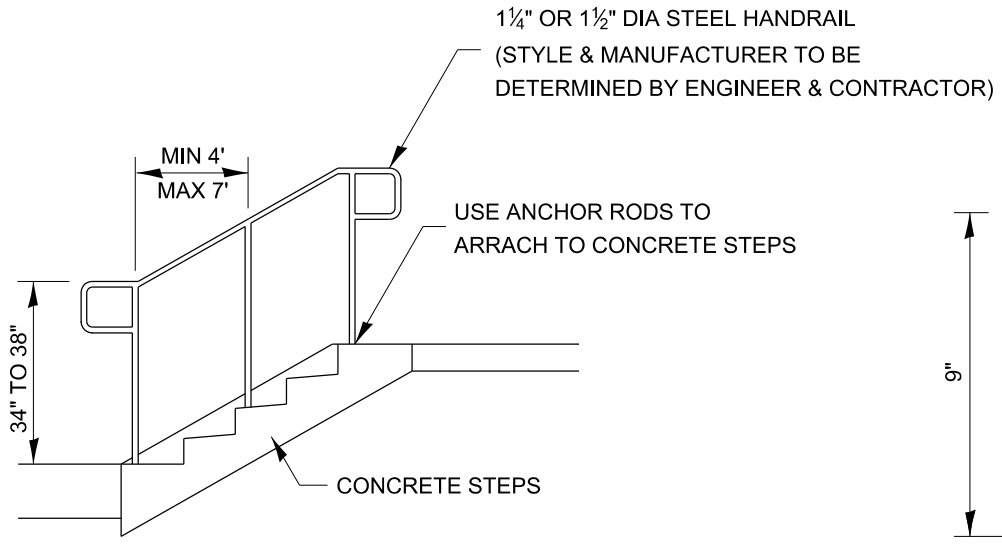
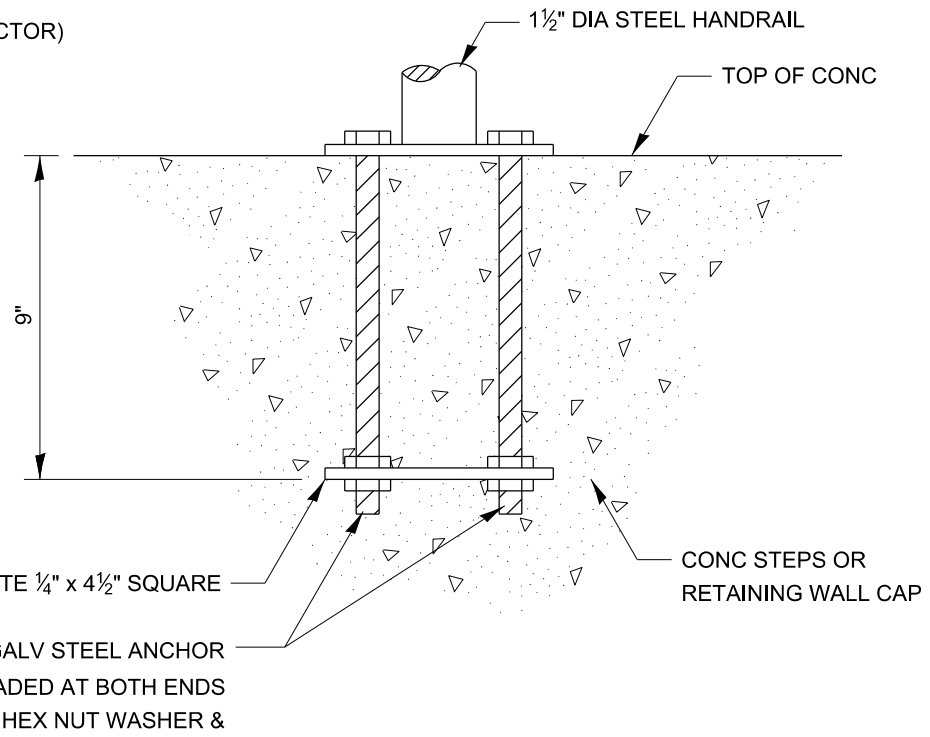
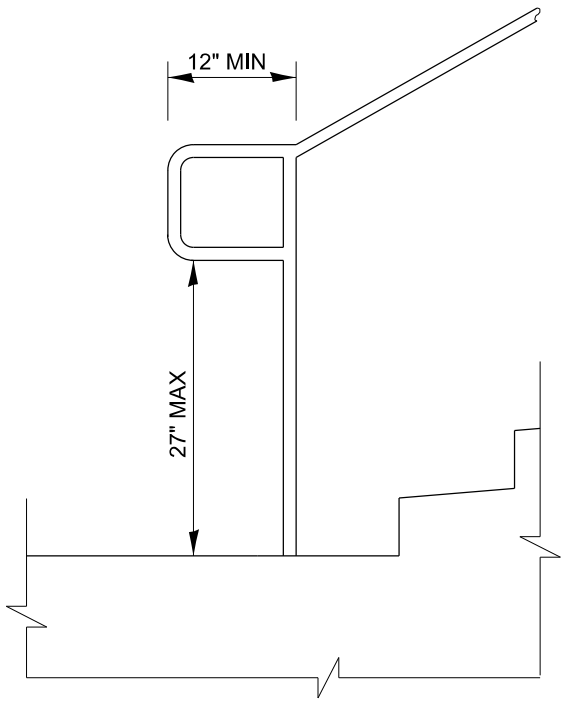


HANDRAIL FOR CONCRETE STEPS

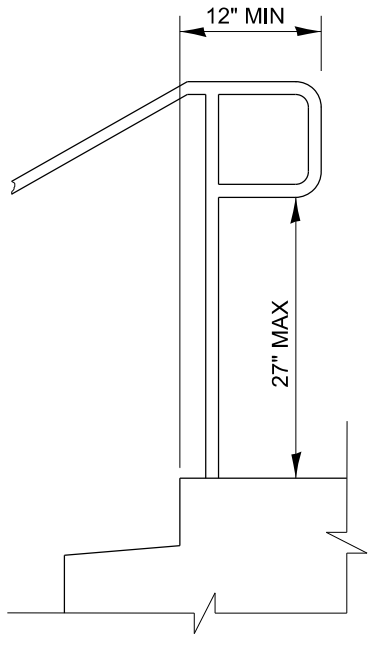


ANCHOR ROD DETAIL

(INCLUDED IN THE COST OF HAND OR SAFETY RAIL)



EXTENSION AT BOTTOM OF RUN DETAIL



EXTENSION AT TOP OF RUN DETAIL

NOTES:

STAIRWAYS SHALL HAVE CONTINUOUS HANDRAILS BOTH SIDES OF ALL STAIRS.

THE INSIDE HANDRAIL ON SWITCHBACK OR DOGLEG STAIRS SHALL ALWAY BE CONTINUOUS.

GRIPPING SURFACES SHALL BE UNINTERRUPTED BY NEWEL POSTS, OTHER CONSTRUCTION ELEMENTS, OR OBSTRUCTIONS.

ENDS OF HANDRAIL SHALL BE EITHER ROUNDED OR RETURNED SMOOTHLY TO FLOOR, WALL, OR POST.

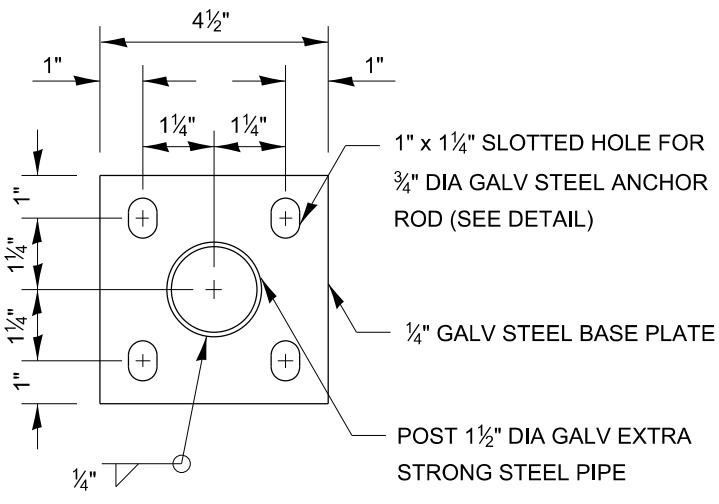
HAND & SAFETY RAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS.

THE CLEAR SPACES BETWEEN HANDRAILS AND ANY WALL SHALL BE 1½".

HANDRAIL SHALL CONFORM TO SECTION 509 WITH THE EXCEPTION THAT ALL PIPE AND CONNECTIONS SHALL BE WELDED GALVANIZED OR ALUMINUM ACCORDING TO ARTICLE 1006.27, 1006.30, OR 1006.34.

THE DIAMETER OF THE GRIPPING SURFACE OF THE HANDRAIL SHALL BE 1¼" TO 1½".

THIS WORK SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER FOOT FOR PIPE HANDRAIL.

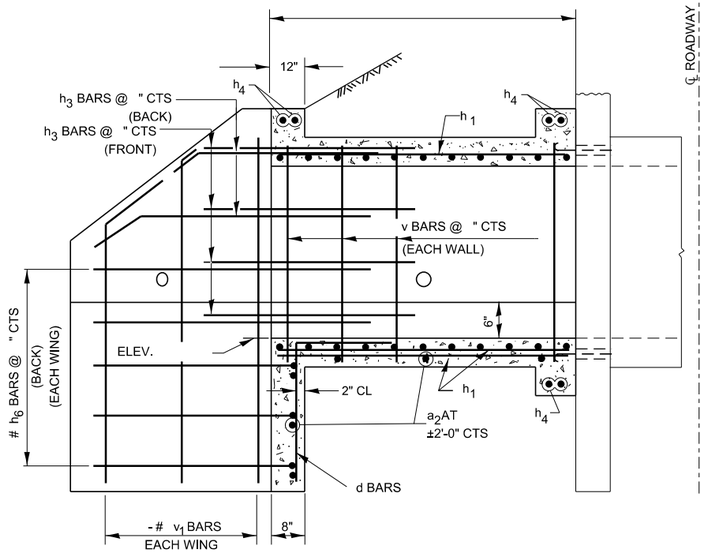


POST CASE PLATE DETAIL

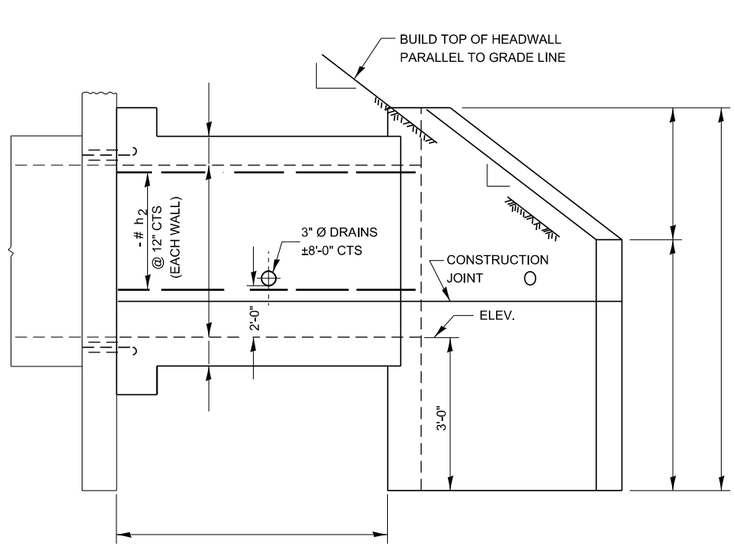
(INCLUDED IN THE COST OF HAND OR SAFETY RAIL)

PIPE HANDRAILS FOR STEPS

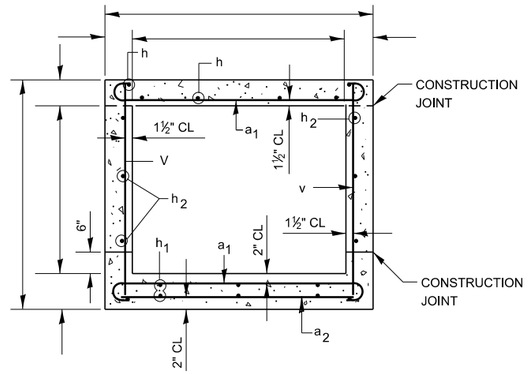
509-1



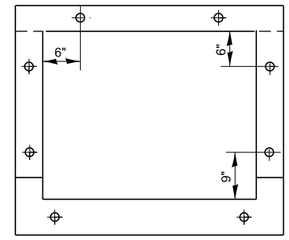
HALF LONG SECTION



HALF ELEVATION



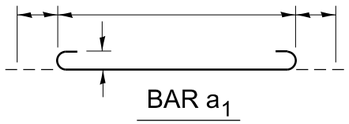
SECTION THRU BARREL



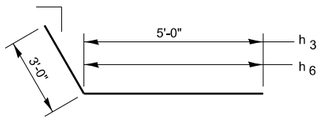
SIDEWALLS . . . . . @ " CTS
TOP & BOTTOM . . @ " CTS

EXPANSION BOLT LOCATION

NOTE: EPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELD AND ¾" DIAMETER HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE.
MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS.



BAR a_1



BARS h_3 & h_6

BILL OF MATERIALS

BAR	NUMBER	SIZE	LENGTH
a_1			
a_2			
a_3			
d			
h			
h_1			
h_2			
h_3			
h_4			
h_6			
V			
V_1			
V_2			
CONCRETE BOX CULVERTS		CU YDS	
REINFORCEMENT BARS		LBS	
EXPANSION BOLTS		EACH	

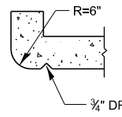
SHOWING REINFORCEMENT

SHOWING OUTLINES

PLAN

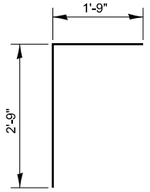
DESIGN STRESSES
fy=60,000 PSI
f'c= 3,500 PSI

LOADING HS 20-44 & ALT



SECTION THRU HEADWALL

(UP STREAM END ONLY)



BAR d

GENERAL NOTES

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
AT LEAST SIX FEET OF BARREL SHALL BE POURED MONOLITHICALLY WITH WINGWALLS.
EXPOSED EDGES SHALL BE BEVELED ¾".
FOR BACKFILLING AND EMBANKMENTS SEE STANDARD SPECIFICATIONS.
TILT HOOK OF a_1 BARS, IF NECESSARY, TO OBTAIN 1½" MINIMUM CLEARANCE AT TOP OF HOOK.
REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31, M-42, ORM-53, GRADE 60.

