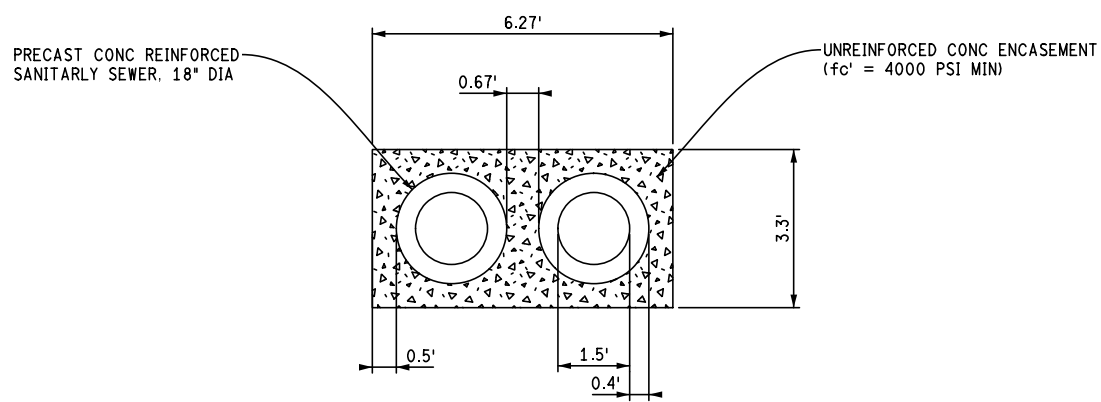
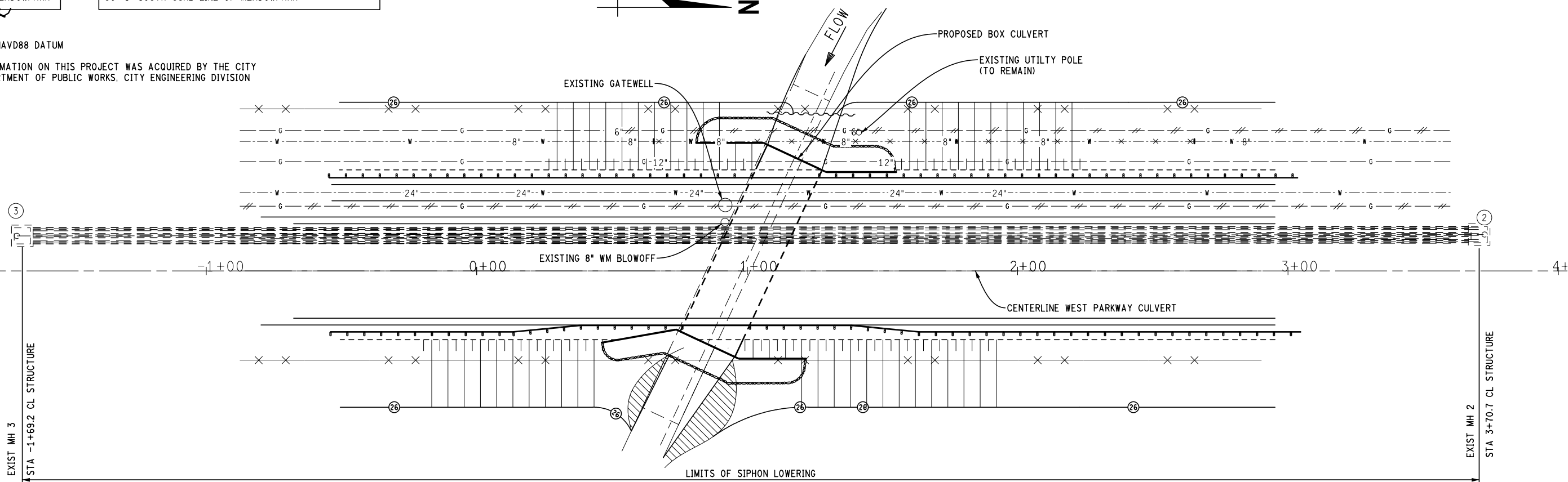
MEADOW PARK

SHERWOOD DRAIN

PLANS REFER TO NAVD88 DATUM

THE SURVEY INFORMATION ON THIS PROJECT WAS ACQUIRED BY THE CITY OF DETROIT DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION SURVEYOR.

WEST PARKWAY



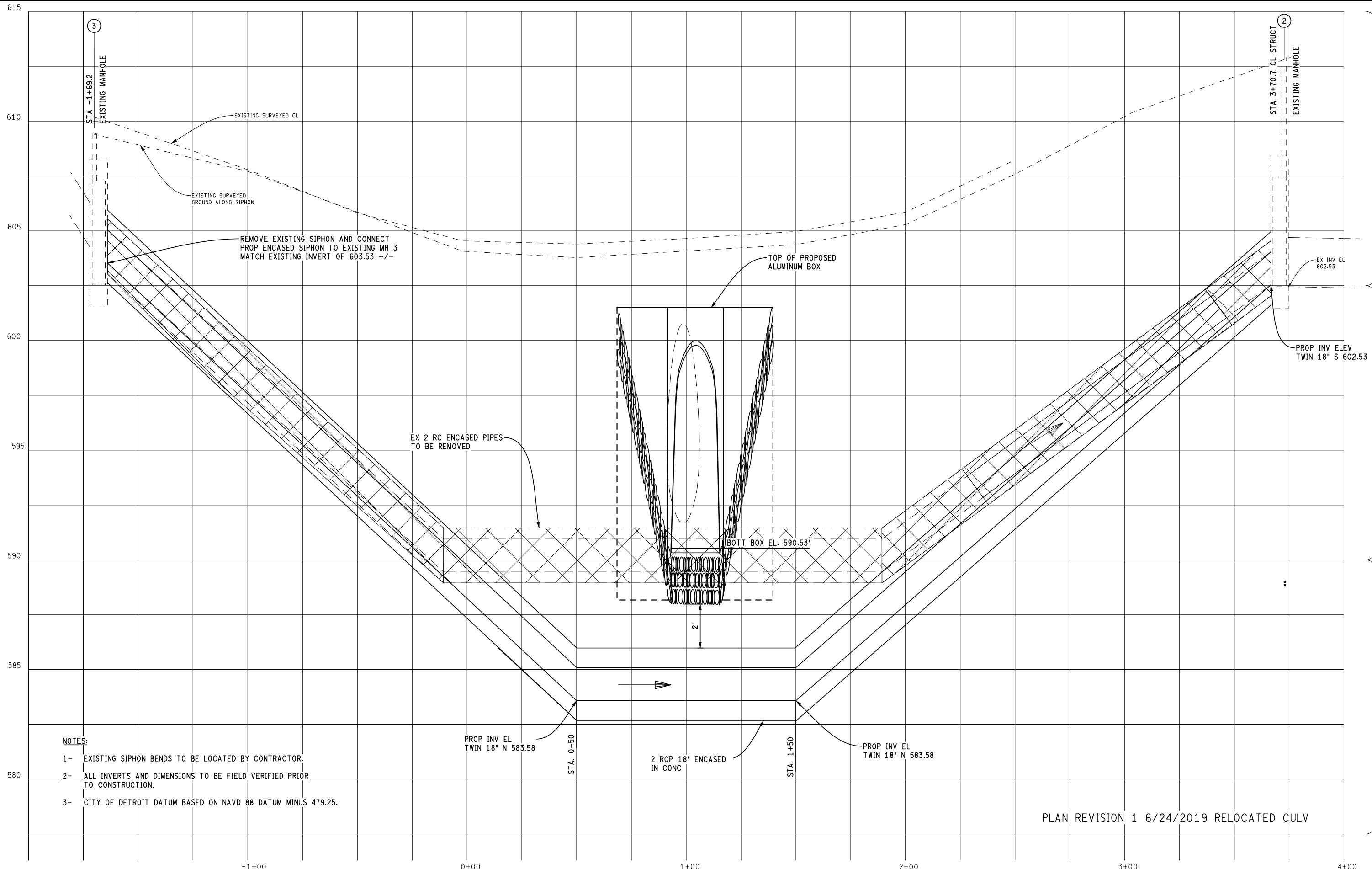
PROPOSED SIPHON CROSS SECTION

NOTES:

- 1. BYPASS PUMPING REQUIRED FOR THE DURATION OF THE SIPHON CONSTRUCTION

PLAN REVISION 1 6/24/2019 REVISED CULV

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)								Z CONTRACTORS		DATE: 04/09/2019		WEST PARKWAY CULVERT		DRAWING SHEET	
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	50500 DESIGN LANE		FILE:		PROPOSED SIPHON SHEET 1 OF 3			
1	6/24/19	JMS	REVISED CULVERT LOCATION					SHELBY TWP, MI		0 40		SITE PLAN			



- NOTES:**
- 1- EXISTING SIPHON BENDS TO BE LOCATED BY CONTRACTOR.
 - 2- ALL INVERTS AND DIMENSIONS TO BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
 - 3- CITY OF DETROIT DATUM BASED ON NAVD 88 DATUM MINUS 479.25.

PLAN REVISION 1 6/24/2019 RELOCATED CULV

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)				Z CONTRACTORS 50500 DESIGN LANE SHELBY TWP, MI				VERT. (FT) 4 HORZ. (FT) 40		DATE: 4/09/2019		JN:		WEST PARKWAY CULVERT		DRAWING SHEET
NO.	DATE	AUTH	DESCRIPTION					NO.	DATE	AUTH	DESCRIPTION	FILE:		PROPOSED SIPHON SHEET 2 OF 3		
1	6/24/19	JMS	REVISED CULVERT LOCATION							ELEVATION						

BENCHMARKS	
BM#1	ELEV=616.82 CHISEL MARK 26.4 FEET RIGHT OF STA 4+81
BM#2	ELEV=605.44 CHISEL MARK SW COR. W. PARKWAY & MEADOWPARK

WITNESSES	
WITNESSES TO CP#2 EAST-W. PARKWAY, NORTH HAZELTON 55' FRONT LIGHTPOLE NORTH	
CP#66 SW COR. W. PARKWAY & MEADOWPARK 5' W FIRE HYDRANT 7' W CURB LINE 30' S. SOUTH CURB LINE OF MEADOWPARK	

