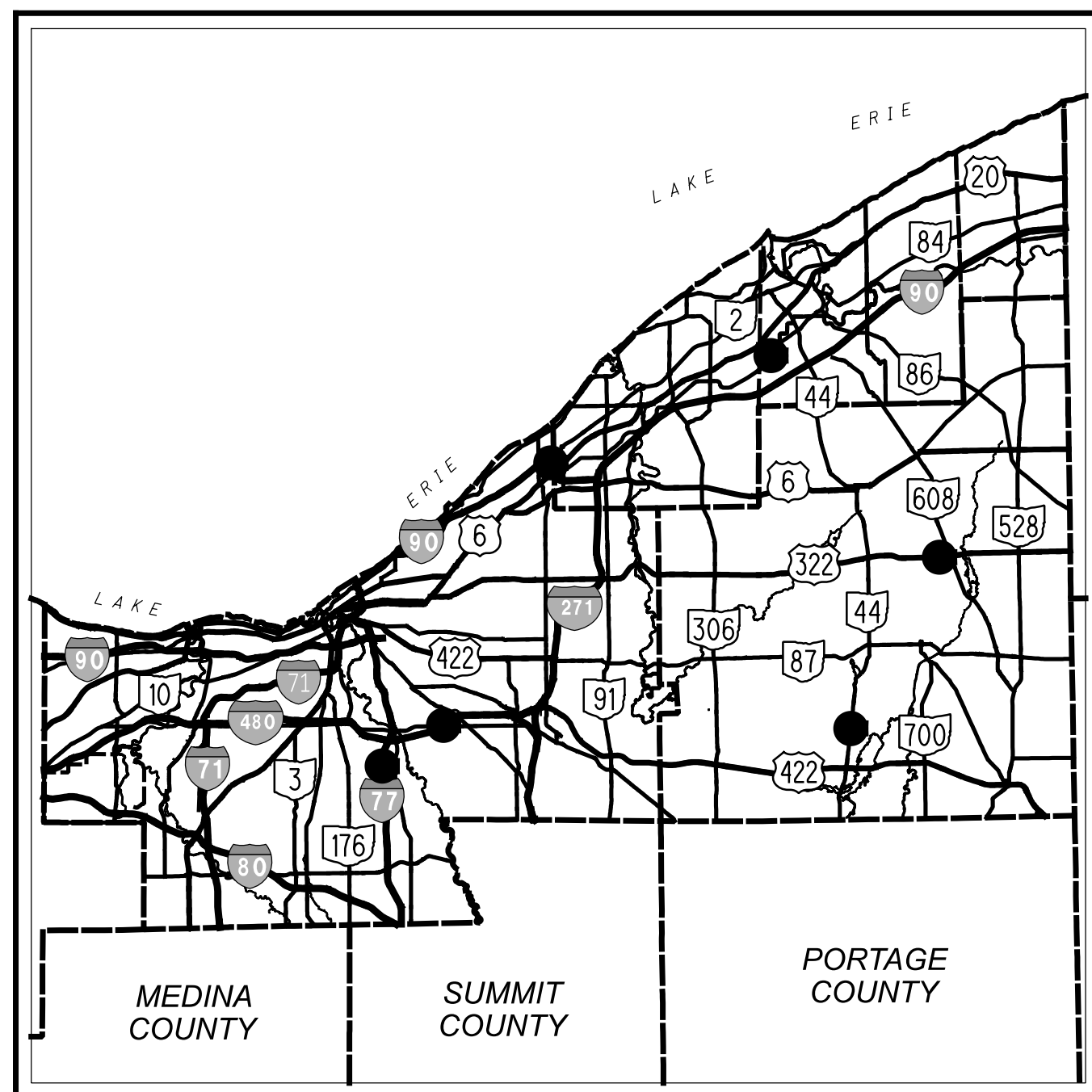


STATE OF OHIO DEPARTMENT OF TRANSPORTATION

D12-CU-FY2024

CITY OF INDEPENDENCE, CITY OF EUCLID, &
CITY OF GARFIELD HEIGHTS
CUYAHOGA COUNTY
AUBURN & CLARIDON TOWNSHIPS
GEAUGA COUNTY
CONCORD TOWNSHIP
LAKE COUNTY



LOCATION MAP

SEE SHEET P.2 FOR CULVERT LOCATIONS



PROJECT LOCATIONS ●

DESIGN DESIGNATION

SEE SHEET P.2 FOR DESIGN DESIGNATIONS

DESIGN EXCEPTIONS

NONE REQUIRED

INDEX OF SHEETS:

TITLE SHEET	P.1
LOCATION MAPS AND DESIGN DESIGNATIONS	P.2
TYPICAL SECTIONS	P.3 - P.5
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GENERAL SUMMARY	P.29 - P.31
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PLAN AND PROFILES	P.34 - P.36
CROSS SECTIONS	P.37 - P.50
CULVERT DETAILS	P.51 - P.69
TRAFFIC CONTROL	P.70 - P.75
GEOTECHNICAL PROFILES	P.76 - P.86

FEDERAL PROJECT NUMBER

E230111

RAILROAD INVOLVEMENT

NONE

PROJECT DESCRIPTION

REHABILITATION OF CULVERTS CUY-77-7.84 AND CUY-18271-0.13, REPLACEMENT OF CULVERT CUY-90-29.92, EXTENSION OF CULVERTS GEA-322-13.88 AND GEA-44-4.52, AND FILLING AND PLUGGING CULVERT LAK-84-14.25.