540-1

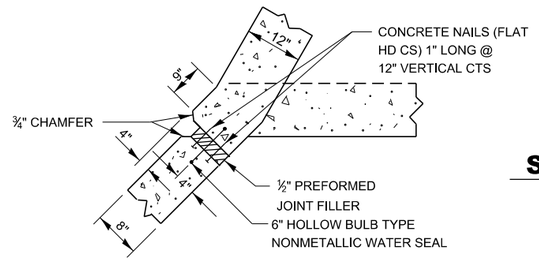
USER NAME = ronald.pohar	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/15/2024	DATE -	REVISED -	

BOX CULVERT EXTENSION STATION

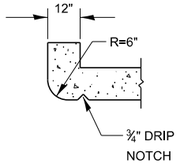
SCALE: | SHEET OF SHEETS | STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS .dgn\500-599 STRUCTURES.dgn

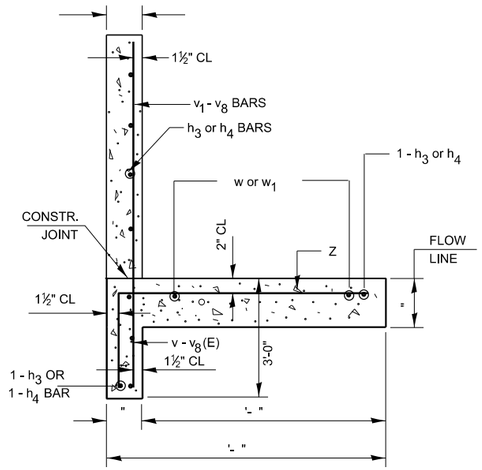


CORNER DETAIL



SECTION THRU HEADWALL

(UP STREAM END ONLY)

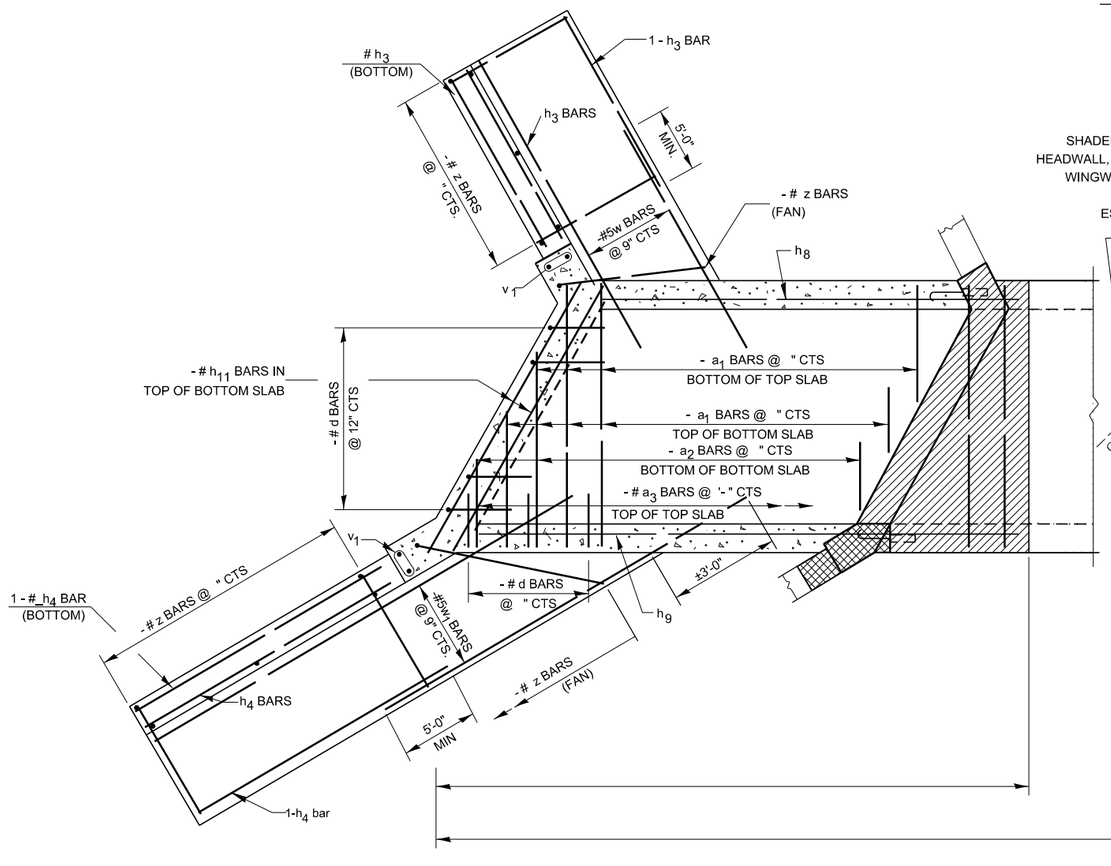


SECTION "A-A"

GENERAL NOTES

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
EXPOSED EDGES SHALL BE BEVELED ¾".
FOR BACKFILLING AND EMBANKMENTS SEE STANDARD SPECIFICATIONS.
REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31, M-43, OR M-53, GRADE 60.
NONMETALLIC WATER SEAL USED IN WINGWALL JOINTS SHALL EXTEND FROM THE TOP OF THE FOOTING TO WITHIN 6" OF THE TOP OF THE HEADWALL.
BARS INDICATED THUS 12x4-#5 ECT. INDICATES 12 LINES OF BARS WITH 4 LENGTHS PER LINE.

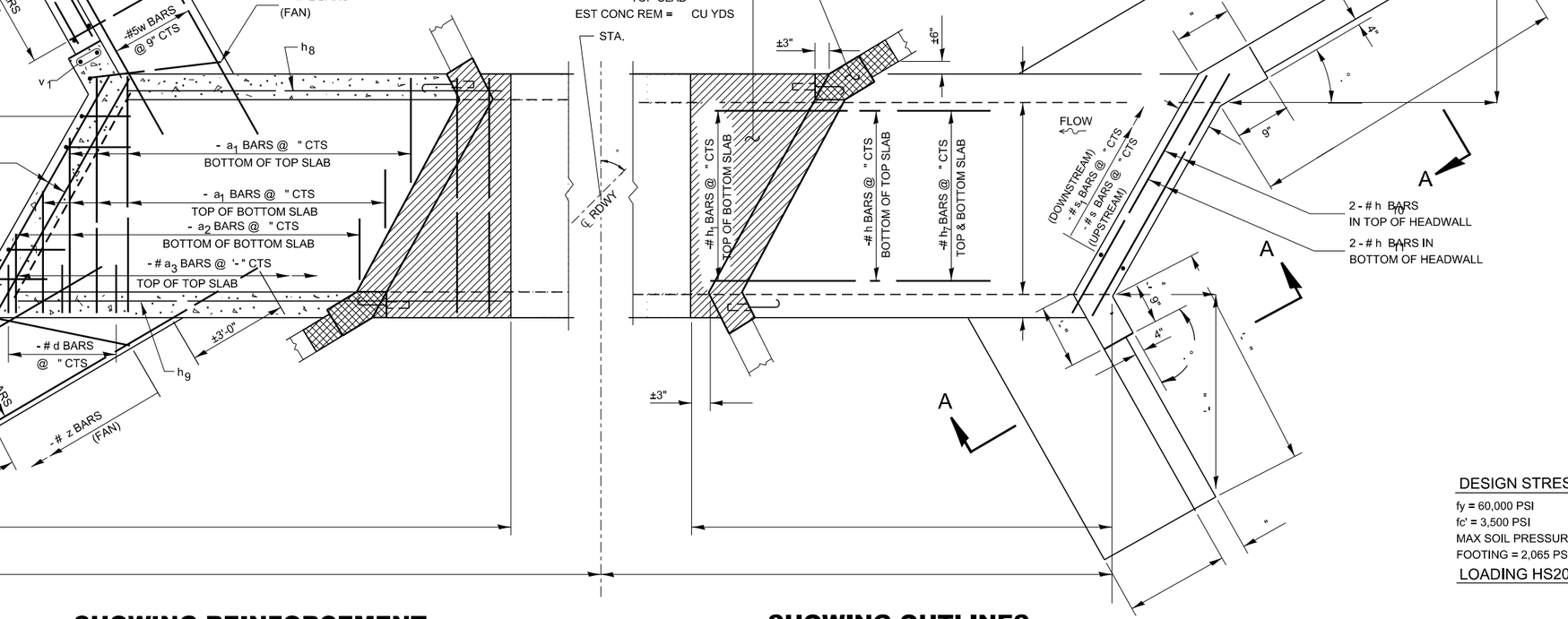
NOTE:
a BARS IN SKEW PORTION OF SLAB SHALL BE ORDERED FULL LENGTH & CUT TO FIT. BALANCE OF BAR TO BE USED IN OPPOSITE END OF CULVERT.



SHOWING REINFORCEMENT

SHADED AREAS TO BE REMOVED:
HEADWALL, TOP SLAB & PORTIONS OF WINGWALL DOWN TO BOTTOM OF TOP SLAB
EST CONC REM = CU YDS

SHADED AREAS TO BE REMOVED:
PORTIONS OF WINGWALL DOWN TO FLOW LINE
OF EXISTING BOX CULVERT.
EST CONC REM = CU YDS



SHOWING OUTLINES

PLAN

DESIGN STRESSES
fy = 60,000 PSI
fc' = 3,500 PSI
MAX SOIL PRESSURE UNDER FOOTING = 2,065 PSF
LOADING HS20-44

540-2A

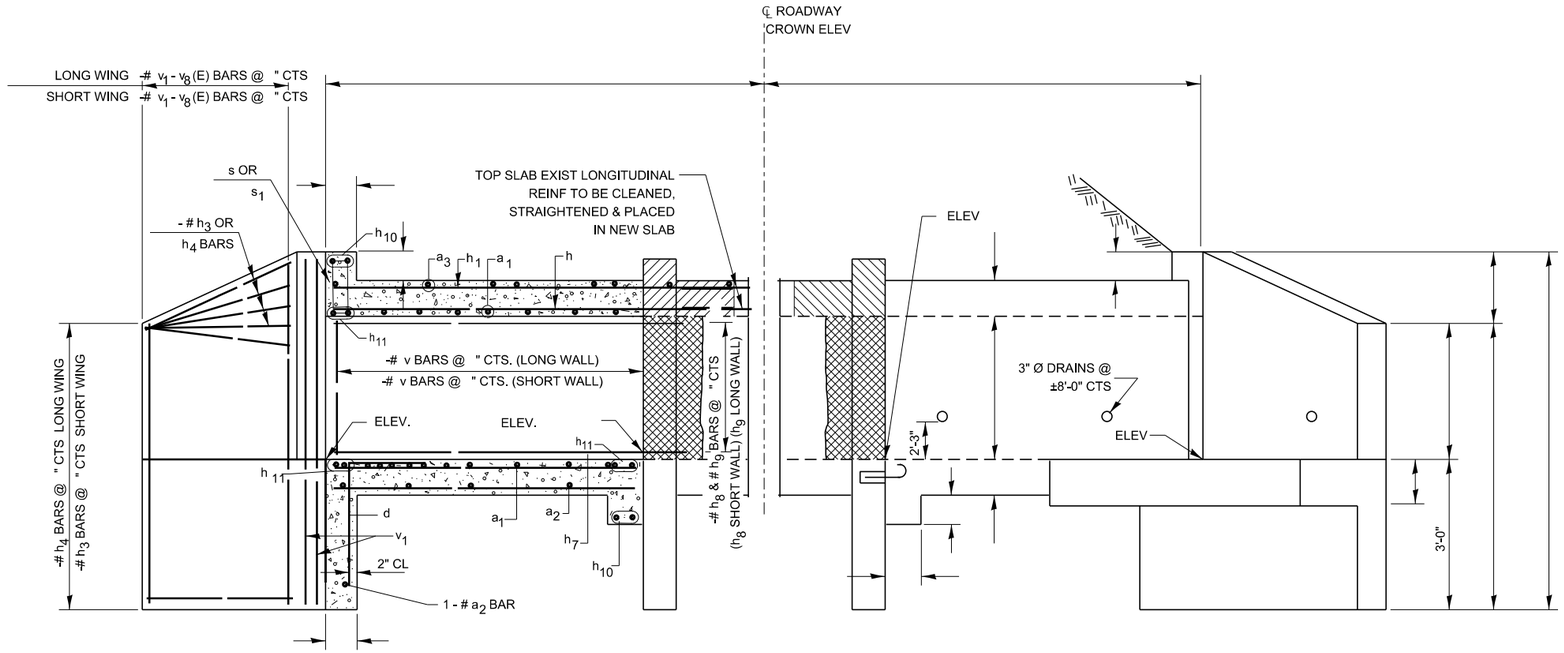
MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOTDocuments\DOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS (DGN\500-599 STRUCTURES.dgn

USER NAME = ronald.pohar	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/15/2024	DATE -	REVISED -	

BOX CULVERT EXTENSION STATION

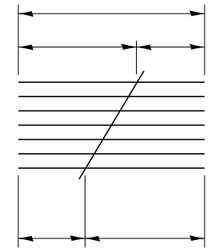
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



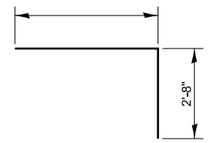
HALF LONG SECTION

HALF ELEVATION

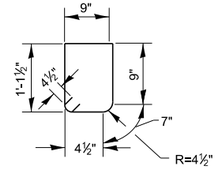


BAR CUTTING DIAGRAM

BARS h & h1

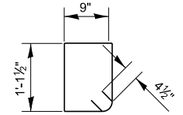


BAR z



BAR s

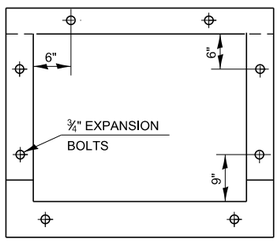
(UPSTREAM)



BAR s1

(DOWNSTREAM)

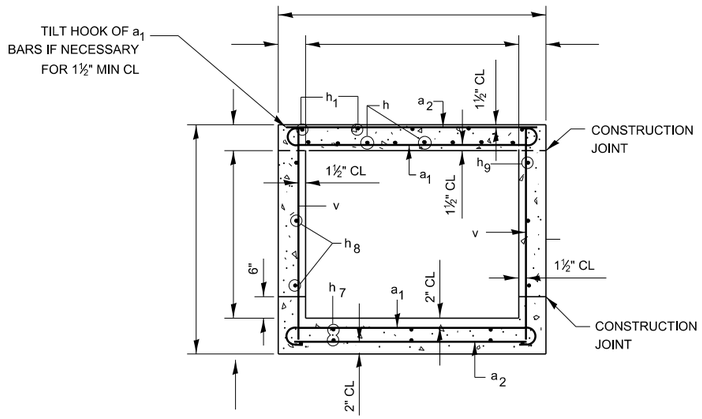
DIMENSIONS AT RT. ∠'S TO ℄ ROADWAY



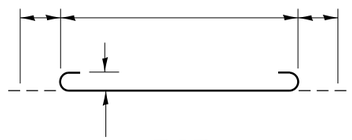
SIDEWALLS @ " CTS
TOP & BOTTOM @ " CTS

EXPANSION BOLT LOCATION

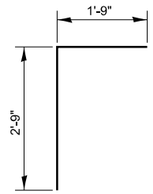
NOTE: EXPANSION BOLTS SHALL CONSIST OF SELF DRILL EXPANSION SHIELDS AND ¾" DIAMETER HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE.
MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS.