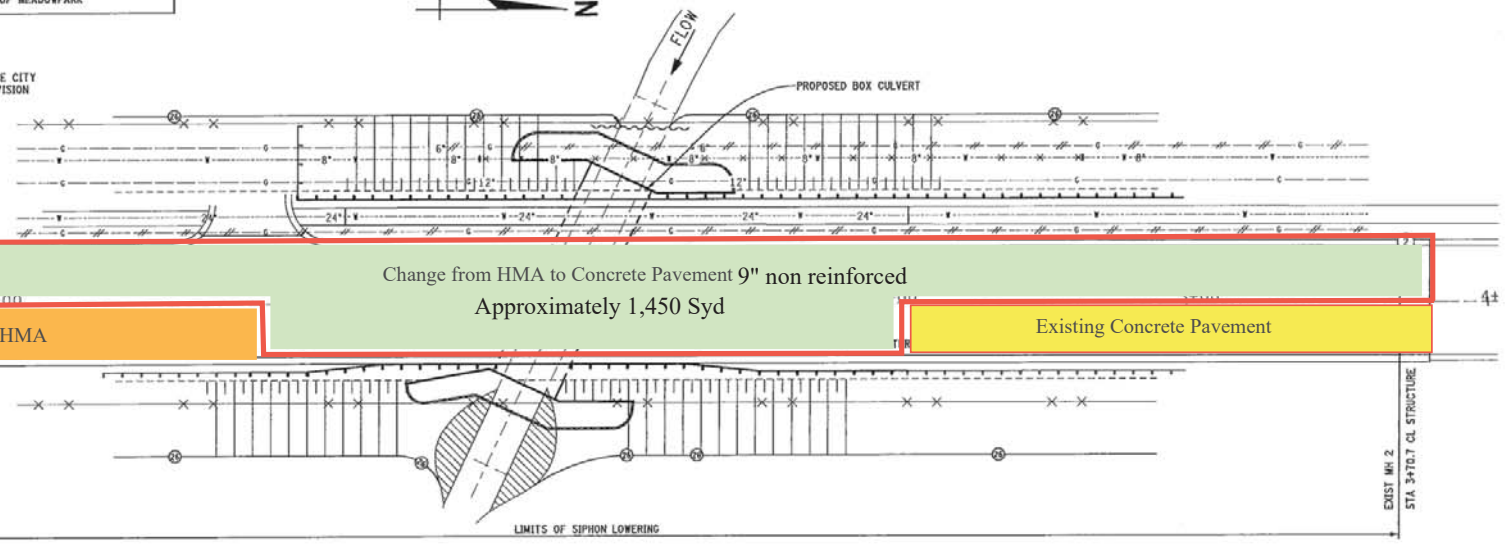
MEADOW PARK

SHERWOOD DRAIN



PLANS REFER TO NAVD88 DATUM

THE SURVEY INFORMATION ON THIS PROJECT WAS ACQUIRED BY THE CITY OF DETROIT DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION SURVEYOR.



WEST PARKWAY

FINAL ROW PLAN REVISIONS			SUBMITTAL DATE: 3		
NO.	DATE	AUTH.	NO.	DATE	AUTH.



FILE:

DATE: 04/09/2019

JN:

WEST PARKWAY CULVERT
PROPOSED SIPHON SHEET 1 OF 3
SITE PLAN

DRAWING SHEET

BENCHMARKS

BM#1 ELEV=616.82
CHISEL MARK 26.4 FEET
RIGHT OF STA 4+81

BM#2 ELEV=605.44
CHISEL MARK SW COR.
W. PARKWAY & MEADOWPARK

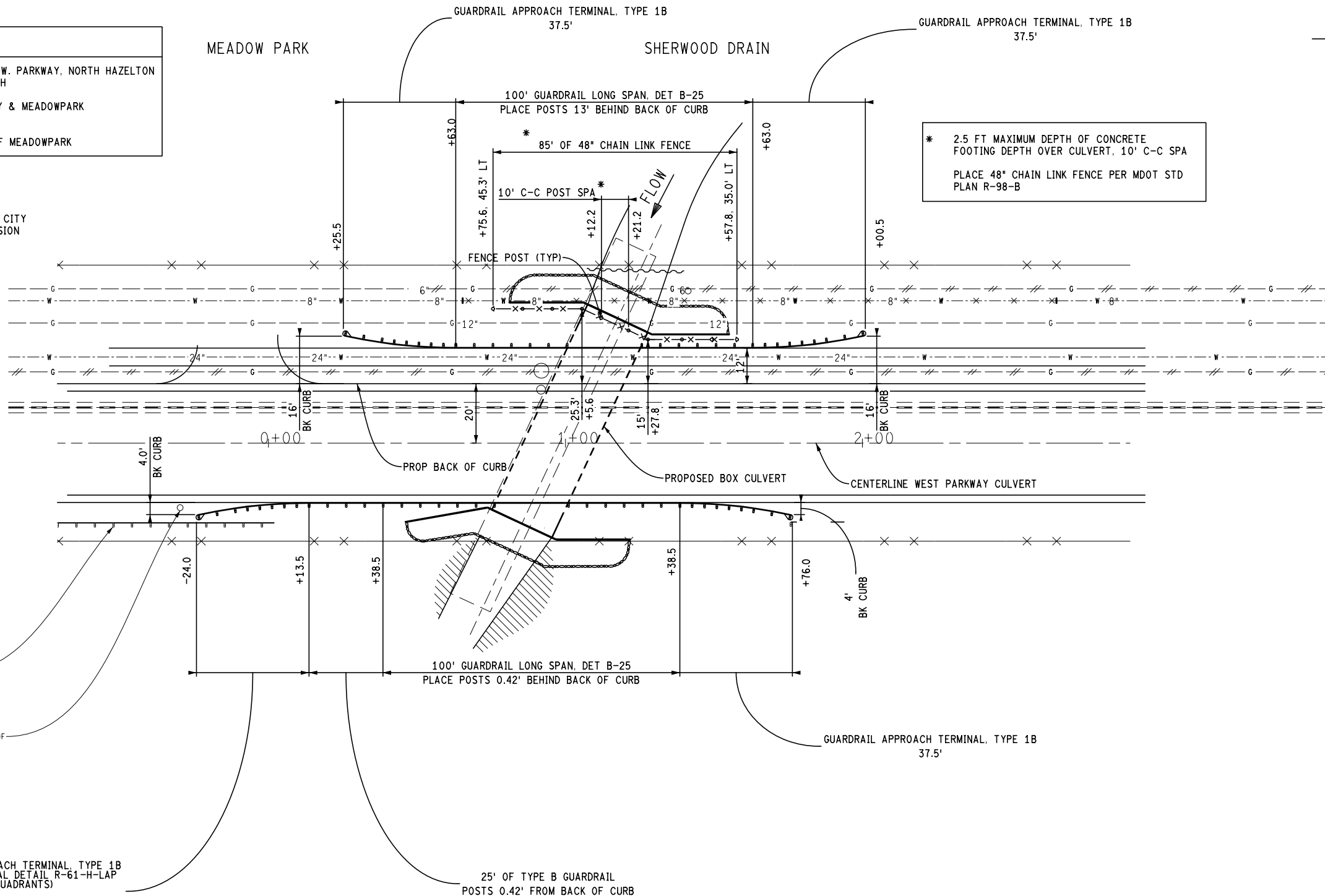
WITNESSES

WITNESSES TO CP#2 EAST-W. PARKWAY, NORTH HAZELTON
55' FRONT LIGHTPOLE NORTH

CP#86 SW COR. W. PARKWAY & MEADOWPARK
5' N FIRE HYDRANT
7' W CURB LINE
30' S. SOUTH CURB LINE OF MEADOWPARK

PLANS REFER TO NAVD88 DATUM

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* 2.5 FT MAXIMUM DEPTH OF CONCRETE FOOTING DEPTH OVER CULVERT, 10' C-C SPA
PLACE 48" CHAIN LINK FENCE PER MDOT STD PLAN R-98-B

REMOVE EXISTING GUARDRAIL WITHIN LIMITS OF PROPOSED GUARDRAIL. REMAINING GUARDRAIL TO REMAIN, NOT PART OF CULVERT REPLACEMENT

APPROXIMATE LOCATION OF STREET LIGHT

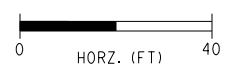
GUARDRAIL APPROACH TERMINAL, TYPE 1B
PLACE PER SPECIAL DETAIL R-61-H-LAP
(TYPICAL ALL 4 QUADRANTS)

LOCATE CULVERT TIE BACK STRAPS / RODS PRIOR TO PLACING GUARDRAIL AND FENCE POSTS

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION
1	6/24/19	JMS	REVISED CULVERT LOCATION				



Z CONTRACTORS
50500 DESIGN LANE
SHELBY TWP, MI



DATE: 11/5/19
JN:
FILE:

WEST PARKWAY CULVERT		DRAWING	SHEET
GUARDRAIL LAYOUT SHEET			
48" CHAIN LINK FENCE LAYOUT (WEST SIDE)			

IMPORTANT:
ASSEMBLY INSTRUCTIONS WILL BE SHIPPED WITH THE STRUCTURE. THEY ARE LOCATED IN THE BRIGHTLY COLORED BOLT KEG.

NOTES:

- INVERT END OF HAUNCH PLATES PAINTED RED.
- WHEN A FULL CORRUGATED INVERT IS USED, IT IS ANTICIPATED THAT NO BACKFILL MATERIAL WILL BE PLACED INSIDE THE STRUCTURE AND ON TOP OF THE INVERT PLATES. THEREFORE, SCALLOPED CLOSURE PLATES ARE TO BE CLIPPED TO THE OUTSIDE OF THE RECEIVING CHANNEL TO MINIMIZE BACKFILL INFILTRATION IN THE VALLEYS OF THE CORRUGATED INVERT PLATE BELOW THE RECEIVING CHANNEL. **NOTE:** THIS DOES NOT MAKE A JOINT TIGHT ENOUGH TO PREVENT INFILTRATION OF FINE SILTS OR SANDS. THE USE OF A GEOTEXTILE PREVENTS THE INFILTRATION OF THE BACKFILL THROUGH THE UNFILLED BOLT HOLES AND THE SPACE BETWEEN THE INVERT PLATE AND THE SCALLOP PLATE. A ROLL OF GEOTEXTILE IS PROVIDED FOR THIS PURPOSE. WHEN SHORT FOOTING PADS ARE USED, THE SCALLOPED CLOSURE PLATES ARE NOT PROVIDED UNLESS ORDERED AS AN EXTRA, SINCE IT IS ANTICIPATED THESE FOOTING PLATES WILL BE BURIED.
- INVERT END OF HAUNCH RIBS PAINTED RED.