EARTH DISTURBED AREAS

PROJECT EARTH DISTURBED AREA: * ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: * ACRES
NOTICE OF INTENT EARTH DISTURBED AREA: * ACRES
* SEE PLAN AND PROFILE AND CULVERT DETAIL SHEETS

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

2023 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THESE IMPROVEMENTS WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY, EXCEPT AS NOTED ON SHEET P.24 AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

John Picuri, P.E., S.I.
District 12 Deputy Director

Pamela Boratyn
Director, Department of Transportation

UNDERGROUND UTILITIES
Contact Two Working Days Before You Dig

OHIO811.org
Before You Dig

OHIO811, 8-1-1, or 1-800-362-2764
(Non members must be called directly)

ENGINEER'S SEAL
FOR ENTIRE PLAN EXCEPT GEA-322-13.88 & GEA-44-4.52 EXTENSION DETAILS

ENGINEER'S SEAL
GEA-322-13.88 & GEA-44-4.52 EXTENSION DETAILS

STANDARD CONSTRUCTION DRAWINGS								SUPPLEMENTAL SPECIFICATIONS	SPECIAL PROVISIONS
BP-3.1	1/21/22	RM-1.1	1/20/23	MT-95.45	7/21/23	TC-41.20	10/18/13	800-2023 7/19/24 821 4/20/22 832 7/21/23 836 1/19/18 873 4/16/21 899 1/20/23 921 4/20/12	WATERWAY PERMITS CONDITIONS 2/16/2024
BP-5.1	7/15/22	RM-4.2	4/17/20	MT-96.11	7/21/23	TC-42.10	10/18/13		
BP-9.1	1/18/19			MT-96.20	7/21/23	TC-42.20	10/18/13		
		HW-1.1	7/20/18	MT-96.26	1/18/19	TC-61.10	4/21/23		
		HW-2.1	7/15/22	MT-97.10	4/19/19	TC-61.30	7/19/19		
CB-2-2A, 2B, 2C	1/20/23	HW-2.2	7/20/18	MT-97.11	1/20/17	TC-65.10	1/17/14		
CB-8	7/16/21			MT-99.30	1/17/20	TC-65.11	7/15/22		
		F-1.1	7/19/13	MT-101.70	4/21/23				
DM-1.1	7/17/20			MT-101.75	7/21/23				
DM-2.1	1/18/13			MT-102.10	7/21/23				
				MT-105.10	1/17/20				
MGS-1.1	7/16/21								
MGS-2.1	1/19/18								
MGS-4.2	7/19/13								
MGS-4.3	1/18/13								
MGS-5.3	7/15/16								

PLAN PREPARED BY:
Environmental Design Group
AKRON / CLEVELAND / COLUMBUS
HD 450 GRANT ST., AKRON, OH 44331
P 330.375.1390 / F 800.855.1390
W ENVDESIGNGROUP.COM

D12-CU-FY2024

MODEL: Sheet PAPER SIZE: 34x22 (in.) DATE: 12/31/2024 TIME: 11:44:46 AM USER: scook
E:\ODOT\12-00121-010 ODOT D-12 Culvert Replacement 122947\122947\400-Engineering\Roadway\Sheets\122947_GT001.dgn

TITLE SHEET

DESIGN AGENCY
Environmental Design Group
AKRON / CLEVELAND / COLUMBUS
HD 450 GRANT ST., AKRON, OH 44331
P 330.375.1390 / F 800.855.1390
W ENVDESIGNGROUP.COM

DESIGNER
MSD
REVIEWER
SAC 12/29/23
PROJECT ID
112947
SHEET TOTAL
P.1 86

SHEET NUM.								PART.				ITEM	ITEM EXT	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
P.10	P.32	P.55	P.62	P.70	OFFICE CALCS	01/IMS/CV	02/NHS/CV	03/S>2/CV	04/STR/CV								
PAVEMENT																	
525						525				254	01000	525	SY	PAVEMENT PLANING, ASPHALT CONCRETE, (1.5" DEPTH)			
					7		3	3	1	301	56000	7	CY	ASPHALT CONCRETE BASE, PG64-22, (449)			
					5		2	2	1	304	20000	5	CY	AGGREGATE BASE			
					3		1	1	1	407	10000	3	GAL	TACK COAT			
45						45				407	20000	45	GAL	NON-TRACKING TACK COAT			
					3		1	1	1	441	70101	3	CY	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (449), AS PER PLAN, PG70-22M	P.8		
	23						9		14	441	70801	23	CY	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (449), (UNDER GUARDRAIL), AS PER PLAN	P.8		
22						22				442	22101	22	CY	ASPHALT CONCRETE SURFACE COURSE, 12.5 MM, TYPE A (449), AS PER PLAN, PG70-22M, (1.5")	P.9		
0.36						0.36				618	40600	0.36	MILE	RUMBLE STRIPS, SHOULDER (ASPHALT CONCRETE)			
STRUCTURE 20 FOOT SPAN AND UNDER (GEA-322-13.88)																	
			LS						LS	202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN	P.55		
			LS						LS	503	11100	LS		COFFERDAMS AND EXCAVATION BRACING			
			15						15	503	21100	15	CY	UNCLASSIFIED EXCAVATION			
			2,271						2,271	509	10000	2,271	LB	EPOXY COATED STEEL REINFORCEMENT			
			16						16	510	10000	16	EACH	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT			
			5						5	511	46010	5	CY	CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING			
			10						10	511	46510	10	CY	CLASS QC1 CONCRETE, FOOTING			
			1						1	511	46610	1	CY	CLASS QC1 CONCRETE, HEADWALL			
			4						4	511	47011	4	CY	CLASS QC1 CONCRETE, CULVERT, AS PER PLAN	P.55		
			14						14	512	10100	14	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)			
			20						20	512	33000	20	SY	TYPE 2 WATERPROOFING			
			20						20	516	13600	20	SF	1" PREFORMED EXPANSION JOINT FILLER			
			2						2	518	21201	2	CY	POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN	P.55		
STRUCTURE 20 FOOT SPAN AND UNDER (GEA-44-4.52)																	
			LS				LS			202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN	P.62		
			LS				LS			503	11100	LS		COFFERDAMS AND EXCAVATION BRACING			
			13				13			503	21100	13	CY	UNCLASSIFIED EXCAVATION			
			2,828				2,828			509	10000	2,828	LB	EPOXY COATED STEEL REINFORCEMENT			
			24				24			510	10000	24	EACH	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT			
			5				5			511	46010	5	CY	CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING			
			12				12			511	46510	12	CY	CLASS QC1 CONCRETE, FOOTING			
			1				1			511	46610	1	CY	CLASS QC1 CONCRETE, HEADWALL			
			8				8			511	47011	8	CY	CLASS QC1 CONCRETE, CULVERT, AS PER PLAN	P.62		
			18				18			512	10100	18	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)			
			34				34			512	33000	34	SY	TYPE 2 WATERPROOFING			
			32				32			516	13600	32	SF	1" PREFORMED EXPANSION JOINT FILLER			
			2				2			518	21201	2	CY	POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN	P.62		
TRAFFIC CONTROL																	
	8						4		4	620	00500	8	EACH	DELINEATOR, POST GROUND MOUNTED			
				14			5	4	5	621	00100	14	EACH	RPM			
				112						621	00300	112	EACH	RPM REFLECTOR			
				14			5	4	5	621	54000	14	EACH	RAISED PAVEMENT MARKER REMOVED			
				112						621	54001	112	EACH	RAISED PAVEMENT MARKER REMOVED, AS PER PLAN	P.8		
	15						7		8	626	00110	15	EACH	BARRIER REFLECTOR, TYPE 2, (BIDIRECTIONAL)			
				0.22			0.1	0.06	0.06	642	00104	0.22	MILE	EDGE LINE, 6", TYPE 1			
				0.58			0.27	0.07	0.24	642	00300	0.58	MILE	CENTER LINE, TYPE 1			
				15			15			642	00500	15	FT	STOP LINE, TYPE 1			
				0.47			0.47			646	10010	0.47	MILE	EDGE LINE, 6"			
				1.72			1.72			646	10110	1.72	MILE	LANE LINE, 6"			
				1,086			1,086			646	20504	1,086	FT	DOTTED LINE, 6"			