SECTION THRU BARREL



BAR a1



BAR d

BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH
a1			
a2		#4	
a3			
d			
h			
h1			
h3			
h4			
h5			
h6			
h7			
h8			
h9			
h10		#6	
h11			
s			
s1			
v			
v 1(E)			
v 2(E)			
v 3(E)			
v 4(E)			
v 5(E)			
v 6(E)			
v 7(E)			
v 8(E)			
w		#5	
w1		#5	
z			

CONCRETE BOX CULVERTS	CU YD	
REINFORCEMENT BARS	LBS	
REIN BARS (EPOXY CTD)	LBS	
CONCRETE REMOVAL	CU YD	
EXPANSION BOLTS	EACH	

540-2B

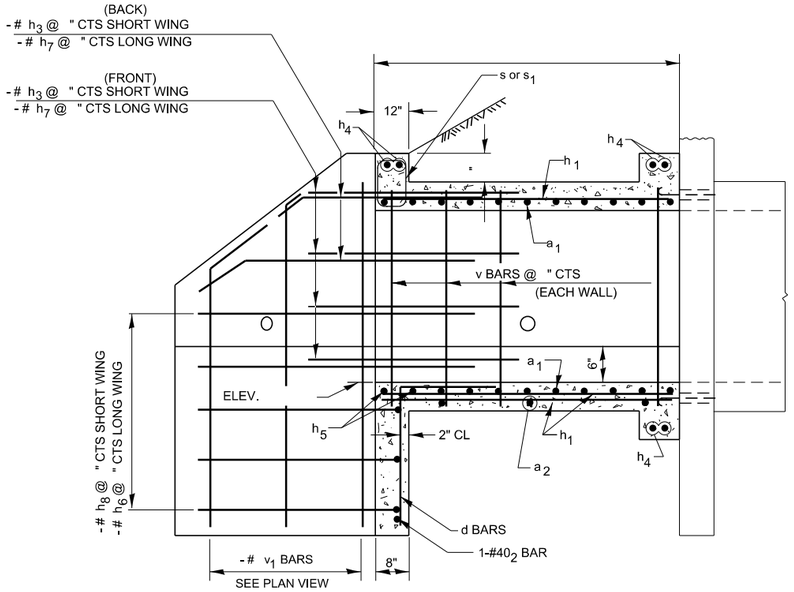
USER NAME = ronald.pohar	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/15/2024	DATE -	REVISED -	

BOX CULVERT EXTENSION STATION

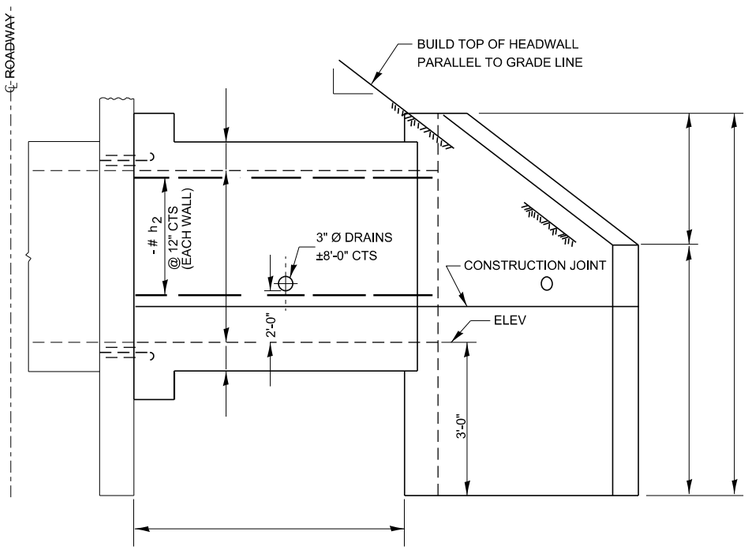
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

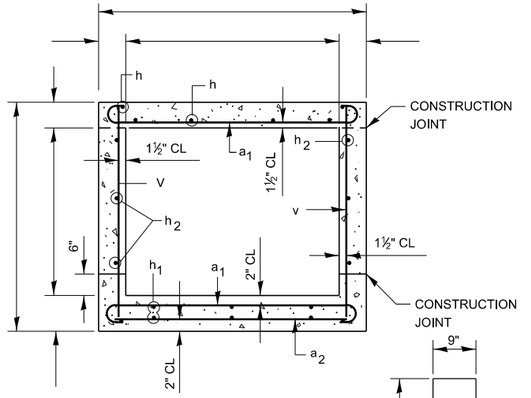
MODEL: dist 3 details
FILE NAME: pw:\\dist-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS (DGN)\500-599 STRUCTURES.dgn



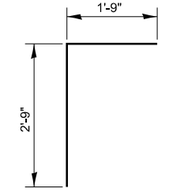
HALF LONG SECTION



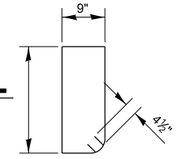
HALF ELEVATION



SECTION THRU BARREL

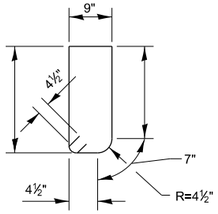


BAR d



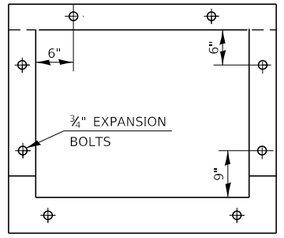
BAR s_1

(DOWNSTREAM)



BAR s

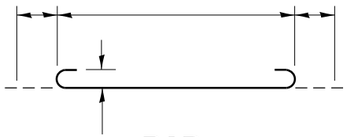
(UPSTREAM)



SIDEWALLS @ " CTS
TOP & BOTTOM @ " CTS

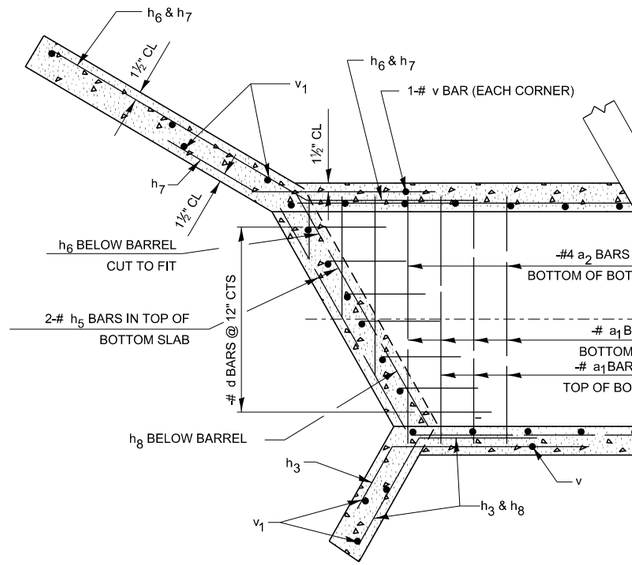
EXPANSION BOLT LOCATION

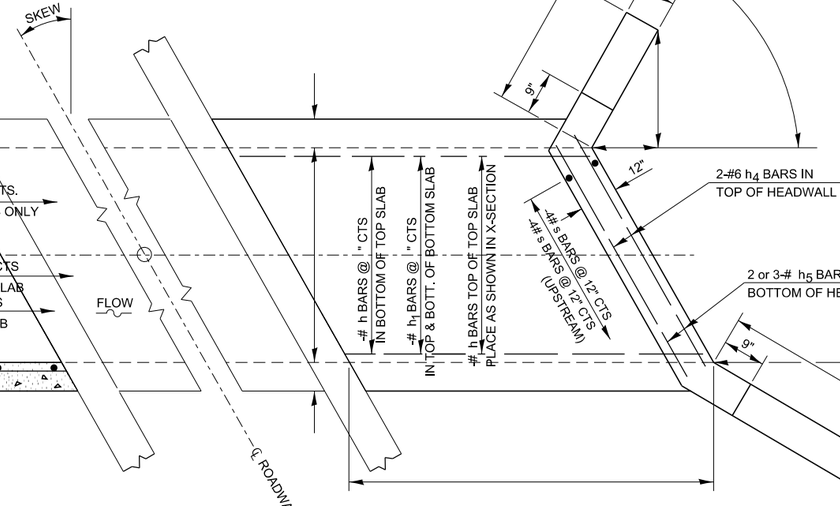
NOTE: EXPANSION BOLTS SHALL CONSIST OF SELF DRILL EXPANSION SHIELDS AND ¾" DIAMETER HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS.



BAR a_1

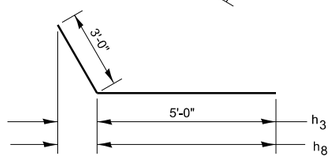
BARS h_6 & h_7





SHOWING REINFORCEMENT PLAN

SHOWING OUTLINES



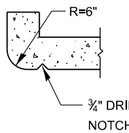
BARS h_3 & h_8

GENERAL NOTES

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
AT LEAST SIX FEET OF BARREL SHALL BE POURED MONOLITHICALLY WITH WINGWALLS.
EXPOSED EDGES SHALL BE BEVELED ¾".
FOR BACKFILING AND EMBANKMENTS SEE STANDARD SPECIFICATIONS.
TILT HOOK OF a_1 BARS, IF NECESSARY, TO OBTAIN 1½" MINIMUM CLEARANCE AT THE TOP OF HOOK.
REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31, M-42 OR M-53, GRADE 60.

DESIGN STRESSES
fy= 60,000 PSI
fc'= 3,500 PSI

LOADING HS 20-44 & ALT



SECTION THRU HEADWALL

(UP STREAM END ONLY)

BILL OF MATERIALS

BAR	NUMBER	SIZE	LENGTH
a_1			
a_2		#4	
d			
h			
h_1			
h_2			
h_3			
h_4		#6	
h_5			
h_6			
h_7			
h_8			
V			
V_1			
s		#4	
s_1		#4	
CONC BOX CULV		CU YDS	
REINFORCEMENT BARS		LBS	
EXPANSION BOLTS		EACH	

540-3

USER NAME = ronald.pohar	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 3/15/2024	DATE -	REVISED -

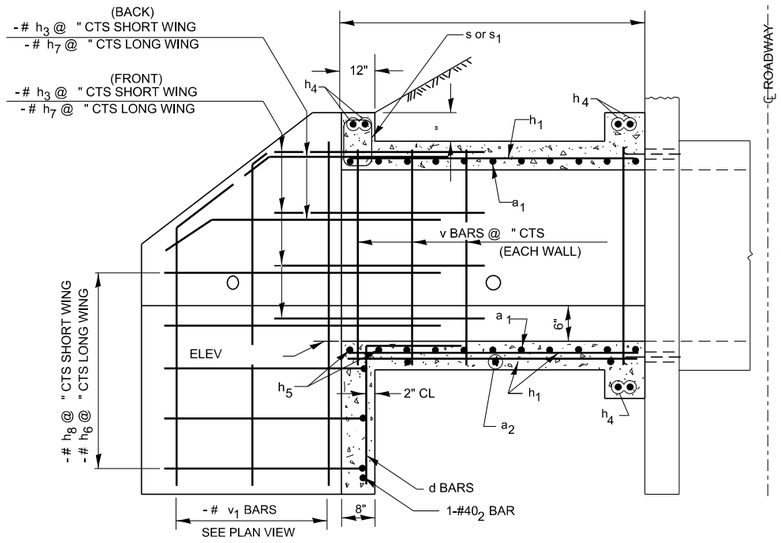
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BOX CULVERT EXTENSION STATION

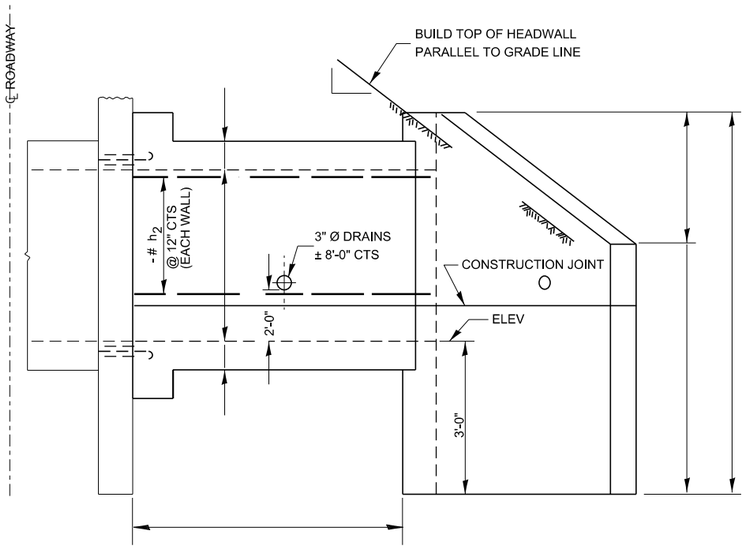
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

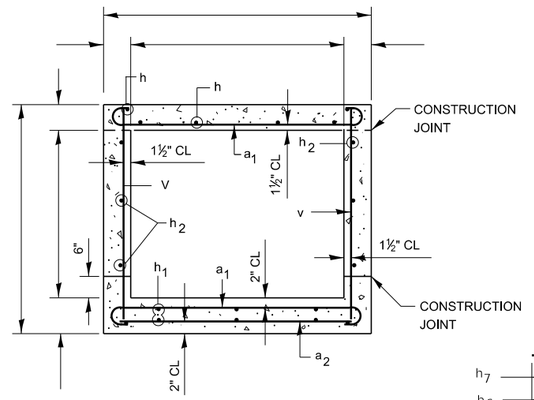
MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS_(DGN\500-599 STRUCTURES.dgn



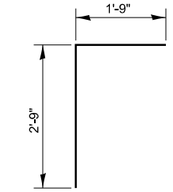
HALF LONG SECTION



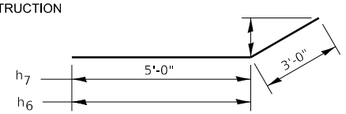
HALF ELEVATION



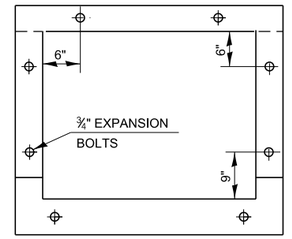
SECTION THRU BARREL



BAR d



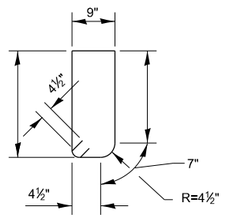
BARS h_6 & h_7



SIDEWALLS @ " CTS
TOP & BOTTOM @ " CTS

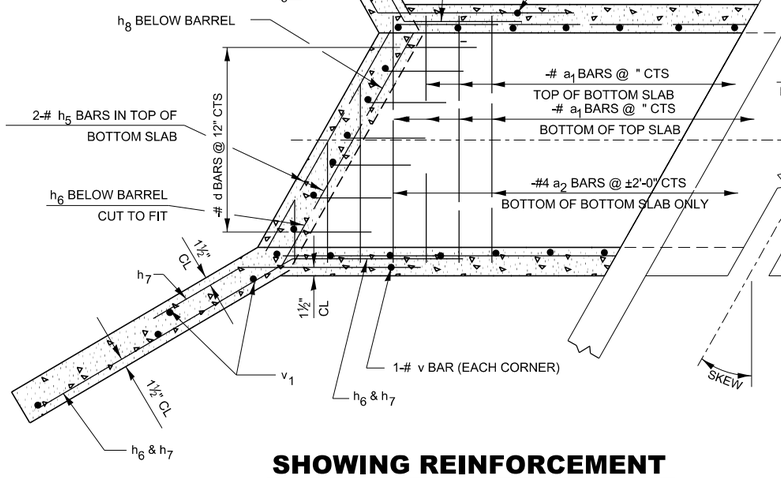
EXPANSION BOLT LOCATION

NOTE: EXPANSION BOLTS SHALL CONSIST OF SELF DRILL EXPANSION SHIELDS AND ¾" DIAMETER HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE.
MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS.