GENERAL NOTES:

- CONFIRMATION OF COVER - THIS STRUCTURE IS WITHIN THE MINIMUM AND MAXIMUM ALLOWABLE HEIGHT OF COVER, FOR THE DESIGNATED LOADING, AS FOLLOWS:

LOADING: HS-25
MINIMUM COVER (FT): 3.25
MAXIMUM COVER (FT): 5

- FOR PROPER BOLT SIZE USAGE, REFER TO THE FOLLOWING:

PLATE ONLY

	1 PLATE	2 PLATE	3 PLATE	4 PLATE
0.100" - 0.125" THK. PLATE		1 1/4"	1 1/4"	1 1/2"
0.150" - 0.175" THK. PLATE		1 1/4"	1 1/2"	2"
0.200" - 0.250" THK. PLATE		1 1/2"	2"	2"

PLATE W/ T2 OR T4 REINFORCING RIB OR RECEIVING CHANNEL

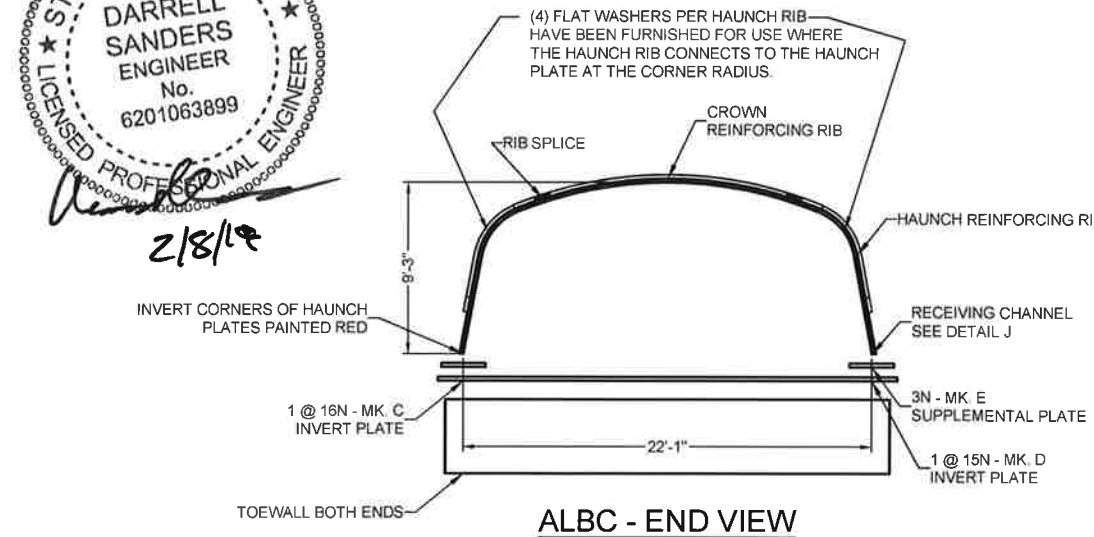
	1 PLATE	2 PLATE	3 PLATE	4 PLATE
0.100" - 0.125" THK. PLATE	1 1/4"	1 1/2"	1 1/2"	2"
0.150" - 0.175" THK. PLATE	1 1/4"	1-1/2"	2"	2"
0.200" - 0.225" THK. PLATE	1 1/2"	2"	2"	2"
0.250" THK. PLATE	1 1/2"	2"	2"	2 1/2"

PLATE W/ T6 REINFORCING RIB

	1 PLATE	2 PLATE	3 PLATE	4 PLATE
0.100" - 0.125" THK. PLATE	1 1/2"	2"	2"	2"
0.150" - 0.175" THK. PLATE	2"	2"	2"	2 1/2"
0.200" - 0.225" THK. PLATE	2"	2"	2 1/2"	2 1/2"
0.250" THK. PLATE	2"	2"	2 1/2"	2 1/2"

- NUTS MAY BE LOCATED ON STRUCTURE'S INTERIOR OR EXTERIOR TO ALLOW CONVENTIONAL ACCESS DURING ASSEMBLY AND TORQUING. ONLY ONE SIDE OF NUT HAS A CURVED SURFACE AND IT SHOULD BE IN DIRECT CONTACT WITH PLATE VALLEY.
- ALL PLATE LAPS AND REINFORCING RIBS MUST BE PROPERLY MATED IN A TANGENT FASHION USING PROPER ALIGNMENT TECHNIQUES AND HELD IN ALIGNMENT BY FASTENERS (FINGER TIGHTENED ONLY). BEFORE BACKFILLING COMMENCES, ALL FASTENERS MUST BE TORQUED FOR ADEQUATE COMPONENT CONTACT. GOOD COMPONENT FIT IS BETTER THAN HIGH TORQUE.
- FASTENER TORQUE REQUIREMENTS: 0.100" THICK PLATE AT 90-155 FOOT-POUNDS. FOR ALL THICKER PLATES AND REINFORCING RIBS, TORQUE AT 115-135 FOOT-POUNDS. TORQUE LEVELS ARE FOR INSTALLATION, NOT RESIDUAL, IN-SERVICE REQUIREMENTS. SINCE TORQUEING MAY LOOSEN PREVIOUSLY TIGHTENED FASTENERS, MULTIPLE PASSES MAY BE NECESSARY. WHEN SEAM SEALANT TAPE IS USED, FASTENERS SHOULD BE TORQUED AGAIN AFTER 24 HOURS.
- ALL ALUMINUM STRUCTURAL PLATE MATERIAL IS MANUFACTURED IN ACCORDANCE WITH AASHTO M219, ASTM B746 AND ASTM B864 SPECIFICATIONS. SEE ASSEMBLY INSTRUCTIONS SHIPPED WITH MATERIAL IN FASTENER CONTAINER. ALSO REFER TO SPECIFIC PRODUCT CATALOG FOR ADDITIONAL PRODUCT INFORMATION.

THE ASSEMBLY BOLTS AND NUTS ARE SPECIALLY DESIGNED WITH ROUNDED OR SPHERICAL THROATS FOR FITTING EITHER THE CREST OR VALLEY OF THE CORRUGATIONS, PROVIDING MAXIMUM BEARING CONTACT AREA WITH THE PLATES WITHOUT THE USE OF WASHERS. NOTE THAT THE BOLTS AND NUTS SHOULD BE INSTALLED SUCH THAT THE ROUNDED PORTION IS IN CONTACT WITH THE PLATES.



ALBC - END VIEW

FOR APPROVAL

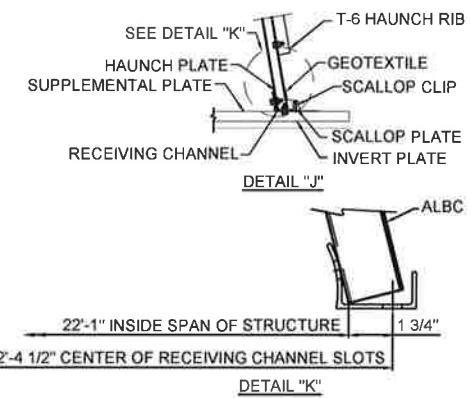
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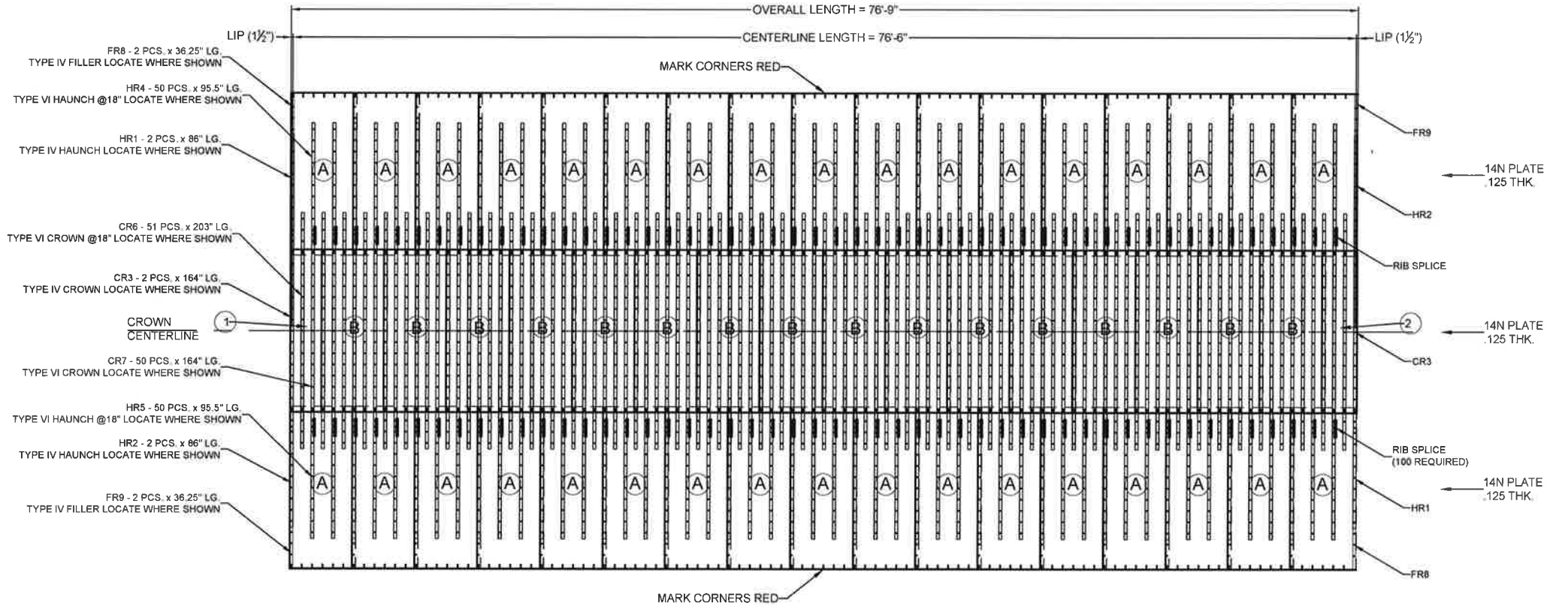
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DRAWING

WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET

TYPE: BOX		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN
SIZE: 60R2		SKEW	0	
SPAN: 22'-1"		BEVEL	0	
RISE: 9'-3"				NUMBER OF STRUCTURES: 1
LENGTH @ c: 76'-6"				



DETAIL "K"

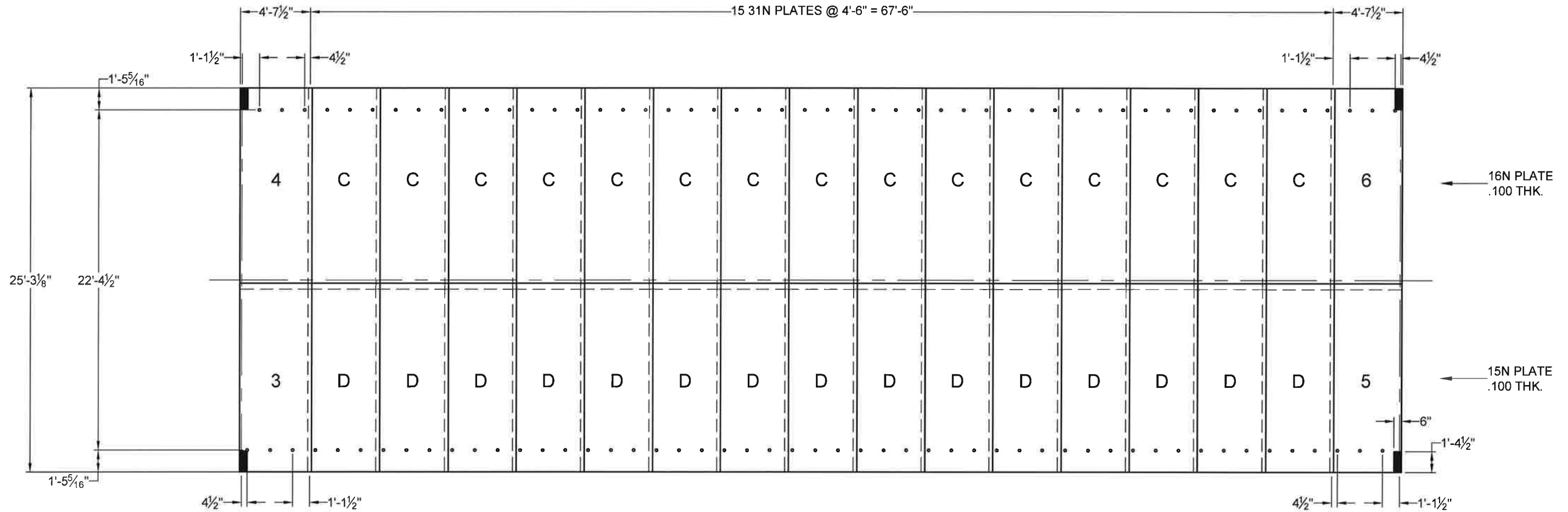


ALBC - DEVELOPED PLAN (OUTSIDE VIEW)
22'-1" SPAN x 9'-3" RISE

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1	02/06/2019	PER REVIEW	JSC
MARK	DATE	REVISION DESCRIPTION	BY

PROJECT No:	576329	SEQ. No.:	010	DATE:	1/10/2019
DESIGNED:		DRAWN:	JSC		
CHECKED:		APPROVED:			
SHEET NO.:	1 OF 9				



ALBC - INVERT PLATES PLAN VIEW

- NOTES:
1. USE 1-1/4" LG. BOLTS ON OVERLAPPING SEAM
 2. NOTCH PLATES 3, 4, 5, AND 6



FOR APPROVAL

TYPE: BOX SIZE: 60R2 SPAN: 22'-1" RISE: 9'-3" LENGTH @ ϵ : 76'-6"		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN NUMBER OF STRUCTURES: 1
	SKEW	0	0	
	BEVEL	0	0	