DESIGN AGENCY
Environmental Design Group
AN IRON / CLEVELAND / COLUMBUS
 ENGINEERING FIRM

DESIGNER
MSD

REVIEWER
SAC 12/29/23

PROJECT ID
112947

SHEET TOTAL
P.30 86

DESIGN SPECIFICATIONS:

THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002 AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA:

THE FOLLOWING DESIGN DATA IS ASSUMED:

INTERNAL ANGLE OF FRICTION OF BACKFILL SOIL, $\phi_s = 30^\circ$
 TOTAL UNIT WEIGHT OF BACKFILL SOIL = 120 PCF
 INTERNAL ANGLE OF FRICTION (DRAINED), FOUNDATION SOIL, $\phi_f = 28^\circ$
 UNDRAINED SHEAR STRENGTH (COHESIVE), FOUNDATION SOIL, $S_u = 1500$ PSF
 UNIT WEIGHT OF CONCRETE = 150 PCF
 SLOPE OF BACKFILL = 2:1

CONCRETE CLASS – COMPRESSIVE STRENGTH 4000 PSI
 (FOOTING, WINGWALL AND FORESLOPE WALL)

REINFORCING STEEL – ASTM A615, A616, OR 617
 GRADE 60 MINIMUM YIELD STRENGTH
 60,000 PSI (ALL REINFORCING SHALL BE
 EPOXY COATED)

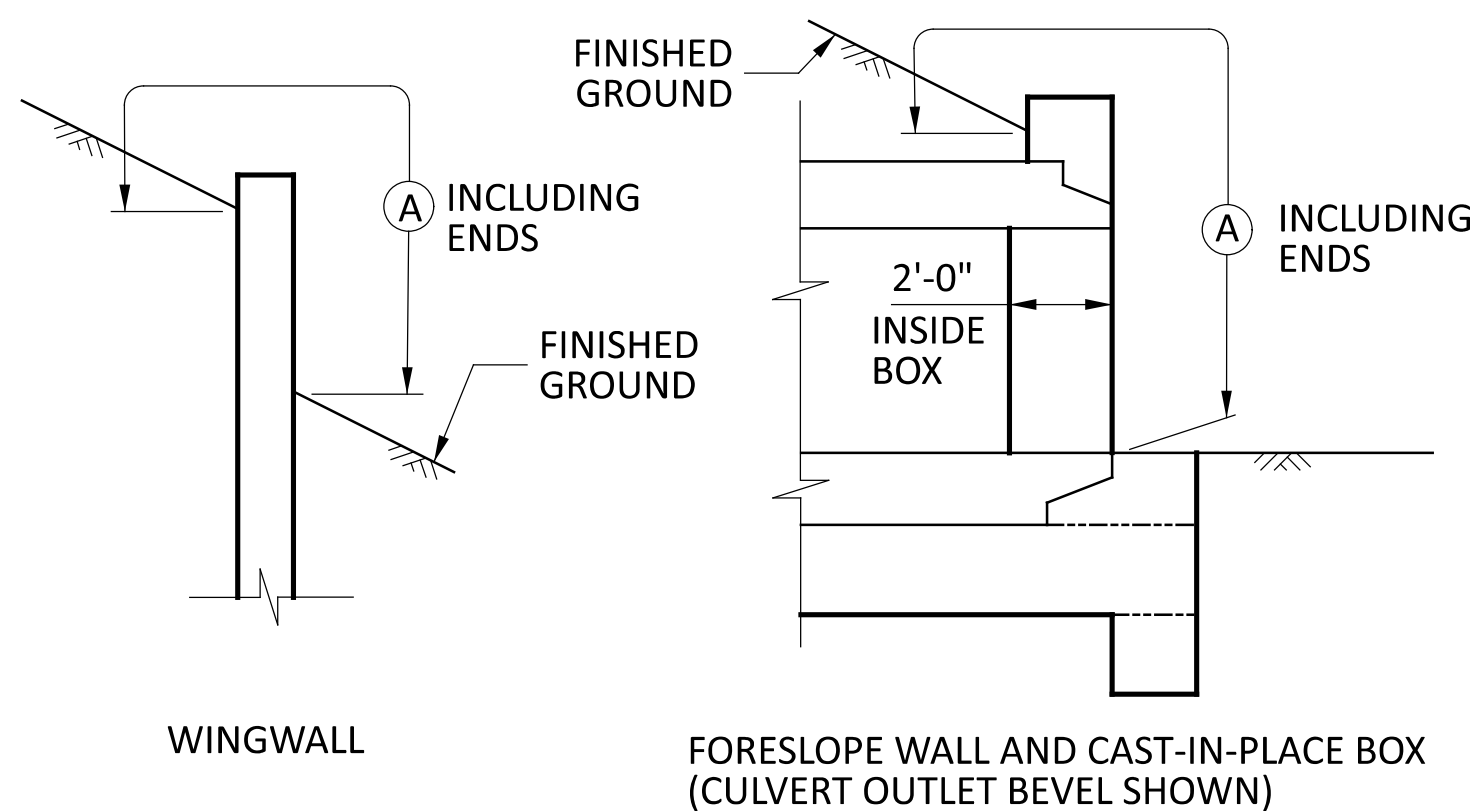
BASED ON THE ASSUMED DESIGN DATA, THE WINGWALLS ACHIEVE FACTORED BEARING RESISTANCES THAT ARE GREATER THAN THEIR RESPECTIVE BEARING PRESSURES. IF A BACKFILL MATERIAL WITH A HIGHER INTERNAL ANGLE OF FRICTION OR A LIGHTER TOTAL UNIT WEIGHT IS USED; OR IF A FOUNDATION SOIL WITH A HIGHER DRAINED INTERNAL ANGLE OF FRICTION OR A HIGHER UNDRAINED SHEAR STRENGTH IS ENCOUNTERED; THEN THE STABILITY OF THE WINGWALLS IS SATISFACTORY.