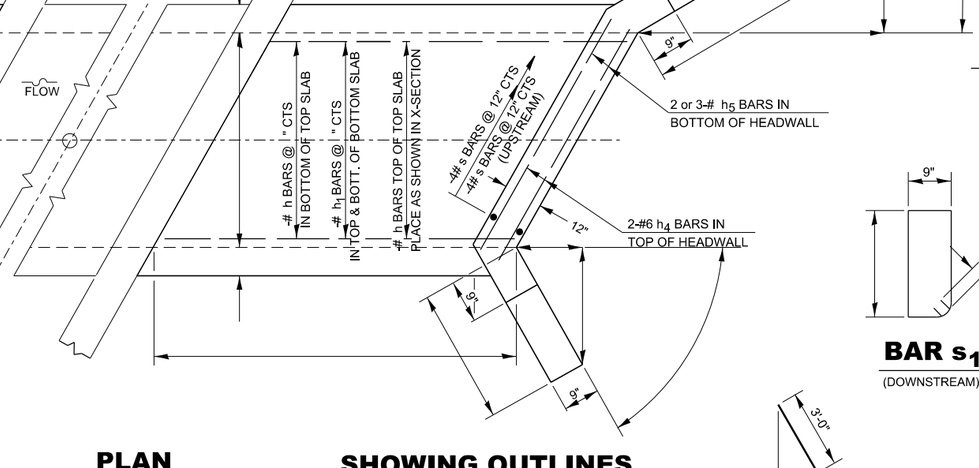


BAR s

(UPSTREAM)

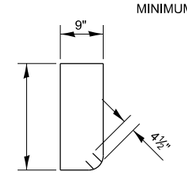


SHOWING REINFORCEMENT



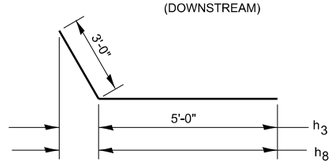
PLAN

SHOWING OUTLINES



BAR s_1

(DOWNSTREAM)



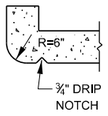
BARS h_3 & h_8

DESIGN STRESSES
fy= 60,000 PSI
fc'= 3,500 PSI

LOADING HS 20-44 & ALT

BILL OF MATERIALS

BAR	NUMBER	SIZE	LENGTH
a_1			
a_2		#4	
d			
h			
h_1			
h_2			
h_3			
h_4		#6	
h_5			
h_6			
h_7			
h_8			
V			
V_1			
s		#4	
s_1		#4	
CONC BOX CULV		CU YDS	
REINFORCEMENT BARS		LBS	
EXPANSION BOLTS		EACH	

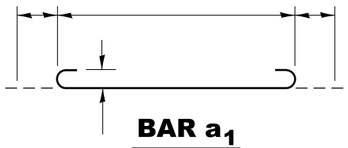


SECTION THRU HEADWALL

(UP STREAM END ONLY)

GENERAL NOTES

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
AT LEAST SIX FEET OF BARREL SHALL BE POURED MONOLITHICALLY WITH WINGWALLS.
EXPOSED EDGES SHALL BE BEVELED ¾".
FOR BACKFILING AND EMBANKMENTS SEE STANDARD SPECIFICATIONS.
TILT HOOK OF a_1 BARS, IF NECESSARY, TO OBTAIN 1½" MINIMUM CLEARANCE AT THE TOP OF HOOK.
REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31, M-42 OR M-53, GRADE 60.



BAR a_1

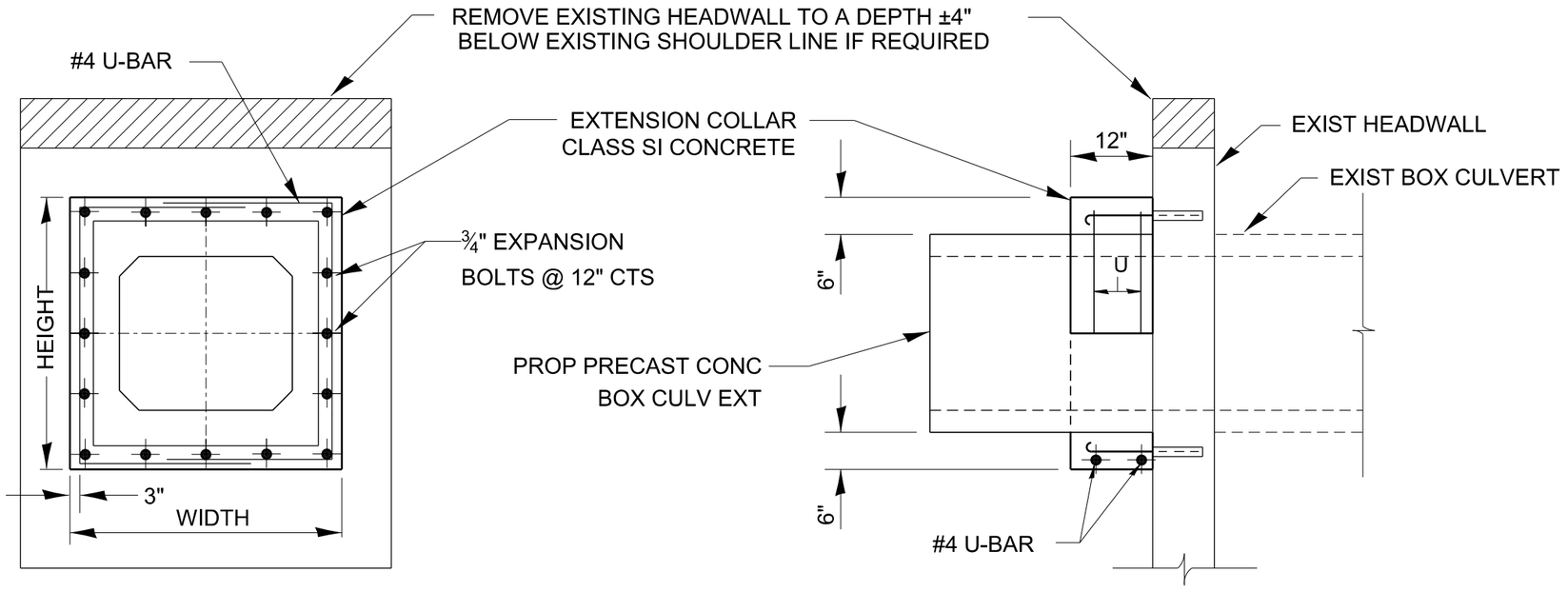
USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/15/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

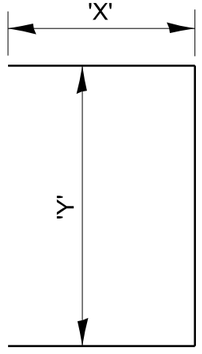
BOX CULVERT EXTENSION STATION

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



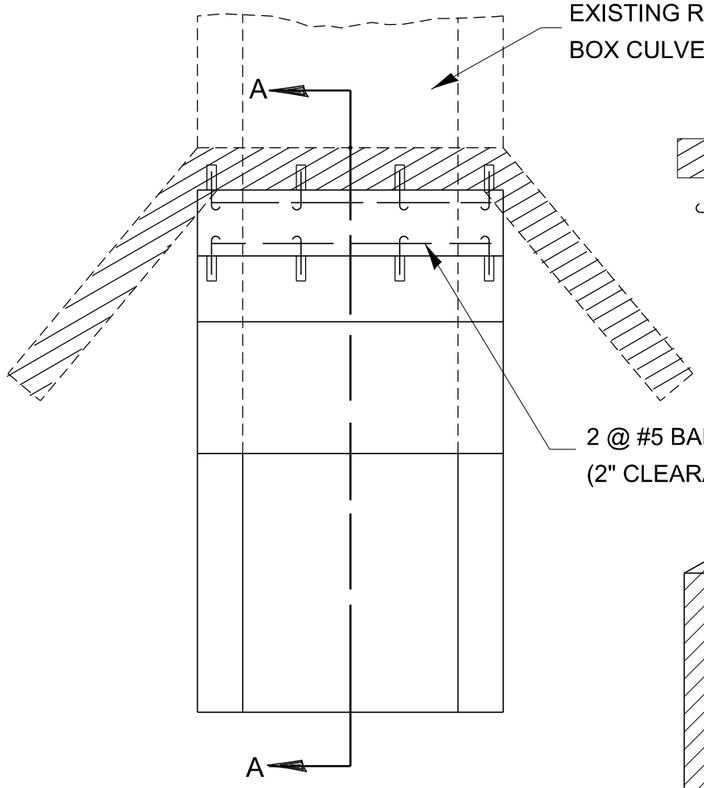
EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



U-BAR

							QUANTITIES ARE FOR ONE SIDE ONLY		
LOCATION	EXISTING CULVERT SIZE	PRECAST CULVERT EXTENSION	EXTENSION COLLAR		U-BAR		CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
			WIDTH	HEIGHT	'X'	'Y'			
	FT x FT	FT x FT	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAIL (PRECAST BOX CULVERT EXTENSION OF BOX CULVERT)

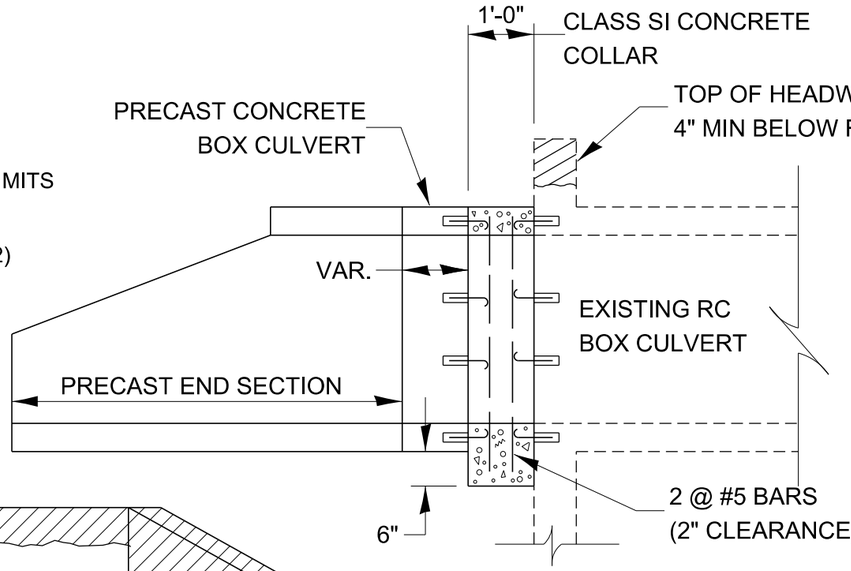


PLAN VIEW

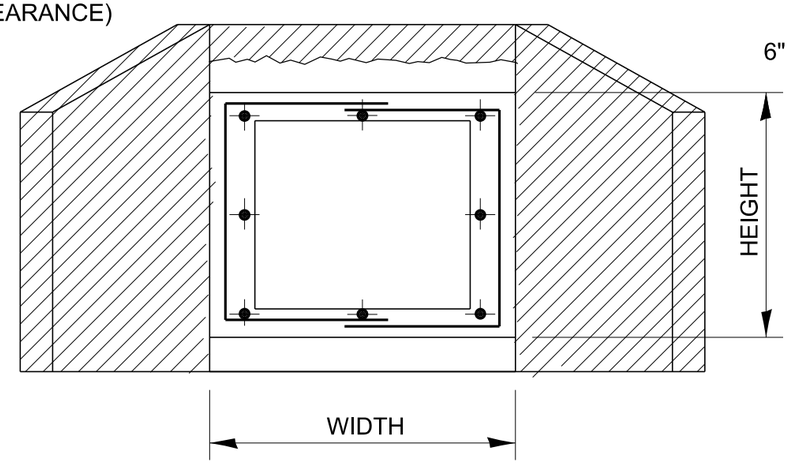
LEGEND

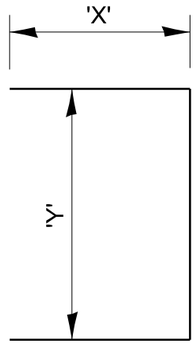
CONCRETE REMOVAL LIMITS

EXPANSION BOLTS, ¾"
(SEE GENERAL NOTE #2)



SECTION A-A





U-BAR

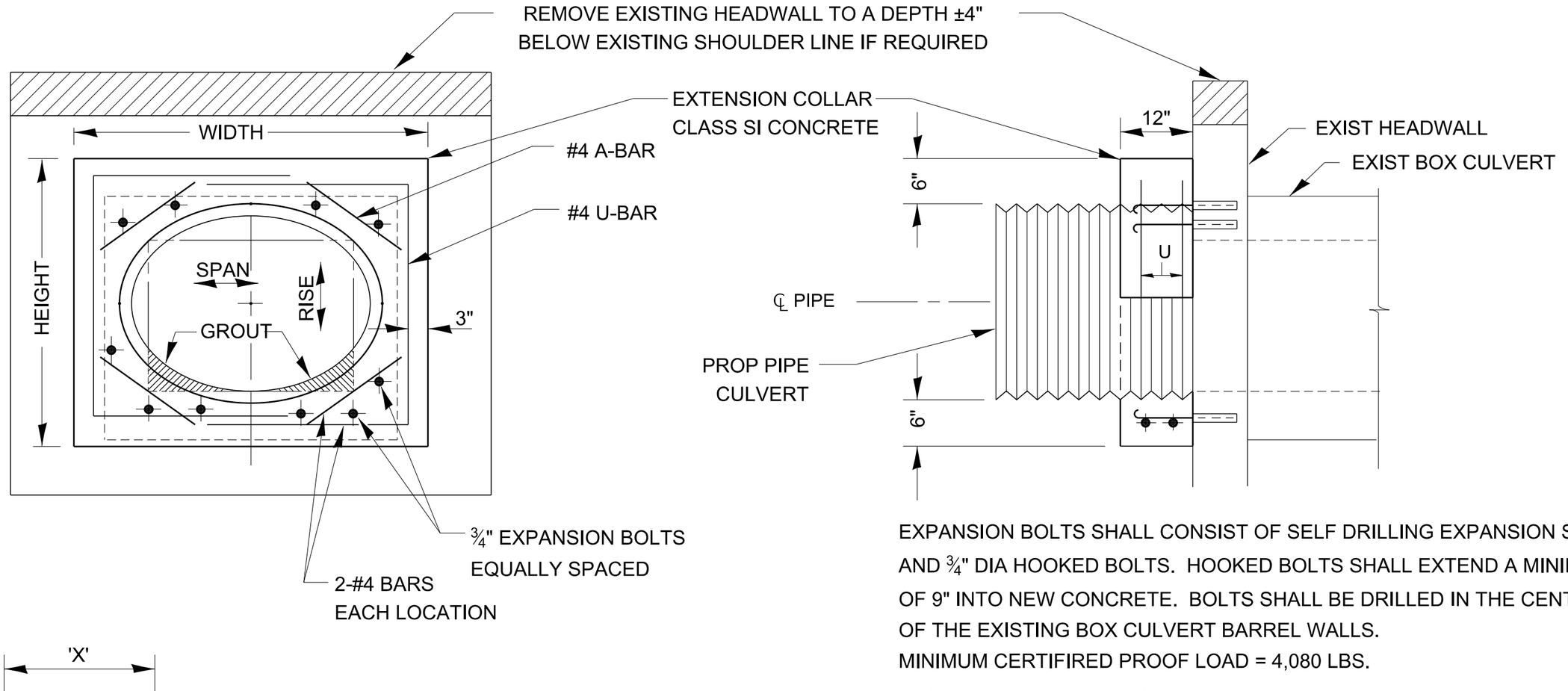
LOCATION	EXISTING CULVERT SIZE	PRECAST CULV. EXTENSION	U-BAR		CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
			'X'	'Y'			
	FT x FT	IN	IN	IN	CU YD	POUND	EACH

GENERAL NOTES

1.) CLASS SI CONCRETE SHALL BE USED THROUGHOUT. THE INSIDE DIMENSIONS OF THE CLASS SI CONCRETE COLLAR SHALL BE THE SAME AS THE NEW PRECAST CONCRETE BOX CULVERT.