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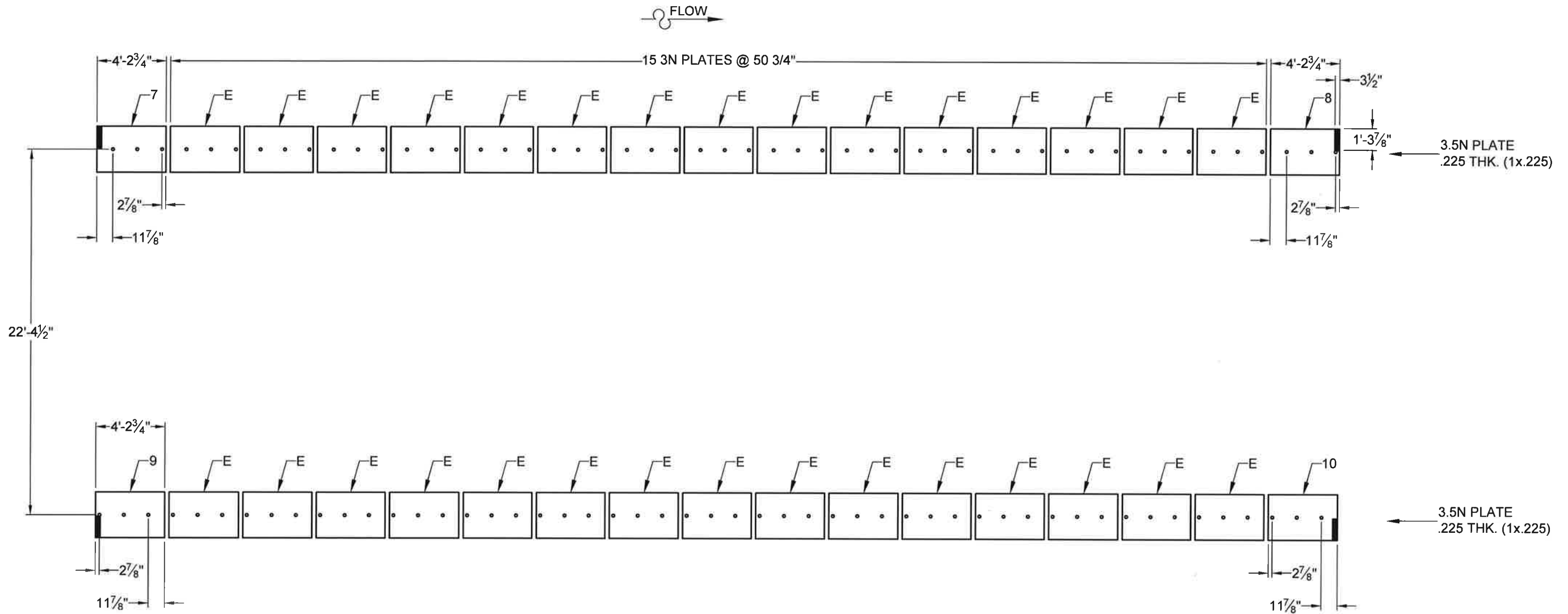
MARK	DATE	REVISION DESCRIPTION	BY
1	02/06/2019	PER REVIEW	JSC

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CONTRACT
DRAWING

WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET
DETROIT, MI

PROJECT No: 576329	SEQ. No.: 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO: 2 OF 9		



ALBC - SUPPLEMENTAL PLATES PLAN VIEW

- NOTES:
- 2-7/8" DIM. EDGE OF PLATES RED
 - 3-1/4" GAP TYP. BETWEEN PLATES
 - NOTCH PLATES 7, 8, 9, AND 10



TYPE: BOX SIZE: 60R2 SPAN: 22'-1" RISE: 9'-3" LENGTH @ ϵ : 76'-6"		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN NUMBER OF STRUCTURES: 1
	SKEW	0	0	
	BEVEL	0	0	

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WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET

DETROIT, MI

PROJECT No. 576329	SEQ No. 010	DATE 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.: 3 OF 9		

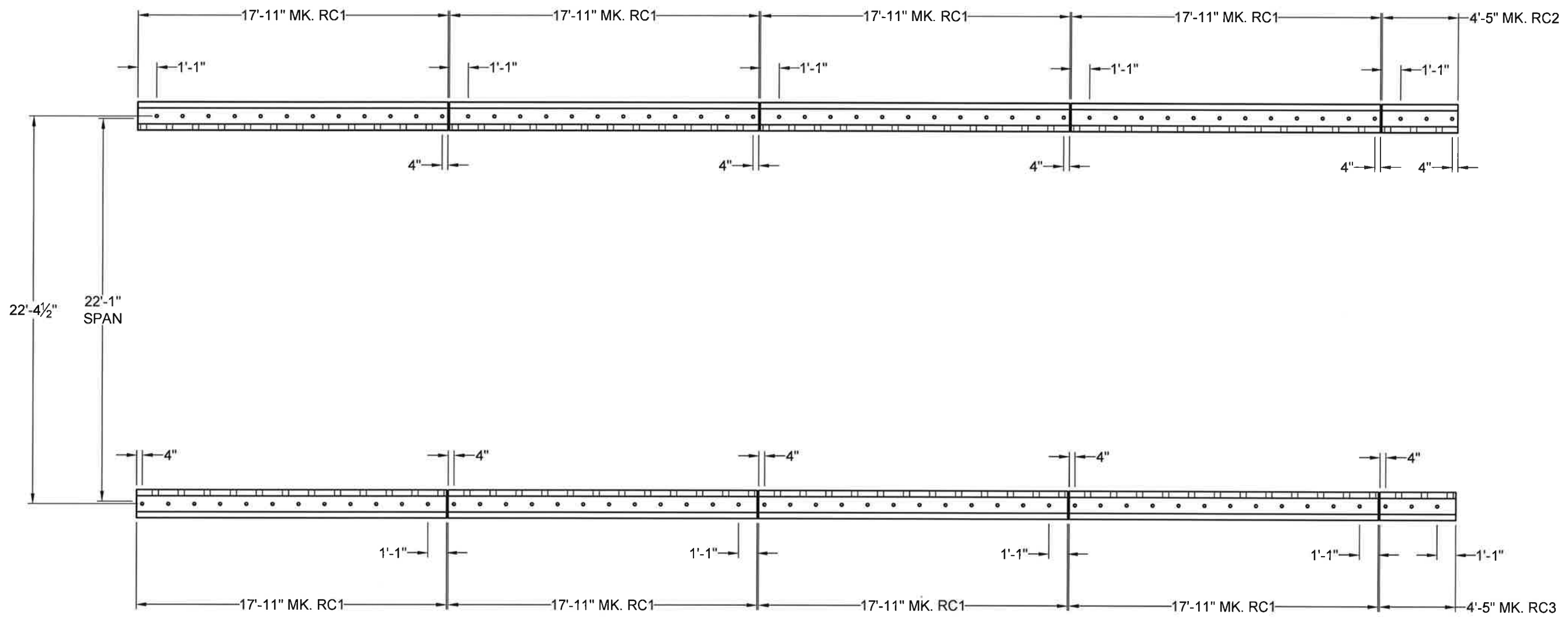
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MARK	DATE	REVISION DESCRIPTION	BY
1	02/06/2019	PER REVIEW	JSC

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FLOW →



ALBC - RECEIVING CHANNEL PLAN VIEW

NOTE: 1" GAP BETWEEN ADJACENT RECEIVING CHANNELS



TYPE: BOX SIZE: 60R2 SPAN: 22'-1" RISE: 9'-3" LENGTH @ c: 76'-6"		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN NUMBER OF STRUCTURES: 1
	SKEW	0	0	
	BEVEL	0	0	

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CONTRACT
DRAWING

WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET
DETROIT, MI

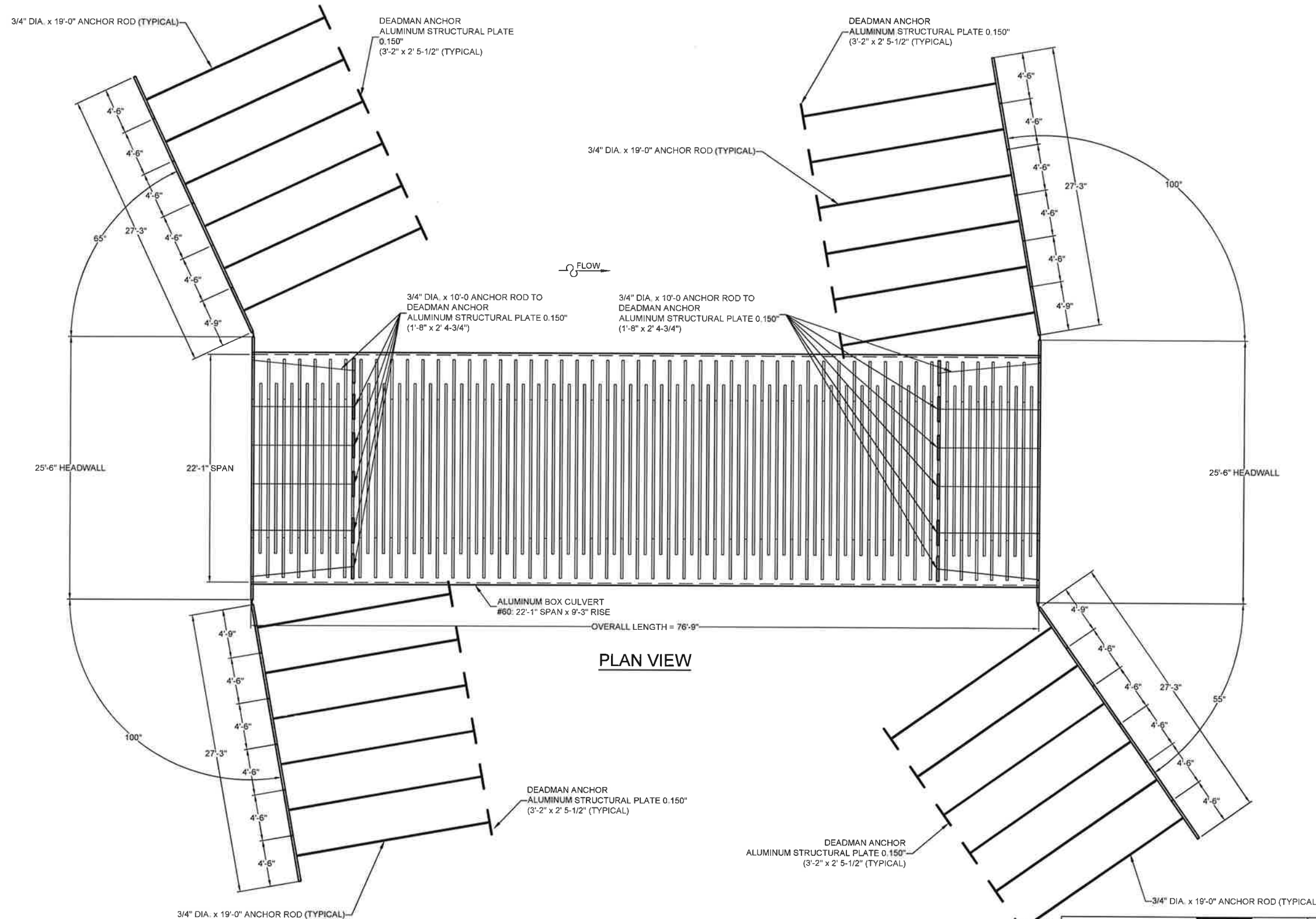
PROJECT No.: 576329	SEQ. No.: 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.: 4 OF 9		