PREFORMED EXPANSION JOINT FILLER

PREFORMED EXPANSION JOINT FILLER (PEJF) CONFORMING TO CMS 705.03, 1 INCH THICK, SHALL BE PLACED ABOVE THE FOOTING BETWEEN THE SIDES OF THE BOX CULVERT AND THE ENDS OF THE WINGWALLS. PAYMENT FOR MATERIALS AND INSTALLATION SHALL BE INCLUDED WITH ITEM 516 - 1" PREFORMED EXPANSION JOINT FILLER.

SEALING OF FORESLOPE WALL AND WINGWALLS:

ALL EXPOSED CONCRETE OF THE INLET HEADWALL SHALL BE SEALED WITH EPOXY-URETHANE SEALER. THE LIMITS SHALL BE AS SHOWN IN THE DIAGRAMS BELOW. PAYMENT FOR THE EPOXY-URETHANE SEALER SHALL BE PER ITEM 512 - SEALING OF CONCRETE SURFACES



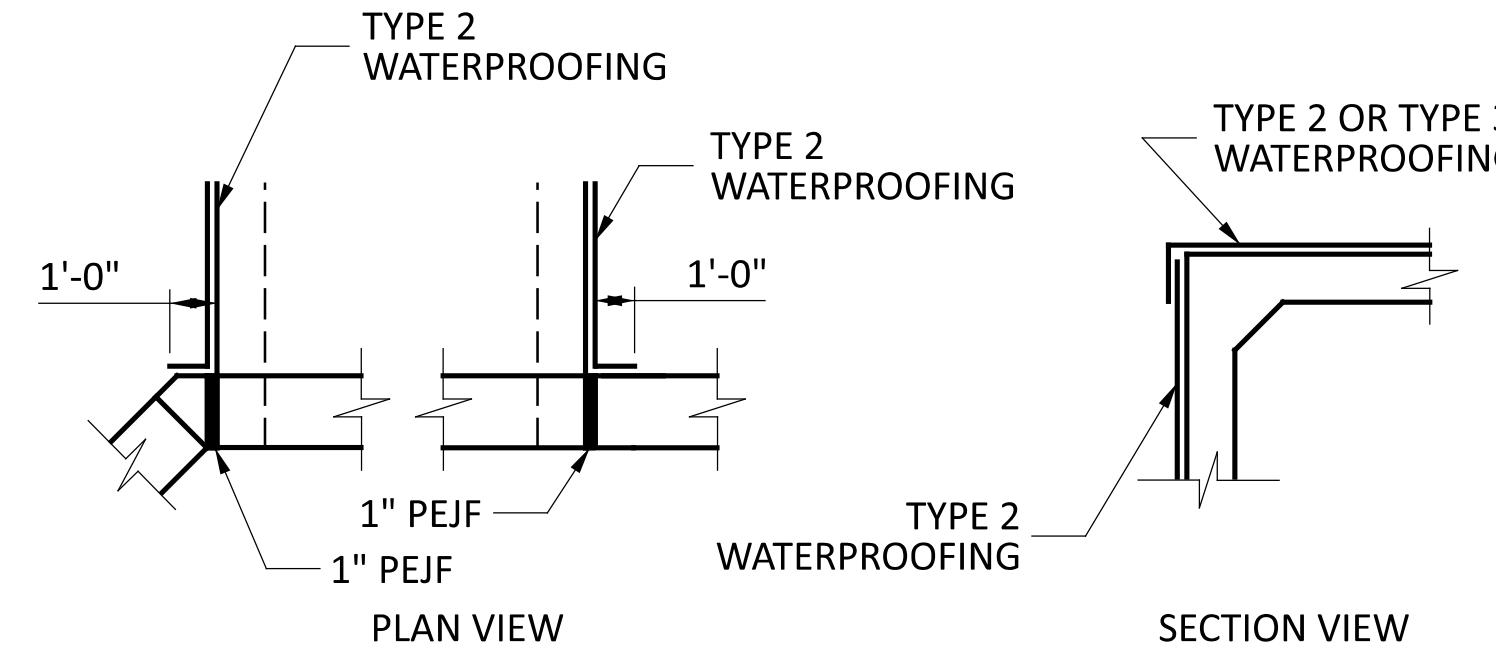
LIMITS OF ITEM 512-SEALING CONCRETE SURFACES

WATERPROOFING

TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25, SHALL EXTEND VERTICALLY DOWN THE ENTIRE SIDES OF THE CULVERT SECTIONS FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

IF PAVEMENT IS NOT PLACED DIRECTLY ON TOP OF THE CULVERT, TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE CULVERT SECTIONS AND SHALL EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE IN THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

IF PAVEMENT IS TO BE USED DIRECTLY ON TOP OF THE CULVERT, TYPE 3 WATERPROOFING, PER CMS 512.10 AND 712.29 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE CULVERT SECTIONS AND SHALL EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 3 WATERPROOFING.