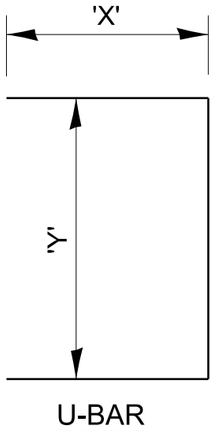
2.) EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE PLACED IN EACH CORNER AND AT 18" MAXIMUM CENTERS. MINIMUM CERTIFIED PROOF LOADING = 4,080 LBS.

COLLAR DETAIL (PRECAST BOX CULVERT EXTENSION OF BOX CULVERT)

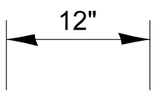


EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.

MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



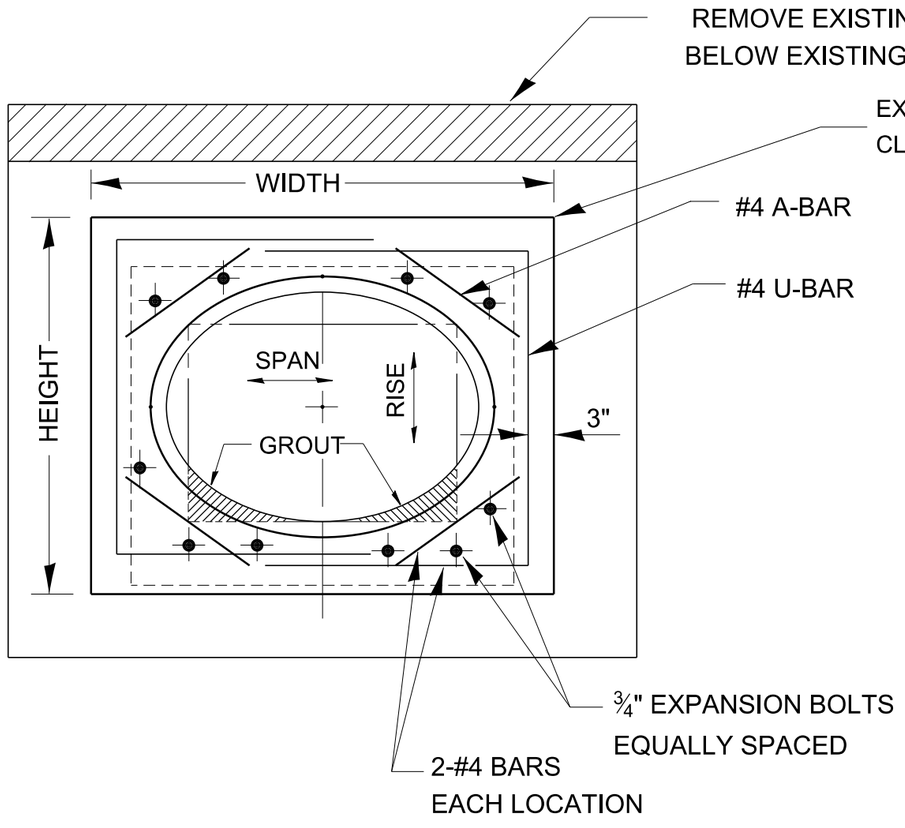
U-BAR

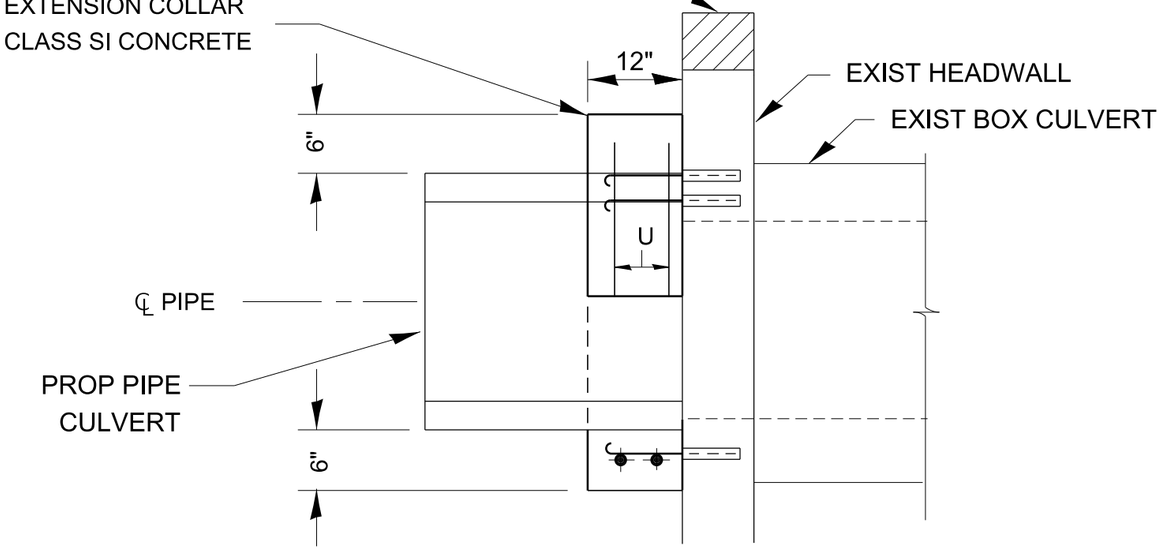


A-BAR

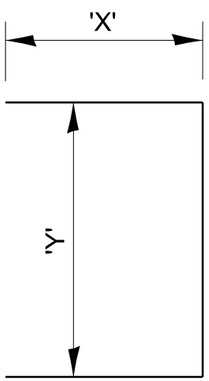
LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION (ELLIPTICAL)	EXTENSION COLLAR		A-BAR	U-BAR		CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
			WIDTH	HEIGHT	305	'X'	'Y'			
	FT x FT	IN	IN	IN	IN	IN	IN	CU YD	POUND	EACH

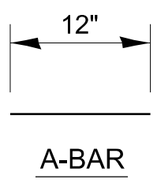
COLLAR DETAIL (ELLIP. CMP EXTENSION OF BOX CULVERT)





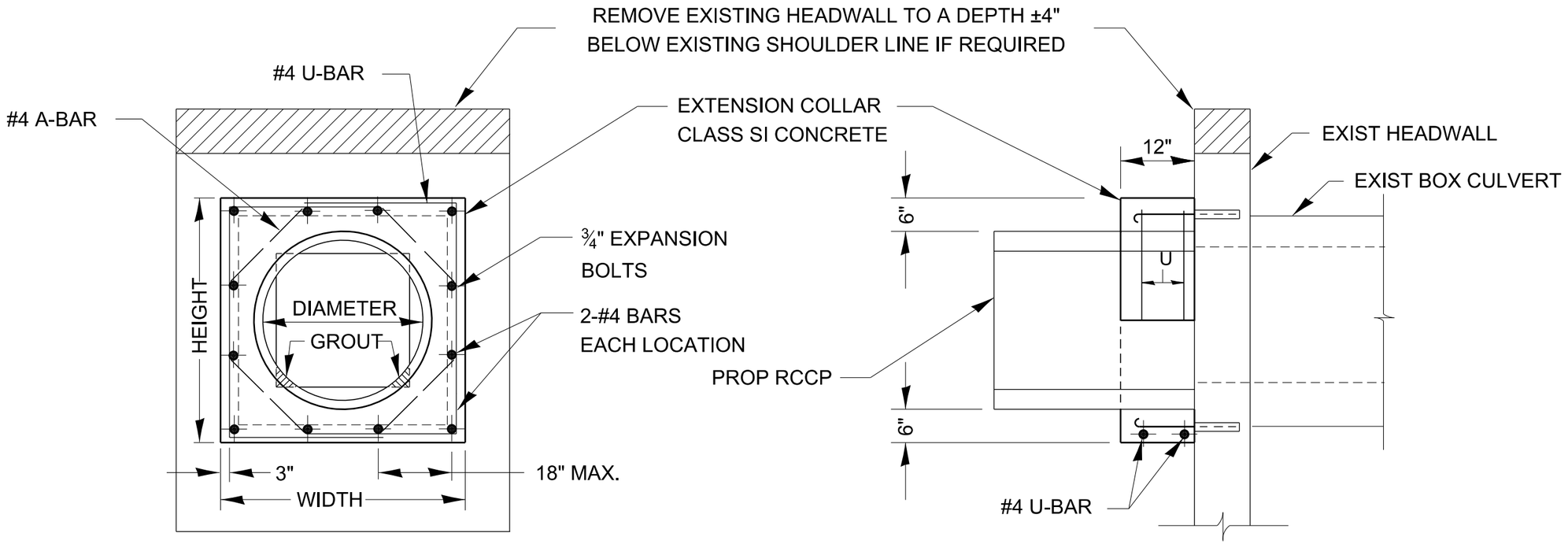
EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



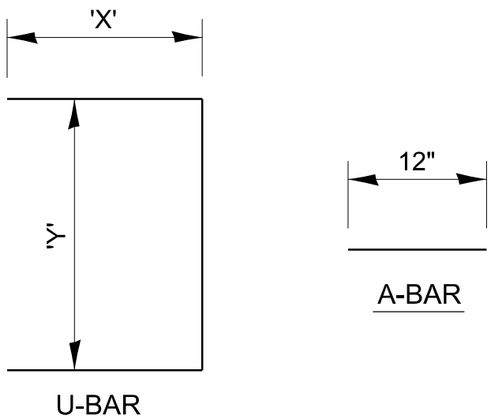


LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION (ELLIPTICAL)	EXTENSION COLLAR		A-BAR	U-BAR		CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
			WIDTH	HEIGHT	305	'X'	'Y'			
	FT x FT	IN	IN	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAIL (ELLIP. CONC. EXTENSION OF BOX CULVERT)

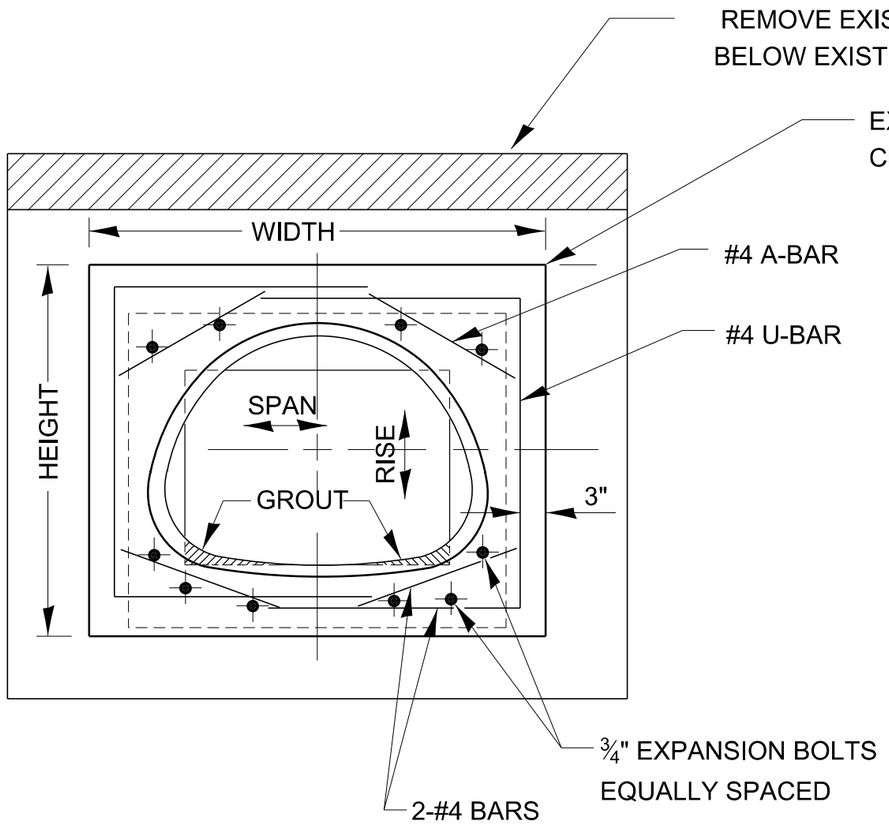


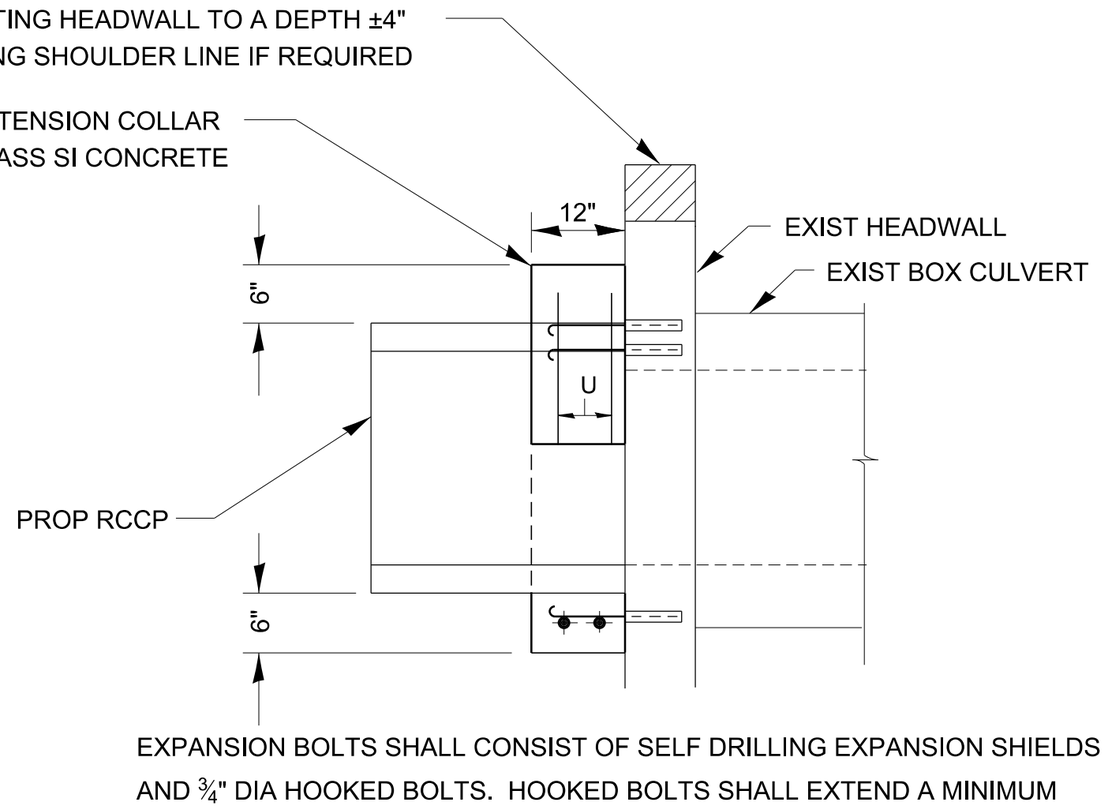
EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