MARK	DATE	REVISION DESCRIPTION	BY
1	02/06/2019	PER REVIEW	JSC

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PLAN VIEW



TYPE: BOX		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN NUMBER OF STRUCTURES: 1
SIZE: 60R2				
SPAN: 22'-1"				
RISE: 9'-3"				
LENGTH @ 1: 76'-6"				

FOR APPROVAL



WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET

DETROIT, MI

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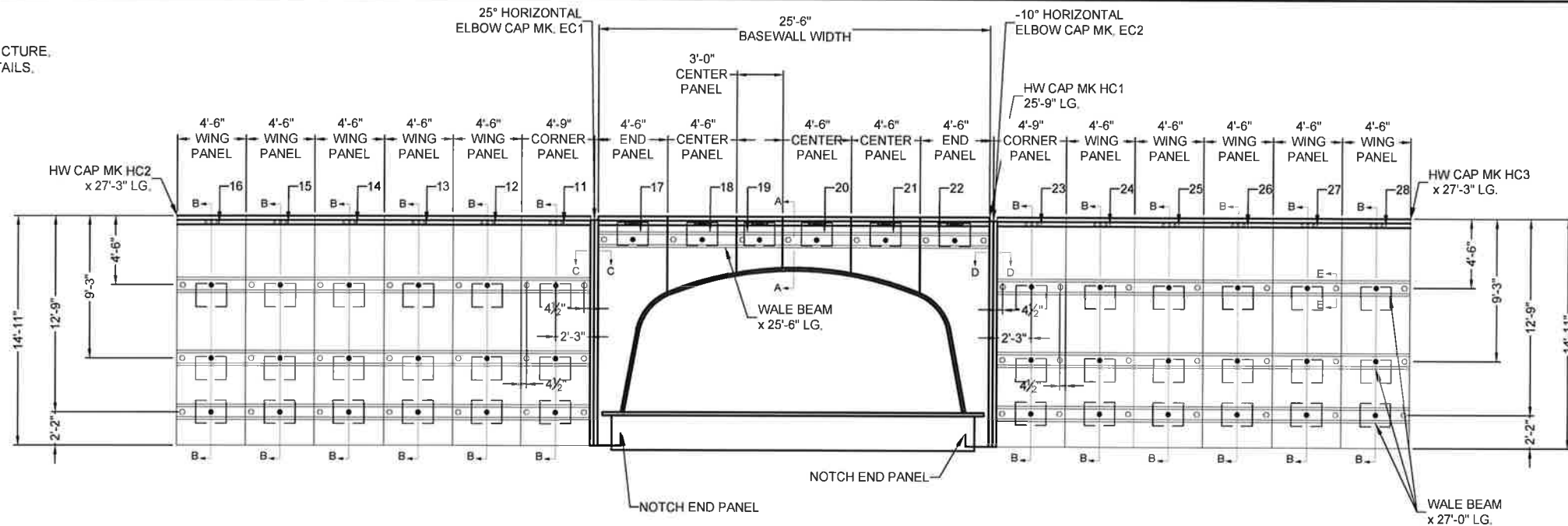
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MARK	DATE	REVISION DESCRIPTION	BY
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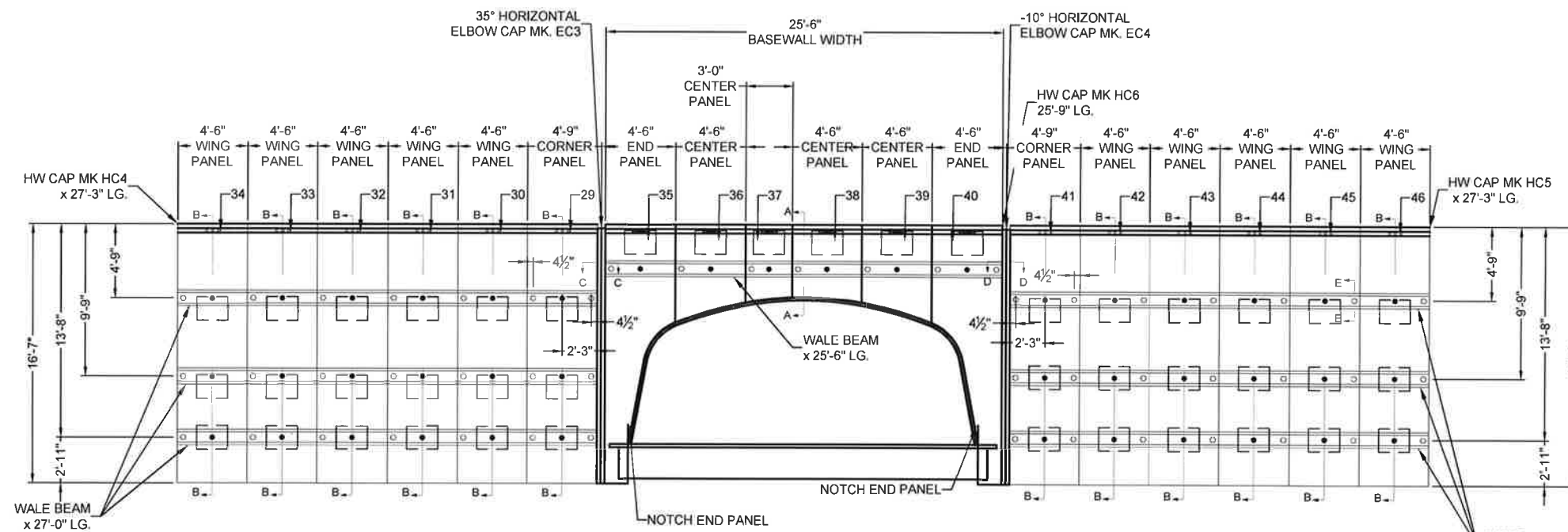
PROJECT No.: 576329	SEQ. No.: 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.: 5	OF 9	

NOTES:

1. ALL MARK IDENTIFICATIONS TO BE ON SOIL SIDE.
2. BOLT BASEWALL TO REINFORCING RIB AT END OF STRUCTURE.
3. SEE SHEETS 7 AND 8 FOR SECTION AND ASSEMBLY DETAILS.
4. ALL 2'-3" DIMENSIONS ARE RELATIVE TO SECTION B-B.
5. ALL 4 1/2" DIMENSIONS ARE RELATIVE TO SECTION E-E.
6. ○ DENOTES BOLTS
7. ● DENOTES RODS



ALBC - INLET EXPANDED END VIEW



ALBC - OUTLET EXPANDED END VIEW



TYPE: BOX		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125 (C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN NUMBER OF STRUCTURES: 1
SIZE: 60R2				
SPAN: 22'-1"	SKEW	0	0	
RISE: 9'-3"	BEVEL	0	0	
LENGTH @ 1: 76'-6"				

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WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET

DETROIT, MI

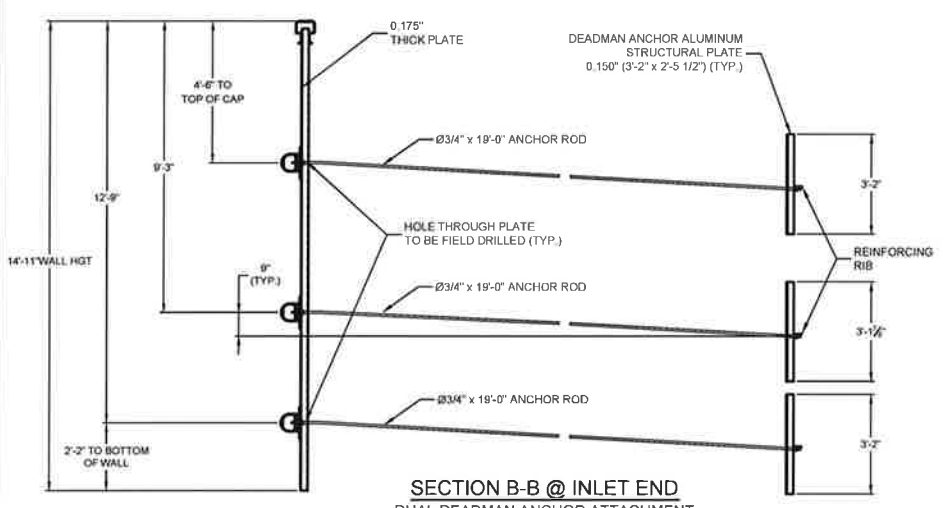
PROJECT No:	576329	SEQ No:	010	DATE:	1/10/2019
DESIGNED:		DRAWN:	JSC		
CHECKED:		APPROVED:			
SHEET No:	6 OF 9				