WATERPROOFING DETAILS

BASIS OF PAYMENT: ALL LABOR, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE FOOTING, CUTOFF WALL, WINGWALLS AND FORESLOPE WALL SHALL BE INCLUDED WITH ITEM 511 - CLASS C CONCRETE (RET-WALL/WINGWALL- INCLUDING FOOTING). PAYMENT FOR REINFORCING STEEL SHALL BE INCLUDED WITH ITEM 509 - EPOXY COATED REINFORCING STEEL.

POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN

1'-6" THICK SHALL BE PLACED BEHIND THE WINGWALLS ONLY AND SHALL EXTEND TO 12" BELOW THE EMBANKMENT SURFACE. GEOTEXTILE FABRIC SHALL BE PLACED BETWEEN THE POROUS BACKFILL AND REPLACED EXCAVATION ADJACENT TO THE STRUCTURE. IT SHALL TURN UNDER THE BOTTOM OF THE POROUS BACKFILL AND RETURN 6" ABOVE THE TOP ELEVATION OF THE WEEPHOLE.

WEEPHOLES SHALL BE PLACED 6" TO 12" ABOVE THE NORMAL WATER ELEVATION OR GROUND LINE AND SHALL HAVE A MAXIMUM SPACING OF 10'-0". A MINIMUM OF ONE WEEPHOLE SHALL BE PROVIDED PER WINGWALL.

FURNISH POROUS BACKFILL CONSISTING OF GRAVEL OR STONE ONLY. AIR-COOLED BLAST FURNACE SLAG IS NOT ACCEPTABLE.

ITEM 202 - PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

MEET ALL REQUIREMENTS OF CMS 202, AS WELL AS THE FOLLOWING: REMOVE PORTIONS OF THE EXISTING CAST IN PLACE CULVERT AND ENTIRE REMAINING HEADWALL AND WINGWALLS AT THE INLET OF THE EXISTING CULVERT AS DETAILED IN THE PLANS. ITEMS TO BE REMOVED INCLUDE ALL EXISTING MATERIALS BEING REPLACED BY NEW CONSTRUCTION AND MISCELLANEOUS ITEMS THAT ARE NOT SHOWN TO BE INCORPORATED INTO THE FINAL CONSTRUCTION AND ARE DIRECTED TO BE REMOVED BY THE ENGINEER. THE DEPARTMENT WILL NOT PERMIT THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE-RAMS. DO NOT BEGIN WORK UNTIL THE ENGINEER ACCEPTS THE METHOD OF REMOVAL AND THE WEIGHT OF HAMMER SHALL BE APPROVED BY THE ENGINEER. PERFORM ALL WORK IN A MANNER THAT WILL NOT CUT, ELONGATE OR DAMAGE THE EXISTING CONCRETE REINFORCEMENT TO BE PRESERVED. CHIPPING HAMMERS SHALL NOT BE HEAVIER THAN THE NOMINAL 90-POUND CLASS. PNEUMATIC HAMMERS SHALL NOT BE PLACED IN DIRECT CONTACT WITH CONCRETE REINFORCEMENT THAT IS TO BE RETAINED IN THE REBUILT STRUCTURE.

MAXIMUM REMOVAL LIMITS: SAWCUT LINES SHOWN ARE APPROXIMATE AND BASED ON PREVIOUS FIELD INSPECTION. AT THE BEGINNING OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE AMOUNT OF REMOVAL TO REACH SOUND CONCRETE AND THIS AMOUNT SHALL BE CONFIRMED BY THE ENGINEER PRIOR TO REMOVAL BEING PERFORMED.

THE EXTENSION SHOULD BE BUILT TO THE STATION AND OFFSET SHOWN IN THE PLANS. IF THE REMOVAL LOCATION DETERMINED BY THE PROJECT ENGINEER IS MORE THAN INDICATED IN THE PLAN, THE CONTRACTOR SHOULD BE PAID FOR THE ADDITIONAL MATERIAL BASED ON THE UNIT COST OF THE CONCRETE FOR THE EXTENSION.

ITEM 511 - CLASS QC1 CONCRETE, CULVERT, AS PER PLAN

PAYMENT FOR THE CAST-IN PLACE CULVERT AND TRANSITION BETWEEN THE PROPOSED CULVERT AND THE EXISTING CULVERT SHALL BE INCLUDED UNDER THIS ITEM. THE CONCRETE SHALL MEET ALL REQUIREMENT OF CMS 511 AND THE REINFORCING STEEL SHALL MEET ALL REQUIREMENTS OF CMS 509.

BASIS OF PAYMENT: ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE CULVERT SHALL BE INCLUDED WITH ITEM 511 - CLASS QC1 CONCRETE, CULVERT, AS PER PLAN.