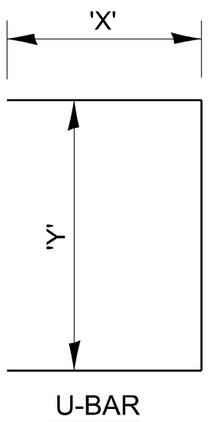
LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION	PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		QUANTITIES ARE FOR ONE SIDE ONLY		
				WIDTH	HEIGHT	305	'X'	'Y'	CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
	FT x FT	DIA IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAIL (R.C.C.P. EXTENSION OF BOX CULVERT)

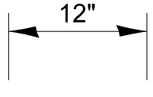




EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



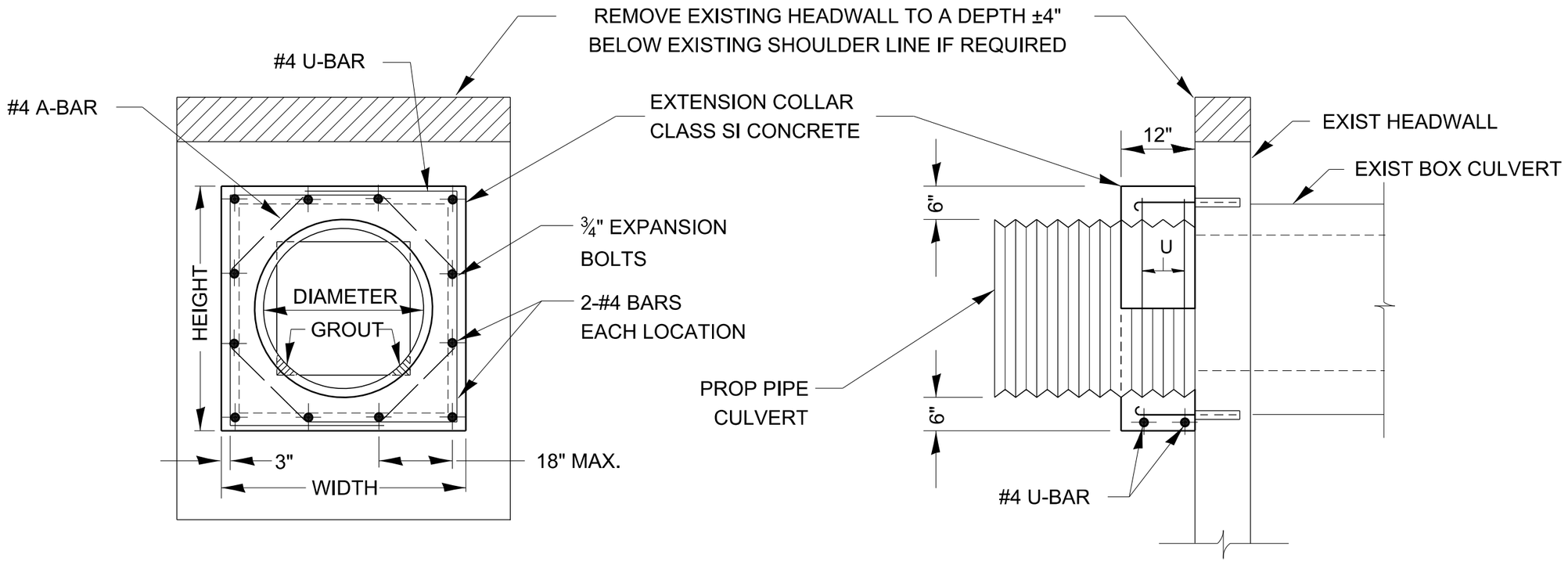
U-BAR



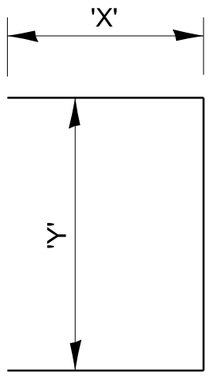
A-BAR

LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION			PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		QUANTITIES ARE FOR ONE SIDE ONLY		
		SPAN	RISE	EQUIV		WIDTH	HEIGHT	380	'X'	'Y'	CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
	FT x FT	IN	IN	IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

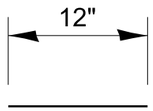
COLLAR DETAIL (A.D.E. R.C.C.P. EXTENSION OF BOX CULVERT)



EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



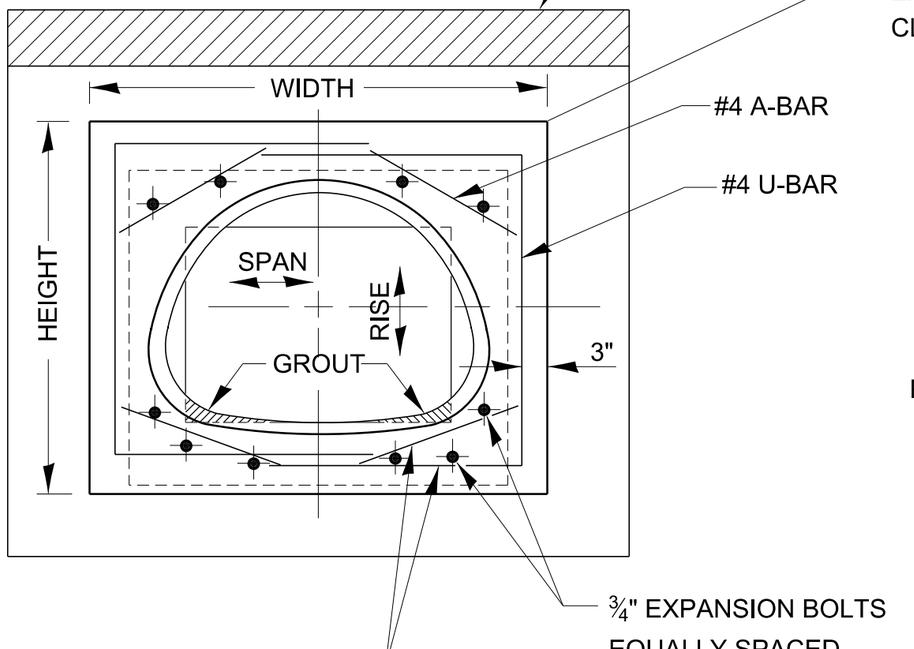
U-BAR

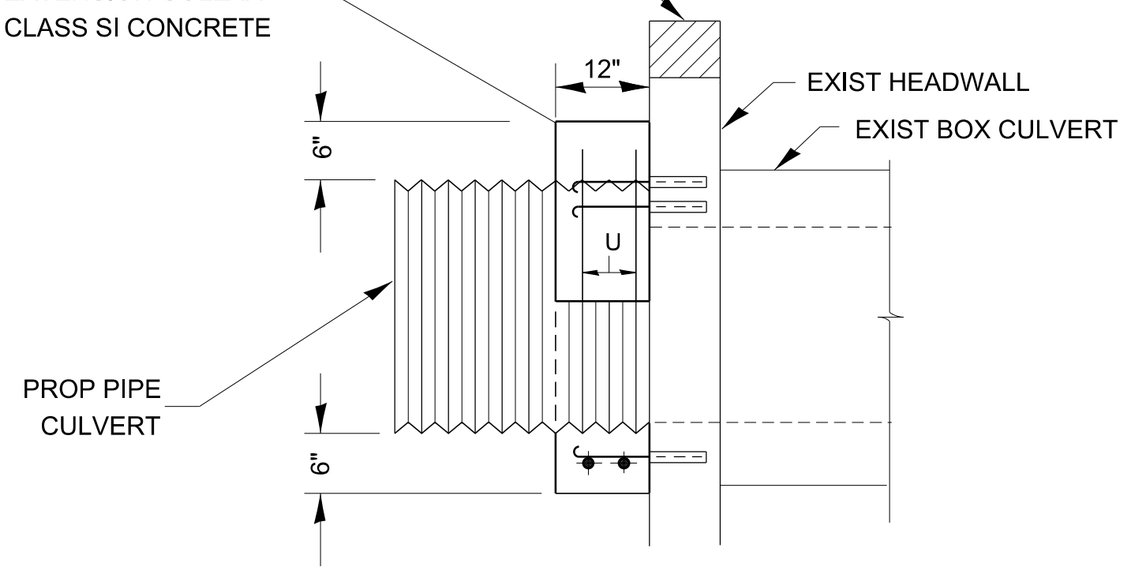


A-BAR

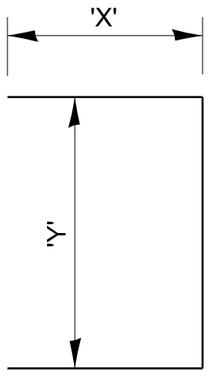
									QUANTITIES ARE FOR ONE SIDE ONLY		
LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION	PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
				WIDTH	HEIGHT	305	'X'	'Y'			
	FT x FT	DIA IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAIL (CMP EXTENSION OF BOX CULVERT)

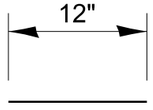




EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE. BOLTS SHALL BE DRILLED IN THE CENTER OF THE EXISTING BOX CULVERT BARREL WALLS.
MINIMUM CERTIFIRED PROOF LOAD = 4,080 LBS.



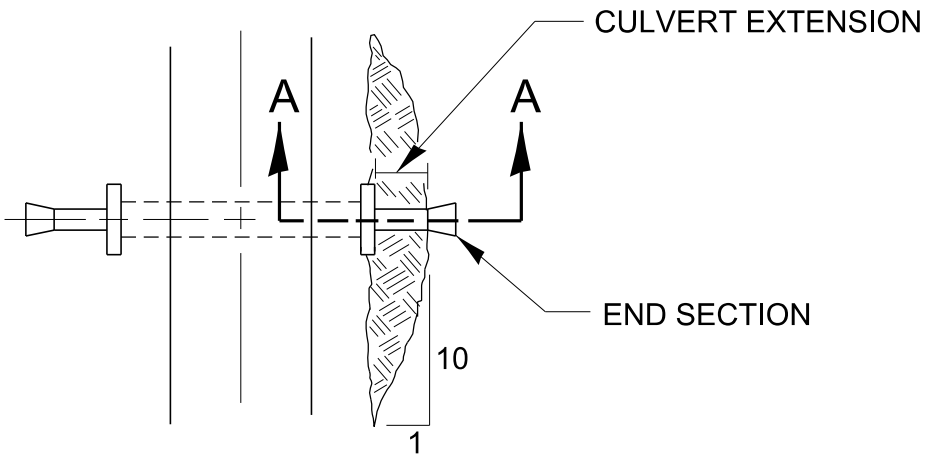
U-BAR

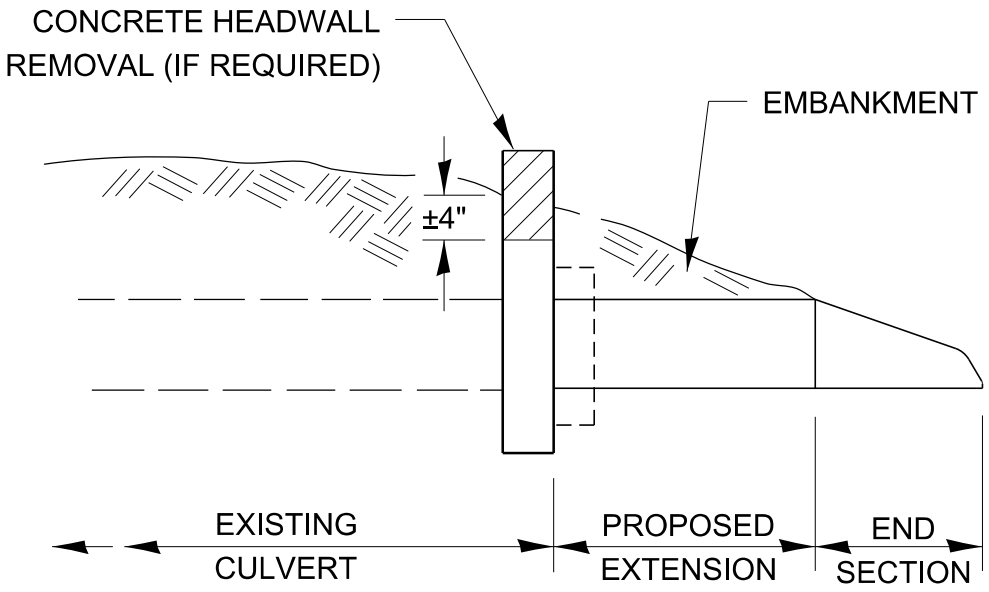


A-BAR

LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION			PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		QUANTITIES ARE FOR ONE SIDE ONLY		
		SPAN	RISE	EQUIV		WIDTH	HEIGHT	380	'X'	'Y'	CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
	FT x FT	IN	IN	IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

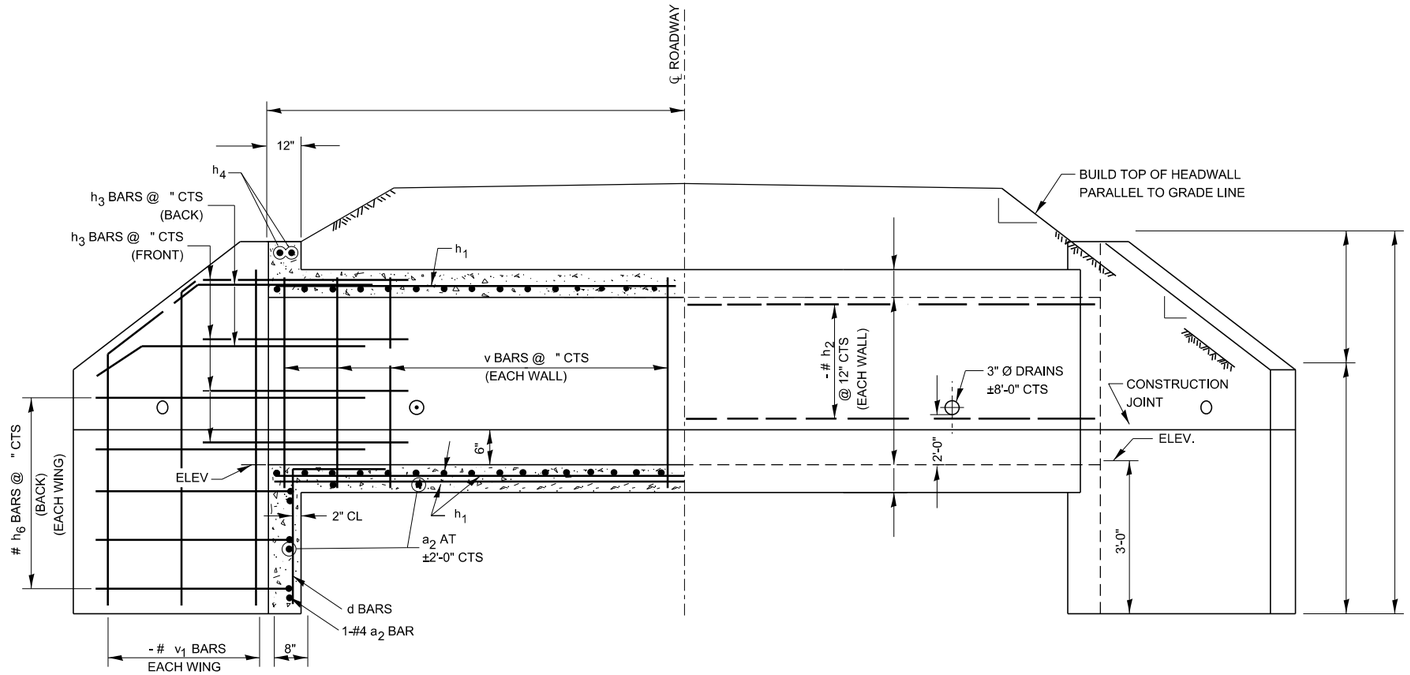
COLLAR DETAIL (A.D.E. CMP EXTENSION OF BOX CULVERT)