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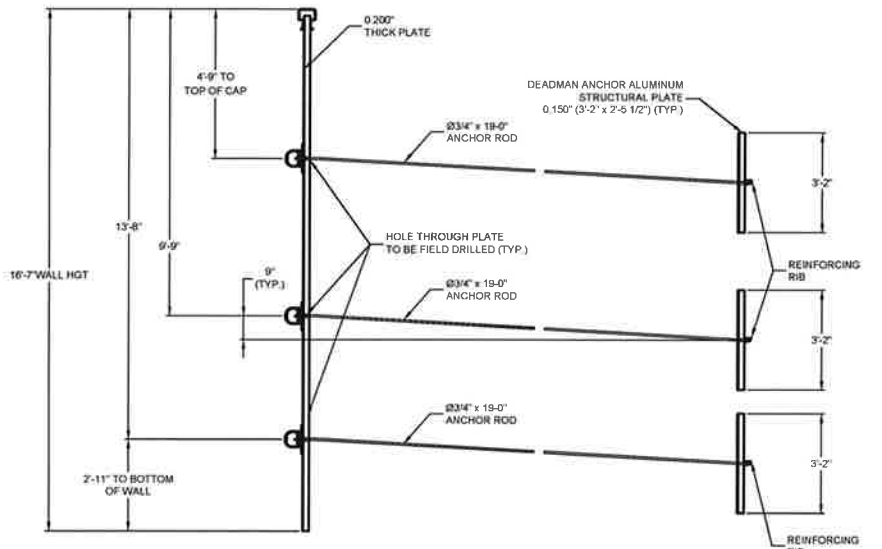
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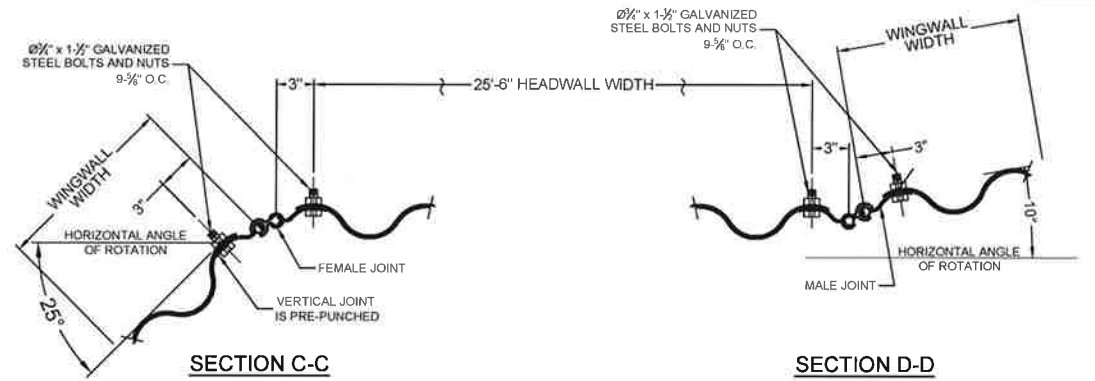
MARK	DATE	REVISION DESCRIPTION	BY
1	02/06/2019	PER REVIEW	JSC



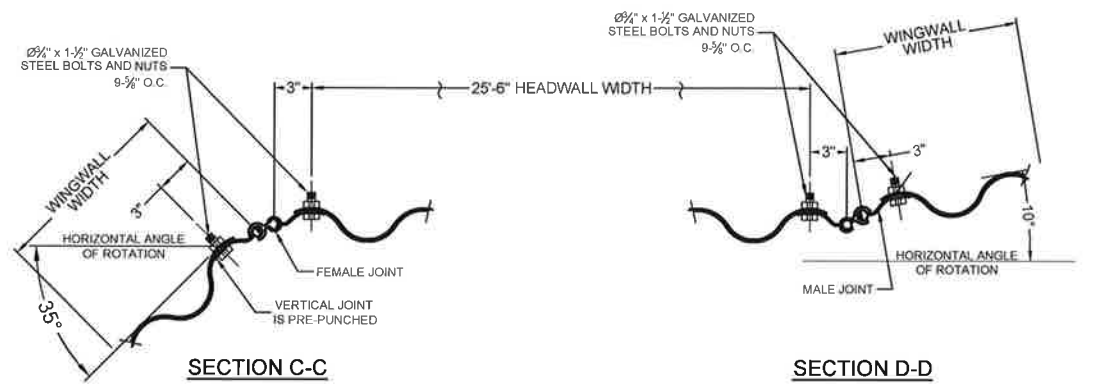
SECTION B-B @ INLET END
DUAL DEADMAN ANCHOR ATTACHMENT



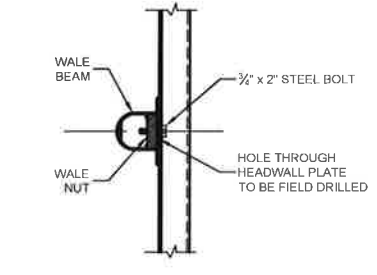
SECTION B-B @ OUTLET END
DEADMAN ANCHOR ATTACHMENT



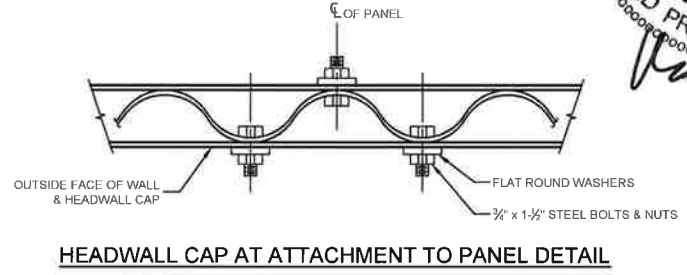
SECTION C-C
SECTION D-D
TYPICAL HEADWALL PANEL TO WING PANEL JOINTS DETAIL
(INLET END)



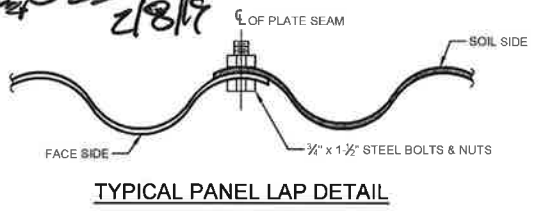
SECTION C-C
SECTION D-D
TYPICAL HEADWALL PANEL TO WING PANEL JOINTS DETAIL
(OUTLET END)



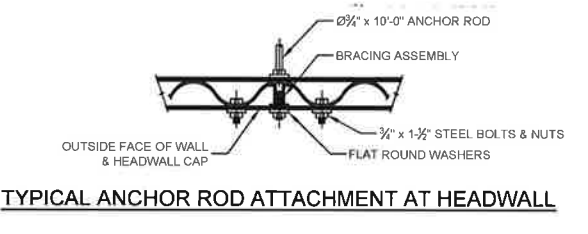
SECTION E-E
WALE BEAM ATTACHMENT



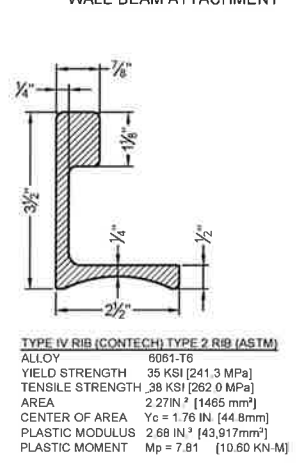
HEADWALL CAP AT ATTACHMENT TO PANEL DETAIL



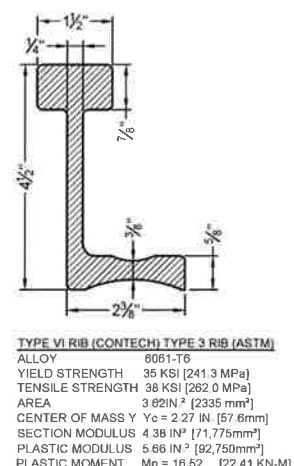
TYPICAL PANEL LAP DETAIL



TYPICAL ANCHOR ROD ATTACHMENT AT HEADWALL

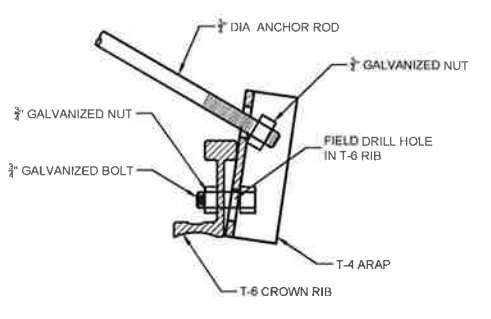


TYPE IV RIB (CONTECH) TYPE 2 RIB (ASTM)
ALLOY 6061-T6
YIELD STRENGTH 35 KSI [241.3 MPa]
TENSILE STRENGTH 38 KSI [262.0 MPa]
AREA 2.27 IN² [1465 mm²]
CENTER OF AREA Y_c = 1.76 IN [44.8mm]
PLASTIC MODULUS 2.68 IN³ [43,917mm³]
PLASTIC MOMENT M_p = 7.81 [10.60 KN-M]

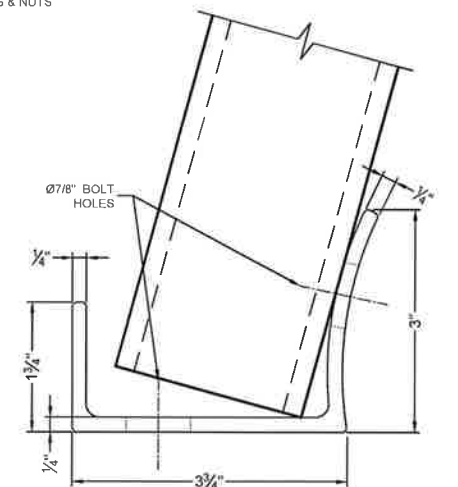


TYPE VI RIB (CONTECH) TYPE 3 RIB (ASTM)
ALLOY 6061-T6
YIELD STRENGTH 35 KSI [241.3 MPa]
TENSILE STRENGTH 38 KSI [262.0 MPa]
AREA 3.02 IN² [2335 mm²]
CENTER OF MASS Y_c = 2.27 IN [57.6mm]
SECTION MODULUS 4.38 IN³ [71,775mm³]
PLASTIC MODULUS 5.66 IN³ [92,750mm³]
PLASTIC MOMENT M_p = 16.52 [22.41 KN-M]

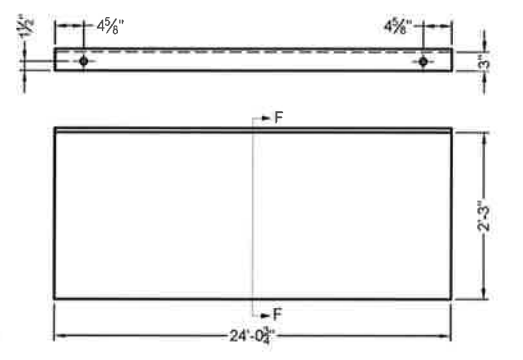
TYPE 4 ANCHOR ROD
ATTACHMENT PLATE



SECTION A1-A1



ALUMINUM RECEIVING CHANNEL



SECTION F-F

TYPICAL TOE WALL
(BOTH ENDS)

TYPE: BOX				PLATE THICKNESS: .125 (H)/.125(C)
SIZE: 60R2				REINFORCING RIB SPACING: AS SHOWN
SPAN: 22'-1"				REINFORCING RIB TYPE: AS SHOWN
RISE: 9'-3"				NUMBER OF STRUCTURES: 1
LENGTH @ 1: 76'-6"				

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WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET
DETROIT, MI