ABBREVIATIONS			
C.J.	CONSTRUCTION JOINT	N.F.	NEAR FACE
CL.	CENTER LINE	PEJF	PREFORMED EXPANSION JOINT FILLER
CLR.	CLEAR	QTY.	QUANTITY
CONC.	CONCRETE	REINF.	REINFORCING
DIA.	DIAMETER	SER.	SERIES
DIM.	DIMENSION	SHT.	SHEET
EXTEN.	EXTENSION	SPA.	SPACING
E.F.	EACH FACE	T & B	TOP AND BOTTOM
F.F.	FAR FACE	TYP.	TYPICAL
MAX.	MAXIMUM	UNO	UNLESS NOTED OTHERWISE
MIN.	MINIMUM		

ESTIMATED QUANTITIES

ITEM	EXT.	QUANTITY	UNIT	DESCRIPTION	SHT. REF.
202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN	2 / 7
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING	
503	21100	15	CY	UNCLASSIFIED EXCAVATION	
509	10000	2,271	LB	EPOXY COATED STEEL REINFORCEMENT	
510	10000	16	EACH	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT	
511	46010	5	CY	CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING	
511	46510	10	CY	CLASS QC1 CONCRETE, FOOTING	
511	46610	1	CY	CLASS QC1 CONCRETE, HEADWALL	
511	47011	4	CY	CLASS QC1 CONCRETE, CULVERT, AS PER PLAN	2 / 7
512	10100	14	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	
512	33000	20	SY	TYPE 2 WATERPROOFING	
516	13600	20	SF	1" PREFORMED EXPANSION JOINT FILLER	
518	21201	2	CY	POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN	2 / 7
601	32100	11	CY	ROCK CHANNEL PROTECTION, TYPE B, WITH FILTER	

DESIGN SPECIFICATIONS:

THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002 AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA:

THE FOLLOWING DESIGN DATA IS ASSUMED:

INTERNAL ANGLE OF FRICTION OF BACKFILL SOIL, $\phi_s = 30^\circ$
 TOTAL UNIT WEIGHT OF BACKFILL SOIL = 120 PCF
 INTERNAL ANGLE OF FRICTION (DRAINED), FOUNDATION SOIL, $\phi_f = 28^\circ$
 UNDRAINED SHEAR STRENGTH (COHESIVE), FOUNDATION SOIL, $S_u = 1500$ PSF
 UNIT WEIGHT OF CONCRETE = 150 PCF
 SLOPE OF BACKFILL = 2:1

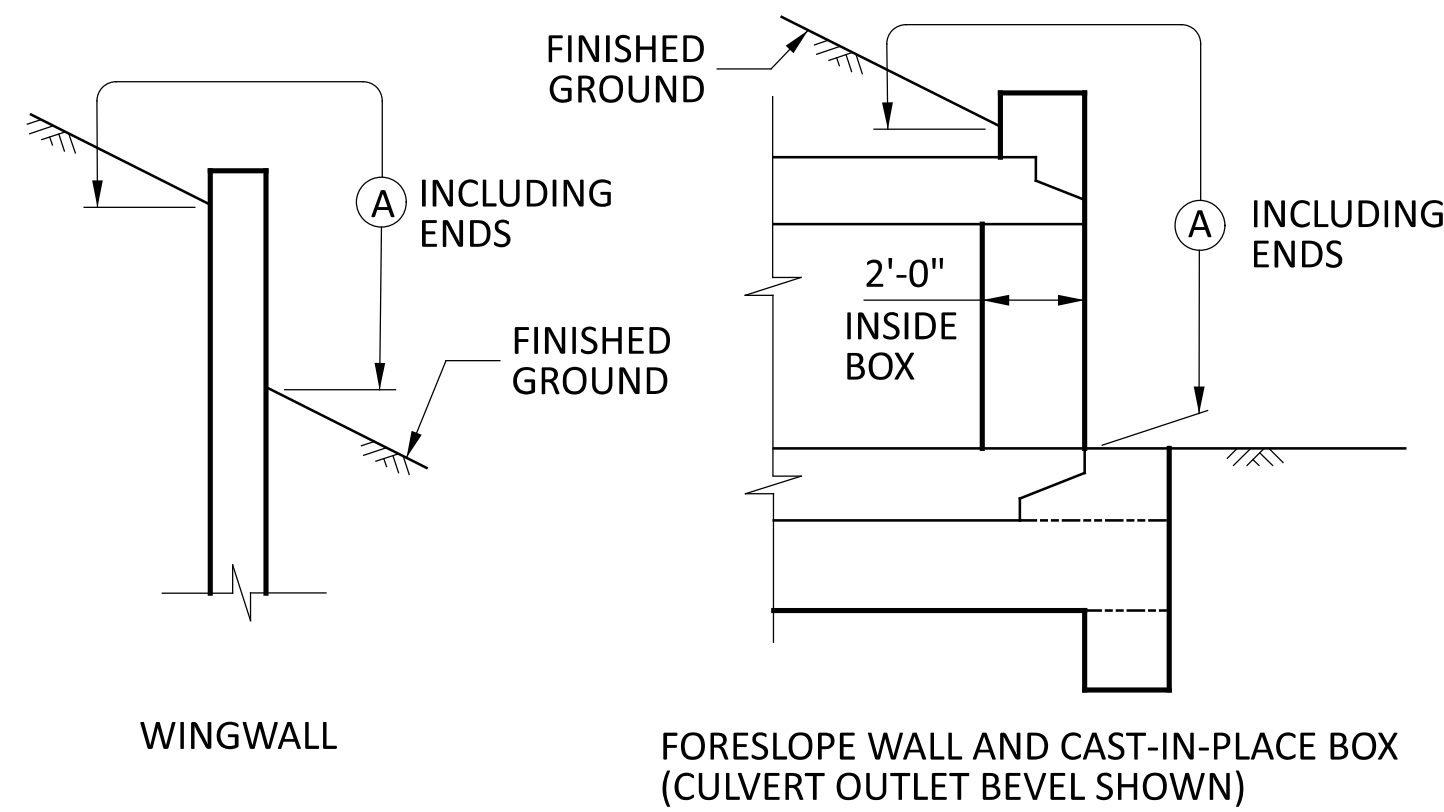
CONCRETE CLASS QC1 – COMPRESSIVE STRENGTH = 4000 PSI

REINFORCING STEEL – GRADE 60 MINIMUM YIELD STRENGTH 60,000 PSI (ALL REINFORCING SHALL BE EPOXY COATED.)