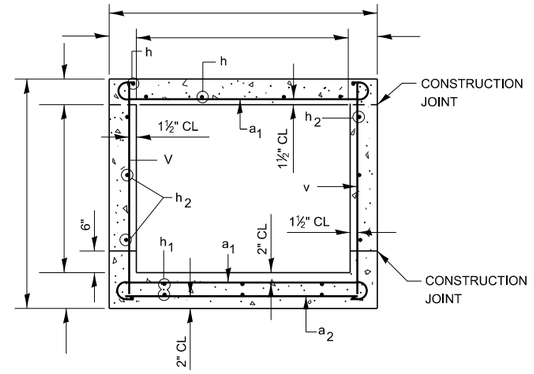
SECTION A-A

PLAN AT CULVERT EXTENSIONS



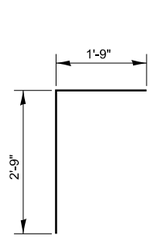
HALF LONG SECTION

HALF ELEVATION

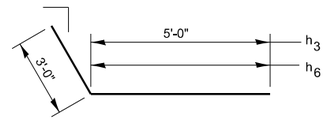


SECTION THRU BARREL

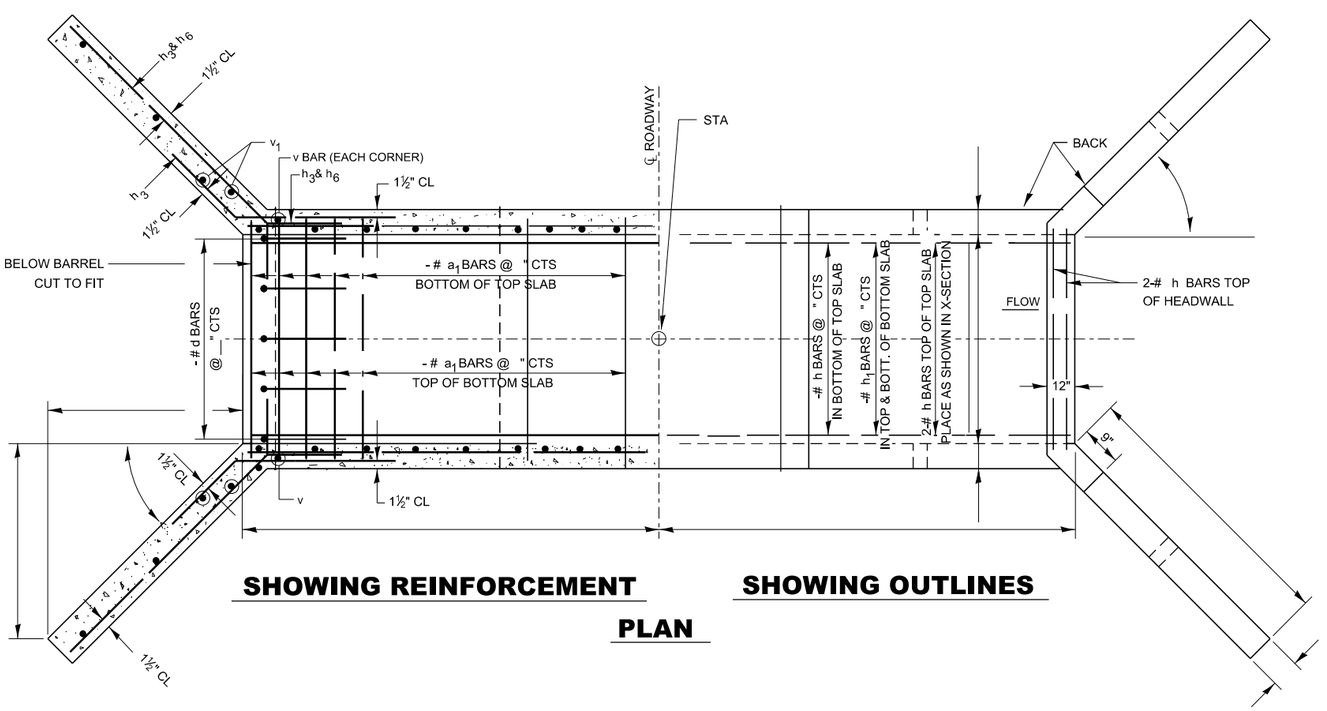
BAR a_1



BAR d



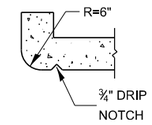
BARS h_3 & h_6



SHOWING REINFORCEMENT

SHOWING OUTLINES

PLAN



SECTION THRU HEADWALL

(UP STREAM END ONLY)

BILL OF MATERIALS

BAR	NUMBER	SIZE	LENGTH
a_1			
a_2			
a_3			
d			
h			
h_1			
h_2			
h_3			
h_4			
h_6			
V			
V_1			
V_2			
CONC BOX CULV		CU YD	
REINFORCEMENT BARS		LBS	

GENERAL NOTES

DESIGN STRESSES

fy=60,000 PSI

f'c= 3,500 PSI

LOADING HS 20-44 & ALT.

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
AT LEAST SIX FEET OF BARREL SHALL BE POURED MONLITHICALLY WITH WINGWALLS.
EXPOSED EDGES SHALL BE BEVELED ¾".
FOR BACKFILLING AND EMBANKMENTS SEE STANDARD SPECIFICATIONS.
TILT HOOK OF a_1 BARS, IF NECESSARY, TO OBTAIN 1½" MINIMUM CLEARANCE AT TOP OF HOOK.

540-14

USER NAME = ronald.pohar	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 3/18/2024	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BOX CULVERT STATION

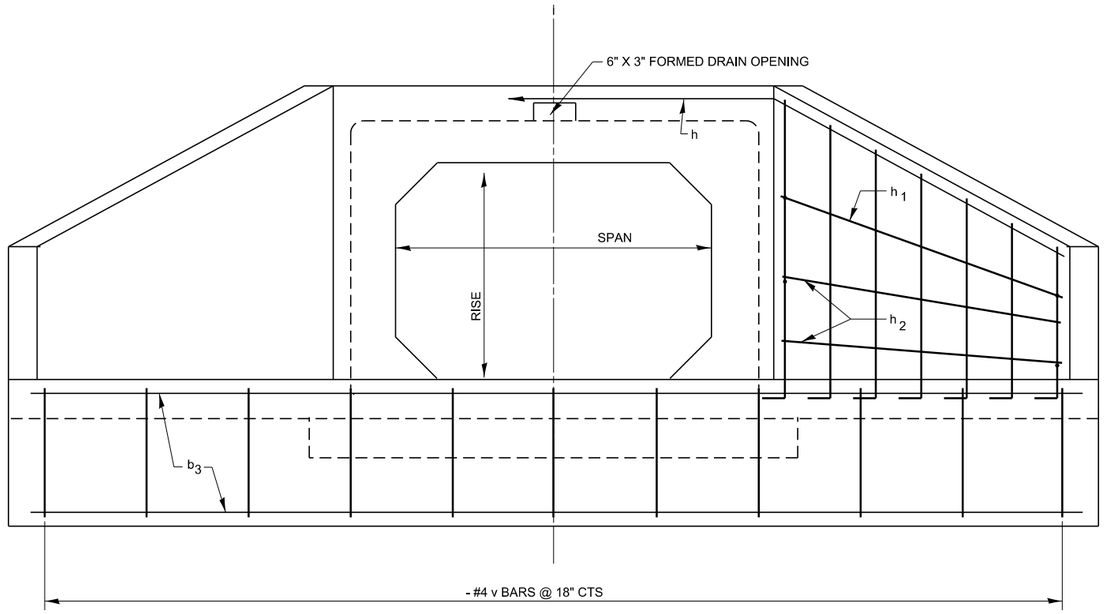
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

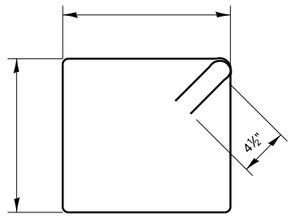
CONTRACT NO.

ILLINOIS | FED. AID PROJECT

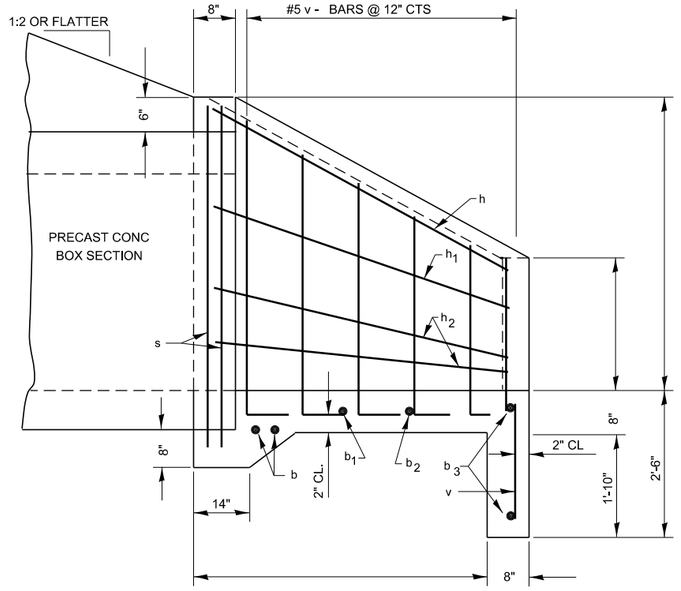
MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS - dDGN\500-599 STRUCTURES.dgn



END ELEVATION

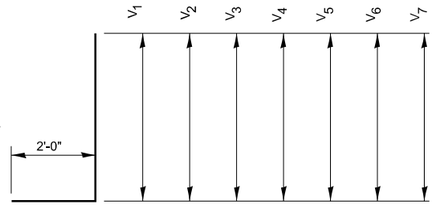


BAR s

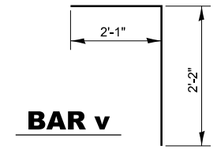


HALF SIDE ELEVATION

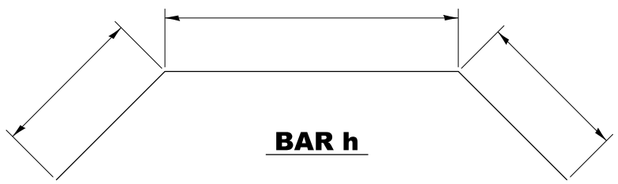
PLAN



BAR v



BAR v



BAR h

GENERAL NOTES

CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
EXPOSED EDGES SHALL BE BEVELED ¾".
REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31, M-42, OR M-53, GRADE 60.

DESIGNER NOTE:
WHEN RISE 5', V_1 to V_7 SHALL BE EPOXY COATED

BILL OF MATERIAL

BAR	SIZE	NO.	LENGTH	SHAPE
b	5	2		
b_1	4	1		
b_2	4	1		
b_3	4	2		
h	5	1		
h_1	4	2		
h_2	4	4		
s	4	2		
V	4		4'-3"	
V_1	5	2		
V_2	5	2		
V_3	5	2		
V_4	5	2		
V_5	5	2		
V_6	5	2		
V_7	5	2		
CONCRETE HEADWALLS			CU YD	
REINFORCEMENT BARS			LBS	
REIN BARS (EPOXY CTD)			LBS	

TABLE FOR ONE (1) HEADWALL

540-17

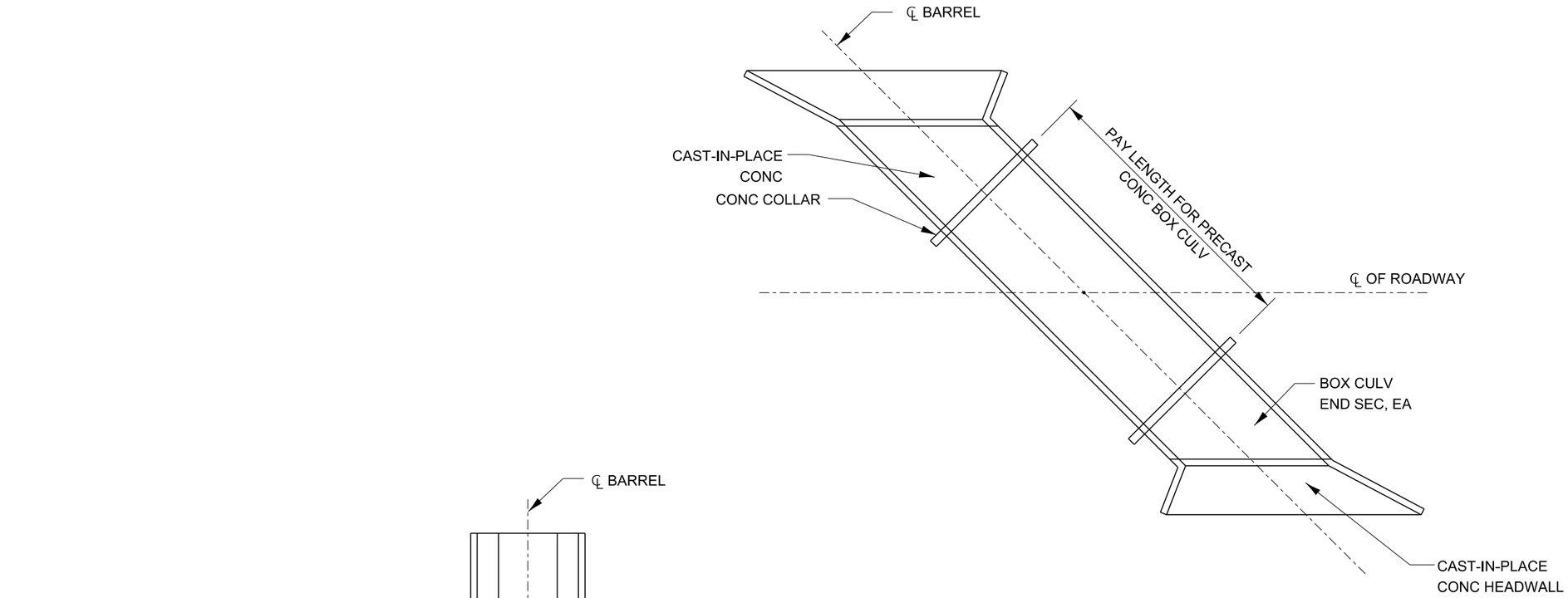
USER NAME = ronald.pohar	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 3/18/2024	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE:	SHEET OF SHEETS	STA.	TO STA.