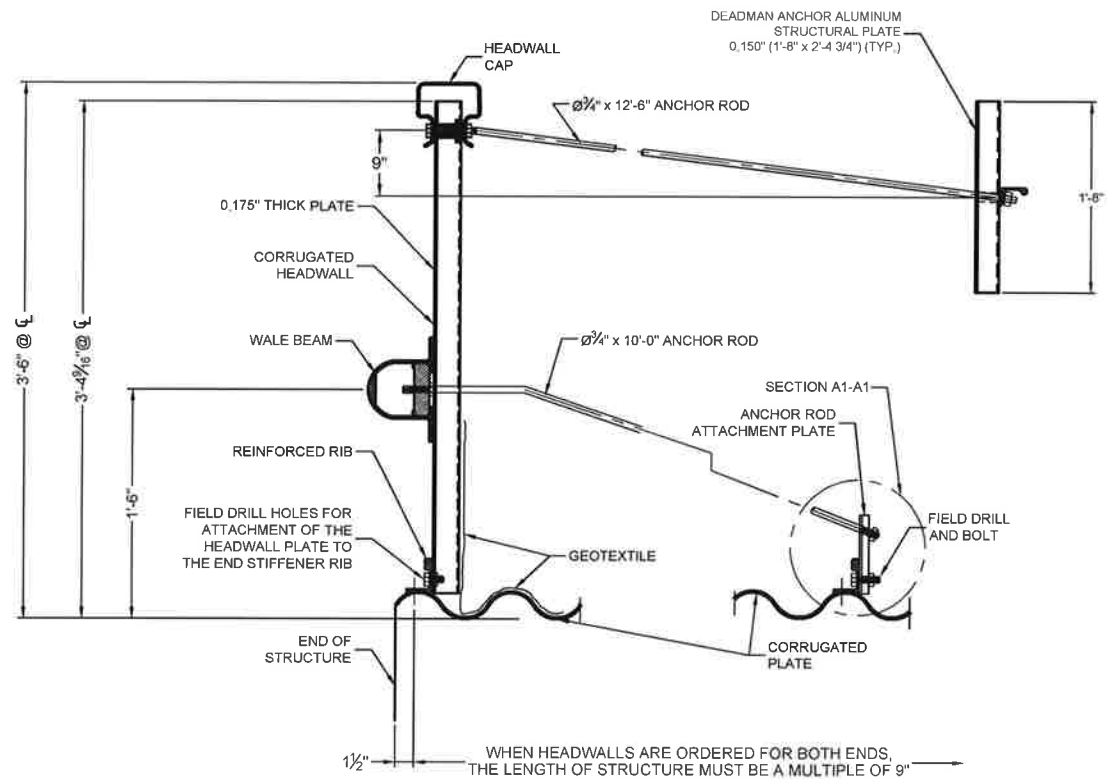
PROJECT No. 576329	SEQ. No. 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.:	7 OF 9	

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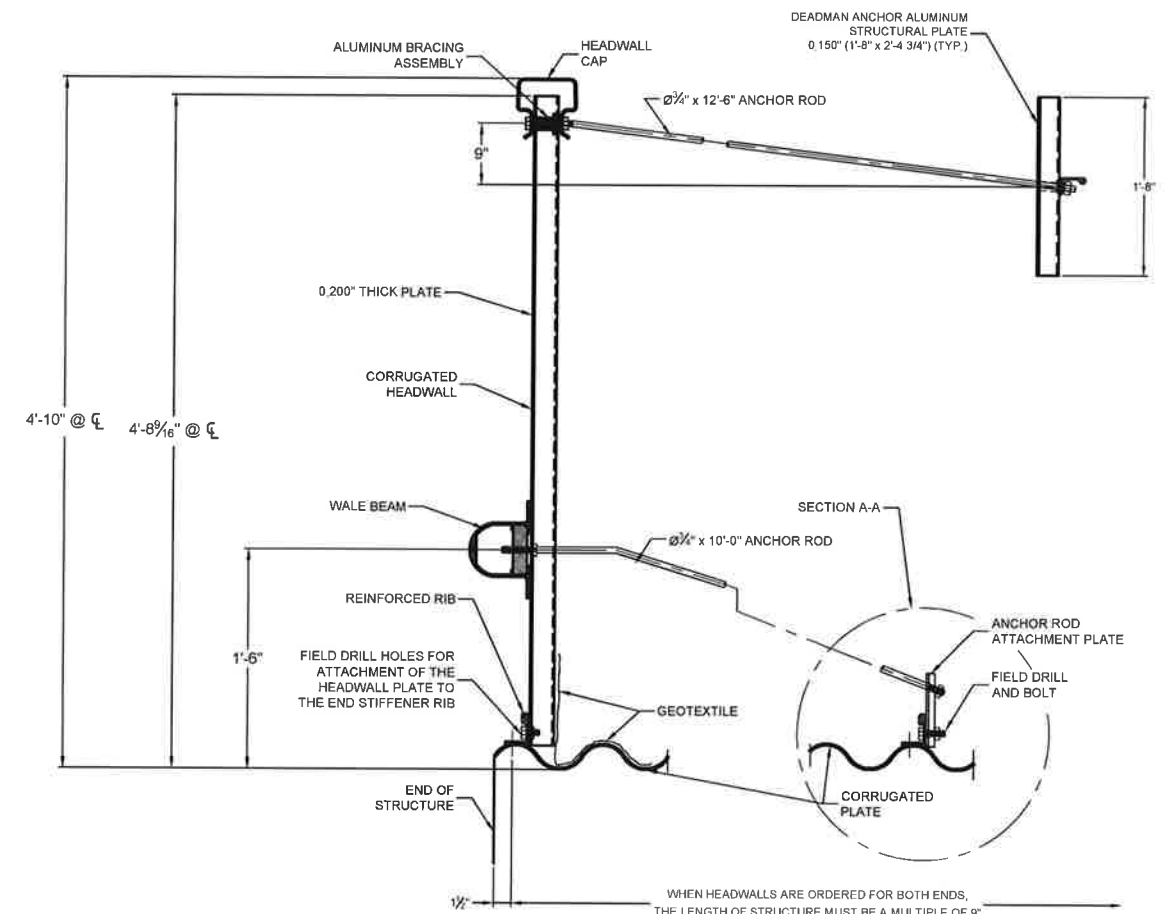
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SECTION A-A @ INLET END
HEADWALL ATTACHMENT TO
CROWN OF STRUCTURE

NOTES:

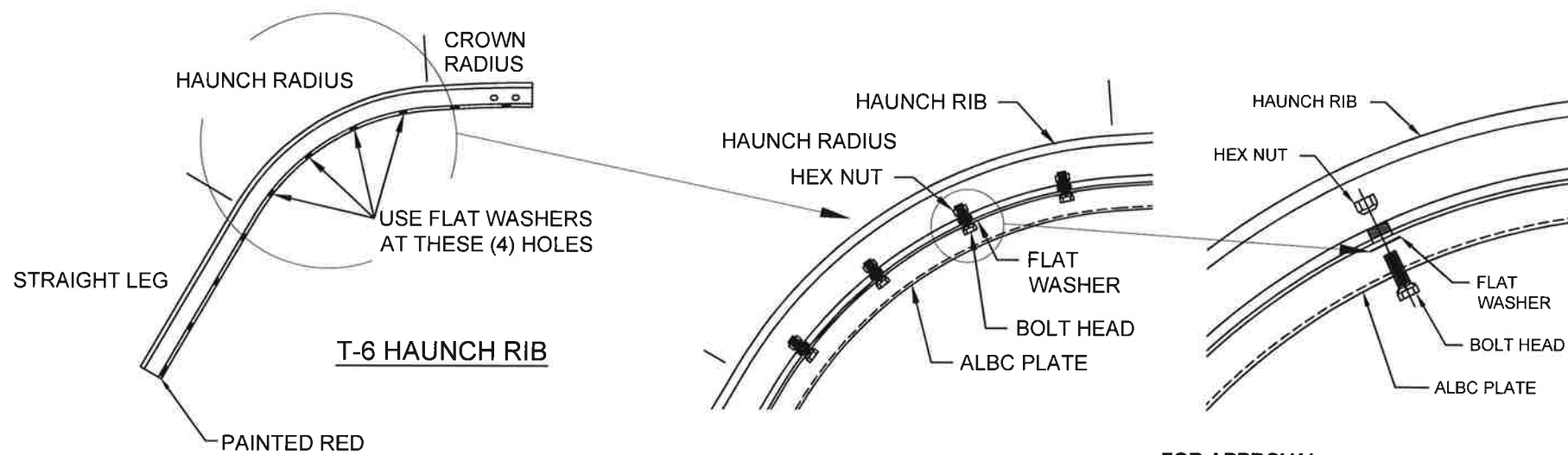
- 1) REVERSE CROWN RIB FOR PROPER ANCHOR ROD ATTACHMENT PLATE ORIENTATION.
- 2) NO SPLICE PLATES ARE USED FOR THE TYPE IV REINFORCING RIBS ATTACHED TO THE CORRUGATED HEADWALL.
- 3) REINFORCING RIB AT EACH END OF STRUCTURE MUST BE ORIENTED SUCH THAT THE HEADWALL CAN BE PLACED BEHIND THEM AS SHOWN.



SECTION A-A @ OUTLET END
HEADWALL ATTACHMENT TO
CROWN OF STRUCTURE

NOTES:

- 1) REVERSE CROWN RIB FOR PROPER ANCHOR ROD ATTACHMENT PLATE ORIENTATION.
- 2) REINFORCING RIB AT EACH END OF STRUCTURE MUST BE ORIENTED SUCH THAT THE HEADWALL CAN BE PLACED BEHIND THEM AS SHOWN.



FOR APPROVAL



TYPE: BOX SIZE: 60R2 SPAN: 22'-1" RISE: 9'-3" LENGTH @ 1: 76'-6"		INLET	OUTLET	PLATE THICKNESS: .125 (H) / .125 (C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN
	SKEW	0	0	
	BEVEL	0	0	NUMBER OF STRUCTURES: 1

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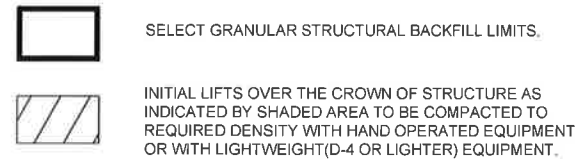
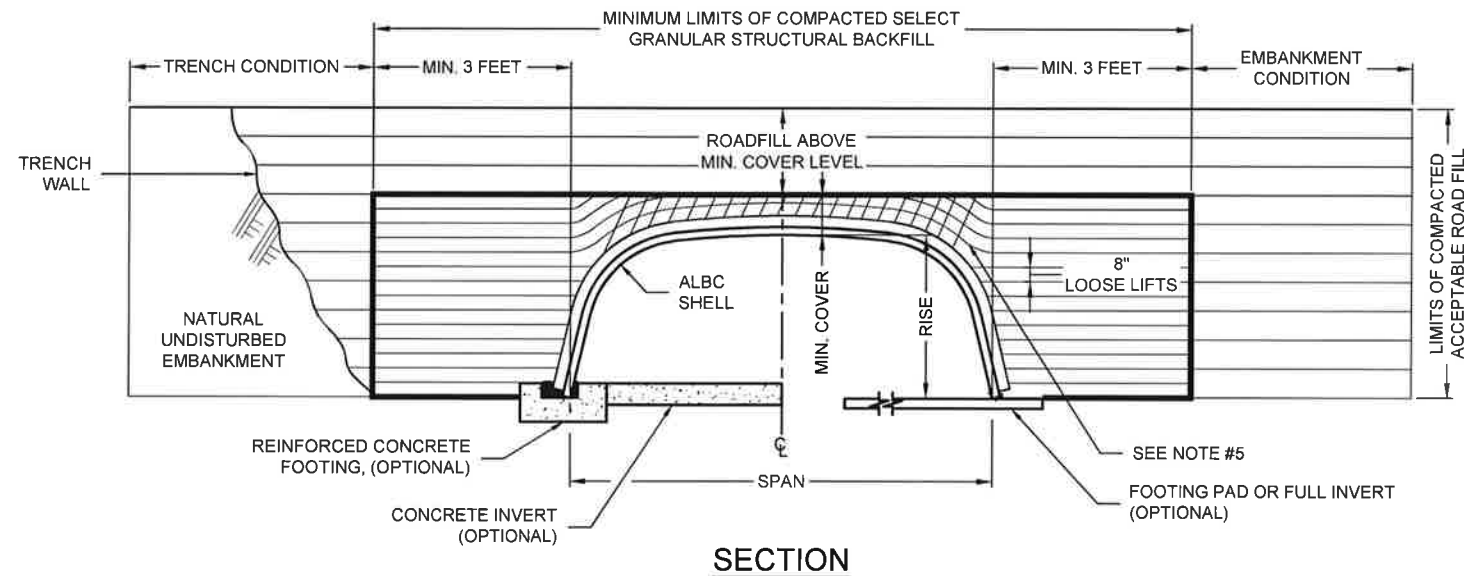
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WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET
DETROIT, MI