BASED ON THE ASSUMED DESIGN DATA, THE HEADWALLS FOR THE STANDARD DESIGN ACHIEVE FACTORED BEARING RESISTANCES THAT ARE GREATER THAN THEIR RESPECTIVE FACTORED BEARING PRESSURES. IF A BACKFILL MATERIAL WITH A HIGHER INTERNAL ANGLE OF FRICTION OR A LIGHTER TOTAL UNIT WEIGHT IS USED; OR IF A FOUNDATION SOIL WITH A HIGHER DRAINED INTERNAL ANGLE OF FRICTION OR A HIGHER UNDRAINED SHEAR STRENGTH IS ENCOUNTERED; THEN THE STABILITY OF THE WALL IS SATISFACTORY.

SEALING OF FORESLOPE WALL AND WINGWALLS:

ALL EXPOSED CONCRETE OF THE INLET HEADWALL SHALL BE SEALED WITH EPOXY-URETHANE SEALER. THE LIMITS SHALL BE AS SHOWN IN THE DIAGRAMS BELOW. PAYMENT FOR THE EPOXY-URETHANE SEALER SHALL BE PER ITEM 512 - SEALING OF CONCRETE SURFACES



LIMITS OF ITEM 512-SEALING CONCRETE SURFACES

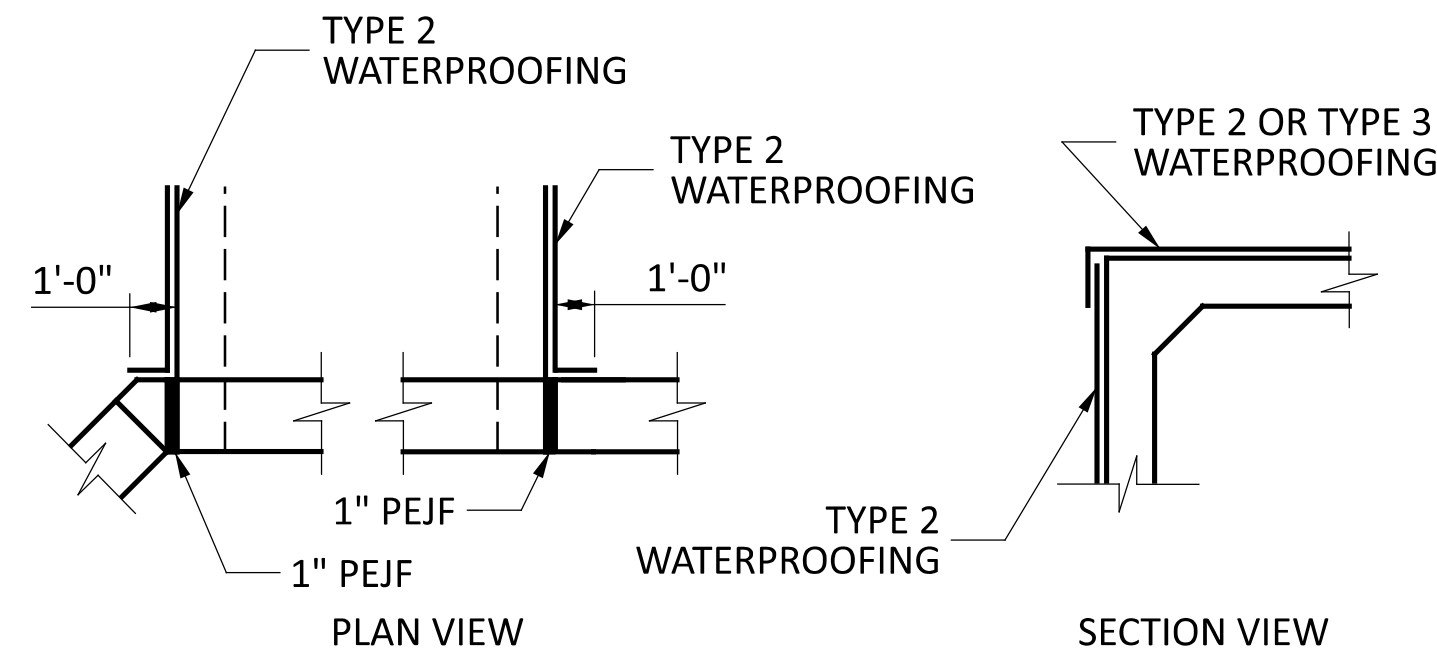
ABBREVIATIONS			
C.J.	CONSTRUCTION JOINT	N.F.	NEAR FACE
CL.	CENTER LINE	PEJF	PREFORMED EXPANSION JOINT FILLER
CLR.	CLEAR	QTY.	QUANTITY
CONC.	CONCRETE	REINF.	REINFORCING
DIA.	DIAMETER	SER.	SERIES
DIM.	DIMENSION	SHT.	SHEET
EXTN.	EXTENSION	SPA.	SPACING
E.F.	EACH FACE	T & B	TOP AND BOTTOM
F.F.	FAR FACE	TYP.	TYPICAL
MAX.	MAXIMUM	UNO	UNLESS NOTED OTHERWISE
MIN.	MINIMUM		

WATERPROOFING

TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25, SHALL EXTEND VERTICALLY DOWN THE ENTIRE SIDES OF THE CULVERT SECTIONS FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

IF PAVEMENT IS NOT PLACED DIRECTLY ON TOP OF THE CULVERT, TYPE 2 WATERPROOFING, PER CMS 512.09 AND 711.25 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE CULVERT SECTIONS AND SHALL EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE IN THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 2 WATERPROOFING.

IF PAVEMENT IS TO BE USED DIRECTLY ON TOP OF THE CULVERT, TYPE 3 WATERPROOFING, PER CMS 512.10 AND 712.29 SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE CULVERT SECTIONS AND SHALL EXTEND ONE FOOT VERTICALLY DOWN THE SIDES FOR ALL PORTIONS OF THE CULVERT WHICH SHALL BE IN CONTACT WITH THE BACKFILL. PAYMENT FOR THE MEMBRANE WATERPROOFING SHALL BE AT THE CONTRACT PRICE BID PER SQUARE YARD FOR ITEM 512 - TYPE 3 WATERPROOFING.