PROJECT No.: 576329	SEQ. No.: 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.: 8	OF 9	



NOTES:

- ALL SELECT GRANULAR BACKFILL TO BE PLACED IN A BALANCED FASHION IN THIN LIFTS (8" LOOSE TYPICALLY) AND COMPACTED TO 90 PERCENT DENSITY PER AASHTO T-180.
- COMPLETE AND REGULAR MONITORING OF THE ALUMINUM BOX CULVERT SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
- PREVENT DISTORTION OF SHAPE AS NECESSARY BY VARYING COMPACTION METHODS AND EQUIPMENT.
- TRENCH WIDTH OTHER THAN 3 FEET SHALL BE BY DIRECTION OF THE ENGINEER OF RECORD.
- SWITCH TO PLACING SELECT GRANULAR BACKFILL NEAR IN RADIAL LIFTS THE MIDDLE OF THE HAUNCH CURVE.

SECTION

ADDITIONAL SELECT GRANULAR STRUCTURAL BACKFILL NOTES:

SATISFACTORY BACKFILL MATERIAL, PROPER PLACEMENT, AND COMPACTION ARE KEY FACTORS IN OBTAINING MAXIMUM STRENGTH AND STABILITY.

THE BACKFILL MATERIAL SHOULD BE FREE OF ROCKS, FROZEN LUMPS, AND FOREIGN MATERIAL THAT COULD CAUSE HARD SPOTS OR DECOMPOSE TO CREATE VOIDS. BACKFILL MATERIAL SHOULD BE WELL GRADED GRANULAR MATERIAL THAT MEETS THE REQUIREMENTS OF AASHTO M-145 FOR SOIL CLASSIFICATIONS A-1, A-2-4, A-2-5, OR A-3 MODIFIED.

SEE THE STRUCTURAL PLATE BACKFILL GROUP CLASSIFICATION TABLE ON THIS SHEET. BACKFILL MUST BE PLACED SYMMETRICALLY ON EACH SIDE OF THE STRUCTURE IN 8" LOOSE LIFTS. EACH LIFT IS TO BE COMPACTED TO A MINIMUM OF 90% DENSITY PER AASHTO T-180.

A HIGH PERCENTAGE OF SILT OR FINE SAND IN THE NATIVE SOILS SUGGESTS THE NEED FOR A WELL GRADED GRANULAR BACKFILL MATERIAL TO PREVENT SOIL MIGRATION. IF THE PROPOSED BACKFILL IS NOT A WELL-GRADED MATERIAL, A NON-WOVEN GEOTEXTILE FILTER FABRIC SHALL BE PLACED BETWEEN THE SELECT BACKFILL AND THE IN SITU MATERIAL.

DURING BACKFILL, ONLY LIGHTWEIGHT TRACKED VEHICLES (D-4 OR LIGHTER) SHOULD BE NEAR THE STRUCTURE AS FILL PROGRESSES ABOVE THE CROWN AND TO THE FINISHED GRADE. THE ENGINEER AND CONTRACTOR ARE CAUTIONED THAT THE MINIMUM COVER MAY NEED TO BE INCREASED TO HANDLE TEMPORARY CONSTRUCTION VEHICLE LOADS (HEAVIER THAN D-4).

STRUCTURAL PLATE BACKFILL GROUP CLASSIFICATION, REFERENCE AASHTO M-145					
GROUP CLASSIFICATION	A-1-a	A-1-b	A-2-4	A-2-5	A-3
Sieve Analysis Percent Passing					
No. 10 (2.000 mm)	50 max.	---	---	---	---
No. 40 (0.425 mm)	30 max.	50 max.	---	---	51 max.*
No. 200 (0.075 mm)	15 max.	25 max.	35 max.	35 max.	10 max.
Atterberg Limits for Fraction Passing No. 40 (0.425 mm)					
Liquid Limits	---	---	40 max.	41 min.	---
Plasticity Index	6 max.	6 max.	10 max.	10 max.	Non Plastic
Usual Materials	Stone Fragment, Gravel and Sand		Silty or Clayey Gravel and Sand		Coarse Sand

*Modified from M-145.

Fine beach sands, windblown sands, stream deposited sands, etc., exhibiting fine, rounded particles and typically Classified by AASHTO M-145 as A-3 materials should not be used.

Reference the most current version of ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), for comparable soil groups.



FOR APPROVAL

- 1.0 STANDARDS AND DEFINITIONS**
- STANDARDS - All standards refer to the current ASTM/AASHTO edition unless otherwise noted.
 - ASTM B-864 "Standard Specification for Corrugated Aluminum Box Culverts" (AASHTO Designation M-219).
 - AASHTO Standard Specification for Highway Bridges - Section 12 Division I - Design, AASHTO LRFD Bridge Design Specifications Section 12.
 - AASHTO Standard Specification for Highway Bridges - Section 26 Division II - Construction, AASHTO LRFD Bridge Construction Specifications - Section 26, ASTM B789, Standard Practice for Installing Corrugated Aluminum Structural Plate Pipe.
 - DEFINITIONS
 - Owner - In these specifications the word "Owner" shall mean Z Contractors Inc MI.
 - Engineer - In these specifications the word "Engineer" shall mean the Engineer of Record or Owner's designated engineering representative.
 - Manufacturer - In these specifications the word "Manufacturer" shall mean CONTECH ENGINEERED SOLUTIONS 800-338-1122 Ryan Loerich (616-403-5529)
 - Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any installation work under the terms of these specifications.
 - Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.
 - As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.
- 3.0 ASSEMBLY AND INSTALLATION**
- Bolts and nuts shall conform to the requirements of ASTM A-307 and/or ASTM A-449. The box culvert shall be assembled in accordance with the plate layout drawings provided by the manufacturer and per the manufacturer's recommendations.

Bolts shall be tightened using an applied torque of between 100 and 150 ft.-lbs.
 - The box culvert shall be installed in accordance with the plans and specifications, the manufacturer's recommendations, and AASHTO Standard Specification for Highway Bridges - Section 26 Division II - Construction/AASHTO LRFD Bridge Construction Specifications - Section 26.
 - Trench excavation shall be made in embankment material that is structurally adequate. The trench width shall be shown on the plans. Poor quality in situ embankment material must be removed and replaced with suitable backfill as directed by the Engineer.
 - Aluminum Box Culvert designs require a minimum allowable soil-bearing pressure of 4,000 psf. Lower bearing capacities may be accommodated with a site specific design for an aluminum foundation or a concrete footing.

If the engineer determines the natural foundation is inadequate to support the structure's backfill, the poor material shall be excavated, removed and replaced to a suitable depth with competent material. The specific depth of excavation required may be reduced by utilizing a geosynthetic reinforced foundation as designed by a qualified geotechnical engineer. For additional information contact your local Contech representative.
 - When a metal foundation is used, the soil bedding requires a minimum of 6 inches of loose granular material with a maximum particle size of one half the corrugation depth. The proper width of the bedding material required shall conform to the project plans and specifications.

Bedding preparation is critical to both structure performance and service life. The bedding should be constructed to uniform line and grade to avoid distortions that may create undesirable stresses in the structure and/or rapid deterioration of the roadway. The bed should be free of rock formations, protruding stones, frozen lumps, roots, and other foreign matter that may cause unequal settlement.
 - The structure shall be assembled in accordance with the Manufacturer's instructions. All plates shall be unloaded and handled with reasonable care. Plates shall not be rolled or dragged over gravel rock and shall be prevented from striking rock or other hard objects during placement in trench or on bedding.

When installed on a full invert or on flexible footing pads, assembly of the invert or footing pads shall start at the downstream end. Circumferential seam laps shall shingle over the top of the downstream plates as assembly progresses upstream. Whether the box culvert is installed on a concrete footing, full metal invert, or flexible footing pad, assembly of the structure shell shall start at the upstream end. Downstream rings of plates shall be assembled outside of the upstream rings (Circumferential seams are shingled downstream when viewed from the inside of the shell).
 - The structure shall be backfilled using clean well graded granular material that meets the requirements for soil classifications A-1, A-2-4, A-2-5, or A-3 modified per AASHTO M-145. See the structural plate backfill group classification table on this sheet.

Backfill must be placed symmetrically on each side of the structure in 8 inch loose lifts. Each lift shall be compacted to a minimum of 90 percent density per AASHTO T-180.
 - Standard highway loads that meet the permissible design load limits for an Aluminum Box Culvert are not allowed on the structure until it is backfilled completely and pavement is in place.

The addition of temporary soil for heavy construction loads is not feasible or permissible for Aluminum Box Culverts. By design, these structures are limited in the range of permissible fill heights and live loads.

Heavy construction loads that exceed that of the particular highway live load design limits are not allowed on Aluminum Box Culverts without approval from the Engineer.
 - If an aluminum headwall and/or wingwall system is specified, the select granular structural backfill limits shall extend past the deadman anchor system. Contact the Engineer if stiff material or rock is encountered where the wingwalls and deadmen are to be installed.

- 2.0 GENERAL CONDITIONS**
- Any installation guidance provided herein shall be endorsed by the engineer; discrepancies herein are governed by the Engineer's plans and specifications.
 - The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading as shown on the plans and as described therein. This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications. This work is to be accomplished under the observation of the Owner or his designated representative.
 - Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner shall be notified immediately. The material which the Contractor believes to be a changed condition shall not be disturbed so that the owner can investigate the condition.
 - The construction shall be performed under the direction of the Engineer.
 - All aspects of the structure design and site layout including foundations, backfill, and treatments and necessary scour consideration shall be performed by the Engineer.

TYPE: BOX SIZE: 60R2 SPAN: 22'-1" RISE: 9'-3" LENGTH @ c: 76'-6"		INLET	OUTLET	PLATE THICKNESS: .125 (H)/.125(C) REINFORCING RIB SPACING: AS SHOWN REINFORCING RIB TYPE: AS SHOWN
	SKEW	0	0	
	BEVEL	0	0	NUMBER OF STRUCTURES: 1

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WEST PARKWAY CULVERT REPLACEMENT AT MEADOW PARK STREET
DETROIT, MI

PROJECT No.: 576329	SEQ No.: 010	DATE: 1/10/2019
DESIGNED:	DRAWN: JSC	
CHECKED:	APPROVED:	
SHEET NO.: 9	OF 9	



23206 Meadow Park,
Detroit, MI 48239

Meadow Park

W Parkway St

Ashcroft Sherwood Drain

23206 Meadow Park