WATERPROOFING DETAILS

BASIS OF PAYMENT: ALL LABOR, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE FOOTING, CUTOFF WALL, WINGWALLS AND FORESLOPE WALL SHALL BE INCLUDED WITH ITEM 511 - CLASS C CONCRETE (RET-WALL/WINGWALL- INCLUDING FOOTING). PAYMENT FOR REINFORCING STEEL SHALL BE INCLUDED WITH ITEM 509 - EPOXY COATED REINFORCING STEEL.

POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN

1'-6" THICK SHALL BE PLACED BEHIND THE WINGWALLS ONLY AND SHALL EXTEND TO 12" BELOW THE EMBANKMENT SURFACE. GEOTEXTILE FABRIC SHALL BE PLACED BETWEEN THE POROUS BACKFILL AND REPLACED EXCAVATION ADJACENT TO THE STRUCTURE. IT SHALL TURN UNDER THE BOTTOM OF THE POROUS BACKFILL AND RETURN 6" ABOVE THE TOP ELEVATION OF THE WEEPHOLE.

WEEPHOLES SHALL BE PLACED 6" TO 12" ABOVE THE NORMAL WATER ELEVATION OR GROUND LINE AND SHALL HAVE A MAXIMUM SPACING OF 10'-0". A MINIMUM OF ONE WEEPHOLE SHALL BE PROVIDED PER WINGWALL.

FURNISH POROUS BACKFILL CONSISTING OF GRAVEL OR STONE ONLY. AIR-COOLED BLAST FURNACE SLAG IS NOT ACCEPTABLE.

ITEM 202 - PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

MEET ALL REQUIREMENTS OF CMS 202, AS WELL AS THE FOLLOWING: REMOVE PORTIONS OF THE EXISTING CAST IN PLACE CULVERT AND ENTIRE REMAINING HEADWALL AND WINGWALLS AT THE INLET OF THE EXISTING CULVERT AS DETAILED IN THE PLANS. ITEMS TO BE REMOVED INCLUDE ALL EXISTING MATERIALS BEING REPLACED BY NEW CONSTRUCTION AND MISCELLANEOUS ITEMS THAT ARE NOT SHOWN TO BE INCORPORATED INTO THE FINAL CONSTRUCTION AND ARE DIRECTED TO BE REMOVED BY THE ENGINEER. THE DEPARTMENT WILL NOT PERMIT THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE-RAMS. DO NOT BEGIN WORK UNTIL THE ENGINEER ACCEPTS THE METHOD OF REMOVAL AND THE WEIGHT OF HAMMER SHALL BE APPROVED BY THE ENGINEER. PERFORM ALL WORK IN A MANNER THAT WILL NOT CUT, ELONGATE OR DAMAGE THE EXISTING CONCRETE REINFORCEMENT TO BE PRESERVED. CHIPPING HAMMERS SHALL NOT BE HEAVIER THAN THE NOMINAL 90-POUND CLASS. PNEUMATIC HAMMERS SHALL NOT BE PLACED IN DIRECT CONTACT WITH CONCRETE REINFORCEMENT THAT IS TO BE RETAINED IN THE REBUILT STRUCTURE.

MAXIMUM REMOVAL LIMITS: SAWCUT LINES SHOWN ARE APPROXIMATE AND BASED ON PREVIOUS FIELD INSPECTION. AT THE BEGINNING OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE AMOUNT OF REMOVAL TO REACH SOUND CONCRETE AND THIS AMOUNT SHALL BE CONFIRMED BY THE ENGINEER PRIOR TO REMOVAL BEING PERFORMED.

THE EXTENSION SHOULD BE BUILT TO THE STATION AND OFFSET SHOWN IN THE PLANS. IF THE REMOVAL LOCATION DETERMINED BY THE PROJECT ENGINEER IS MORE THAN INDICATED IN THE PLAN, THE CONTRACTOR SHOULD BE PAID FOR THE ADDITIONAL MATERIAL BASED ON THE UNIT COST OF THE CONCRETE FOR THE EXTENSION.

ITEM 511 - CLASS QC1 CONCRETE, CULVERT, AS PER PLAN

PAYMENT FOR THE CAST-IN PLACE CULVERT AND TRANSITION BETWEEN THE PROPOSED CULVERT AND THE EXISTING CULVERT SHALL BE INCLUDED UNDER THIS ITEM. THE CONCRETE SHALL MEET ALL REQUIREMENT OF CMS 511 AND THE REINFORCING STEEL SHALL MEET ALL REQUIREMENTS OF CMS 509.

BASIS OF PAYMENT: ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE CULVERT SHALL BE INCLUDED WITH ITEM 511 - CLASS QC1 CONCRETE, CULVERT, AS PER PLAN.

ESTIMATED QUANTITIES

ITEM	EXT.	QUANTITY	UNIT	DESCRIPTION	SHT. REF.
202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN	2 / 8
202	35200	7	FT	PIPE REMOVED, OVER 24"	
503	11100	LS		COFFERDAMS AND EXCAVATION BRACING	
503	21100	13	CY	UNCLASSIFIED EXCAVATION	
509	10000	2828	LB	EPOXY COATED STEEL REINFORCEMENT	
510	10000	24	EACH	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT	
511	46010	5	CY	CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING	
511	46510	12	CY	CLASS QC1 CONCRETE, FOOTING	
511	46610	1	CY	CLASS QC1 CONCRETE, HEADWALL	
511	47011	8	CY	CLASS QC1 CONCRETE, CULVERT, AS PER PLAN	2 / 8
512	10100	18	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	
512	33000	34	SY	TYPE 2 WATERPROOFING	
516	13600	32	SF	1" PREFORMED EXPANSION JOINT FILLER	
518	21201	2	CY	POROUS BACKFILL WITH GEOTEXTILE FABRIC, AS PER PLAN	2 / 8
601	32200	11	CY	ROCK CHANNEL PROTECTION, TYPE C, WITH FILTER	