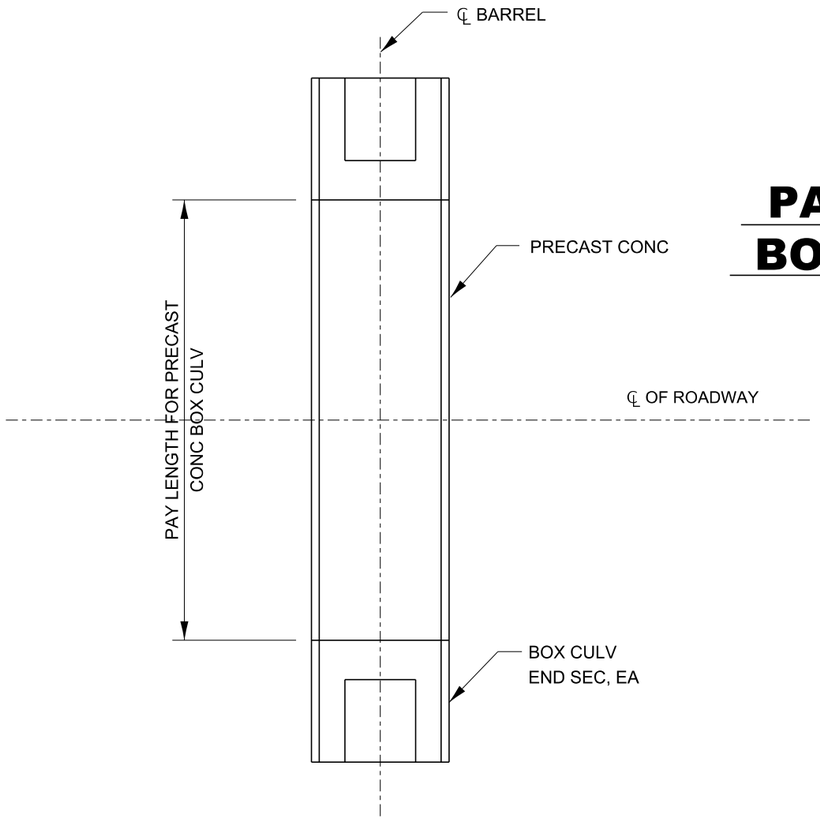
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOT Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS (DGN)\500-599 STRUCTURES.dgn



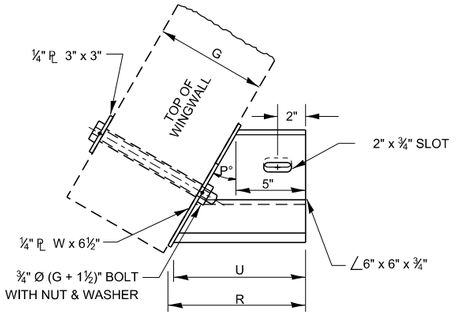
PAY LENGTH FOR PRECAST CONCRETE BOX CULVERT SKEWED WITH ROADWAY

NTS



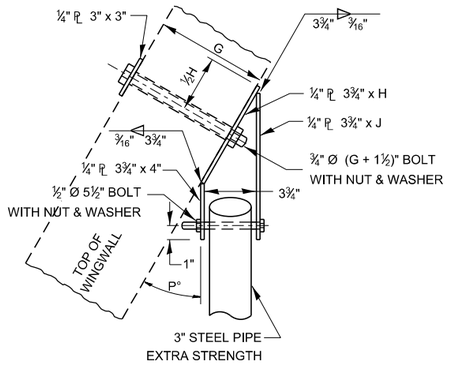
PAY LENGTH FOR PRECAST CONCRETE BOX CULVERT AT RIGHT ANGLES WITH ROADWAY

NTS



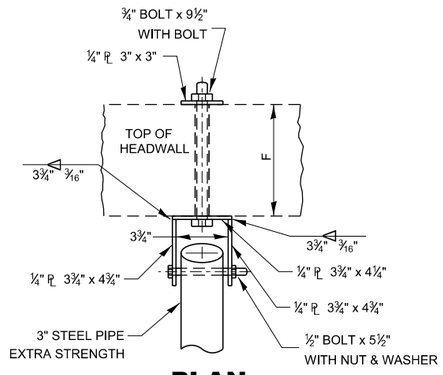
PLAN

END BRACKET ASSEMBLY - LEFT



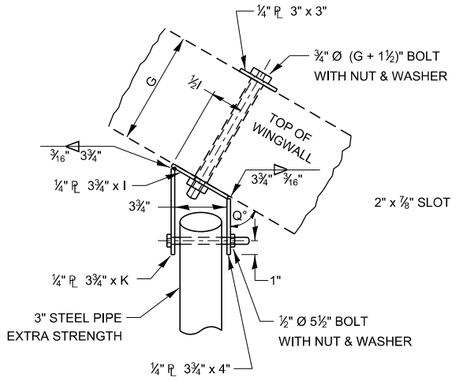
PLAN

WINGWALL BRACKET ASSEMBLY - LEFT



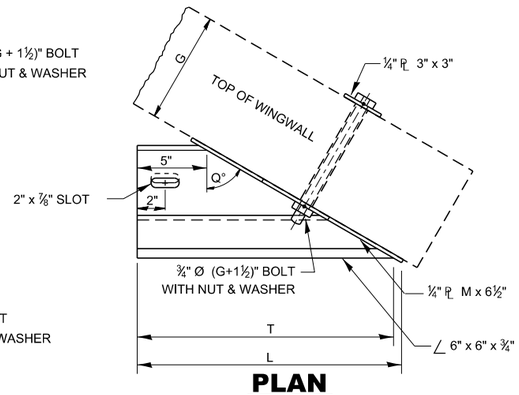
PLAN

HEADWALL BRACKET ASSEMBLY



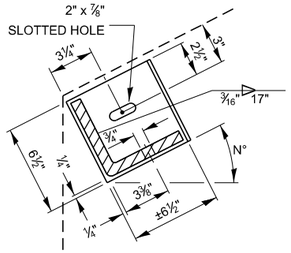
PLAN

WINGWALL BRACKET ASSEMBLY - RIGHT



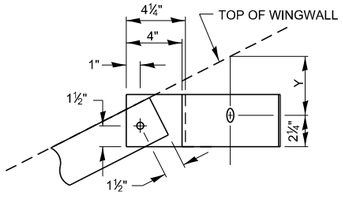
PLAN

END BRACKET ASSEMBLY - RIGHT



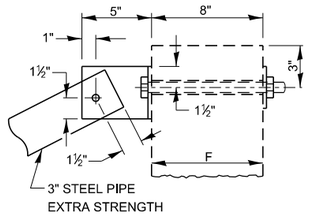
SECTION THRU

DETAIL A



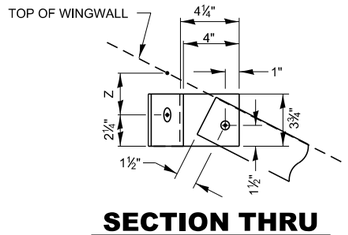
SECTION THRU

DETAIL B



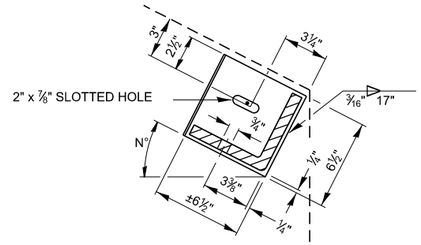
SECTION THRU

DETAIL C



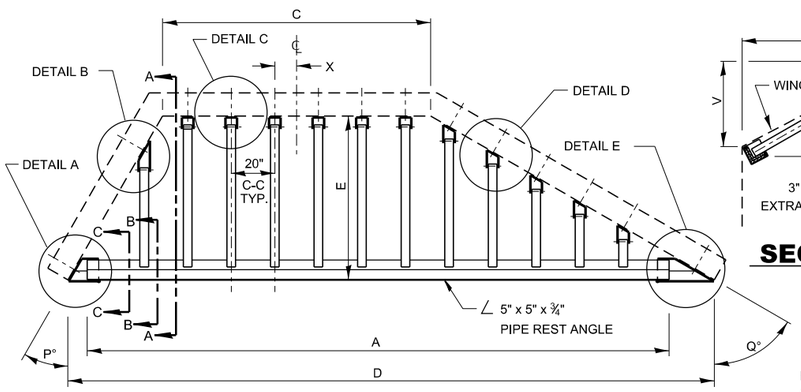
SECTION THRU

DETAIL D

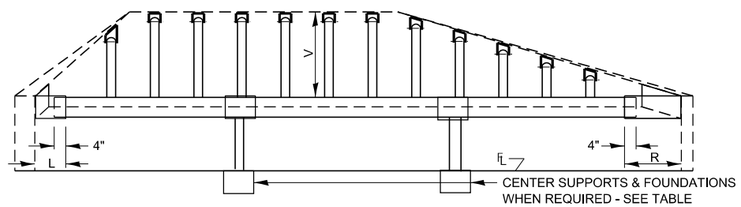


SECTION THRU

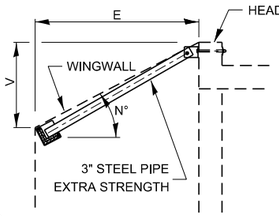
DETAIL E



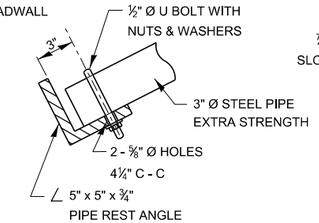
PLAN VIEW



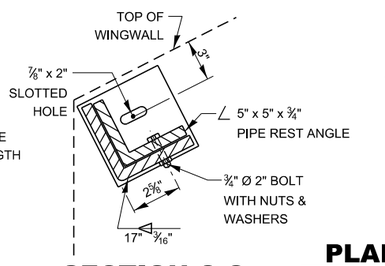
ELEVATION VIEW



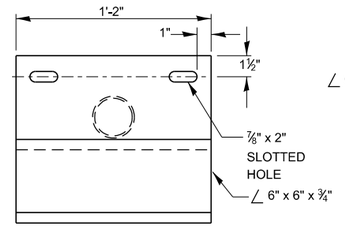
SECTION A-A



SECTION B-B

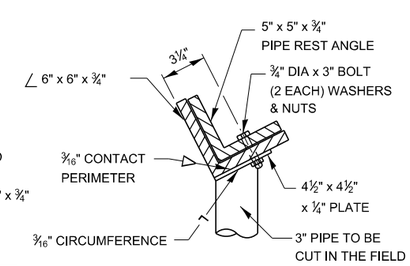


SECTION C-C

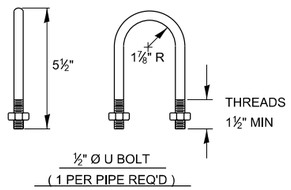


PLAN VIEW OF SUPPORT

3" STEEL PIPE, EXTRA STRENGTH
x 2' LONG TO BE
CUT TO FIT IN THE FIELD



END VIEW OF SUPPORT

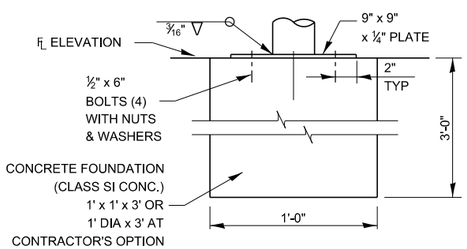


GENERAL NOTES

BOLTS AND NUTS SHALL CONFORM TO ASTM A 307.
ALL BOLTS SHALL HAVE WASHERS AT EACH END.
HOLES SHALL BE 1/16" OVERSIZE UNLESS OTHERWISE NOTED EXCEPT IN CONCRETE WHICH SHALL BE 1/8" OVERSIZE.
ANGLES AND STEEL PLATES SHALL CONFORM TO AASHTO M183.
STEEL PIPES SHALL CONFORM TO ASTM A53 GRADE B OR ASTM A 501.
STEEL PIPES, ANGLES AND PLATES SHALL BE HOT DIPPED GALVANIZED CONFORMING TO THE REQUIREMENTS OF AASHTO M111.
BOLTS, NUTS AND WASHERS SHALL BE HOT DIPPED GALVANIZED CONFORMING TO THE REQUIREMENTS OF AASHTO M232.
THE APPROXIMATE WEIGHT OF STEEL GIVEN IN TABLES INCLUDES PLATES ANGLES, AND PIPES. BOLTS, NUTS AND WASHERS ARE NOT INCLUDED.
ALL DIMENSIONS ARE TO BE VERIFIED IN THE FIELD.
CUTTING OF THE EXTRA STRENGTH PIPE AND ANGLES TO THE EXACT LENGTHS AND DRILLING HOLES IS TO BE DONE IN THE FIELD.
THIS WORK SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE "EACH" FOR GRATING FOR CONCRETE HEADWALLS IN PLACE, AND SHALL INCLUDE FABRICATION PAINTING, CENTER SUPPORTS WHEN REQUIRED, AND INSTALLATION OF THE GRATING AS DETAILED.

DETERMINING NEED OF CENTER SUPPORTS

TIP TO TIP OF WINGWALLS (DIMENSION "D")	NUMBER OF SUPPORTS REQUIRED	LOCATION
0'-0" TO 12'-6"	0	--
12'-6" TO 18'-0"	1	CENTER OF SPAN
18'-0" TO 24'-0"	2	1/3 OF SPAN
24'-0" TO 30'-0"	3	1/4 OF SPAN



CENTER SUPPORT FOUNDATION

540-19

USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

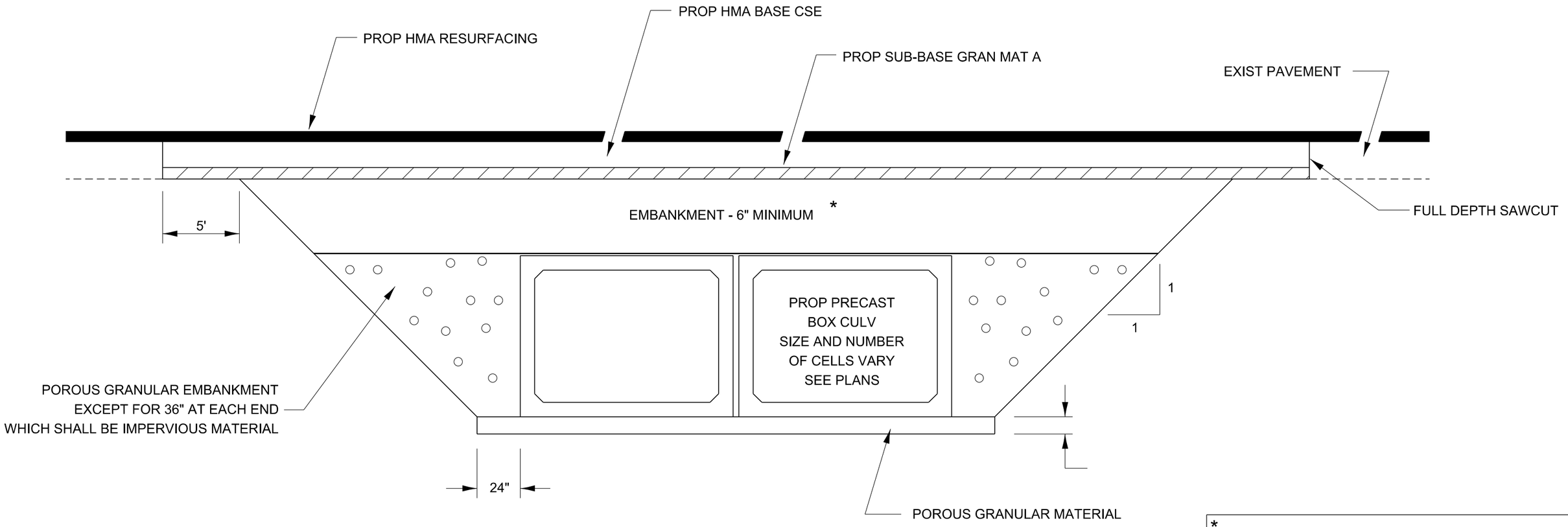
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GRATING FOR CULVERTS WITH WINGWALLS

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

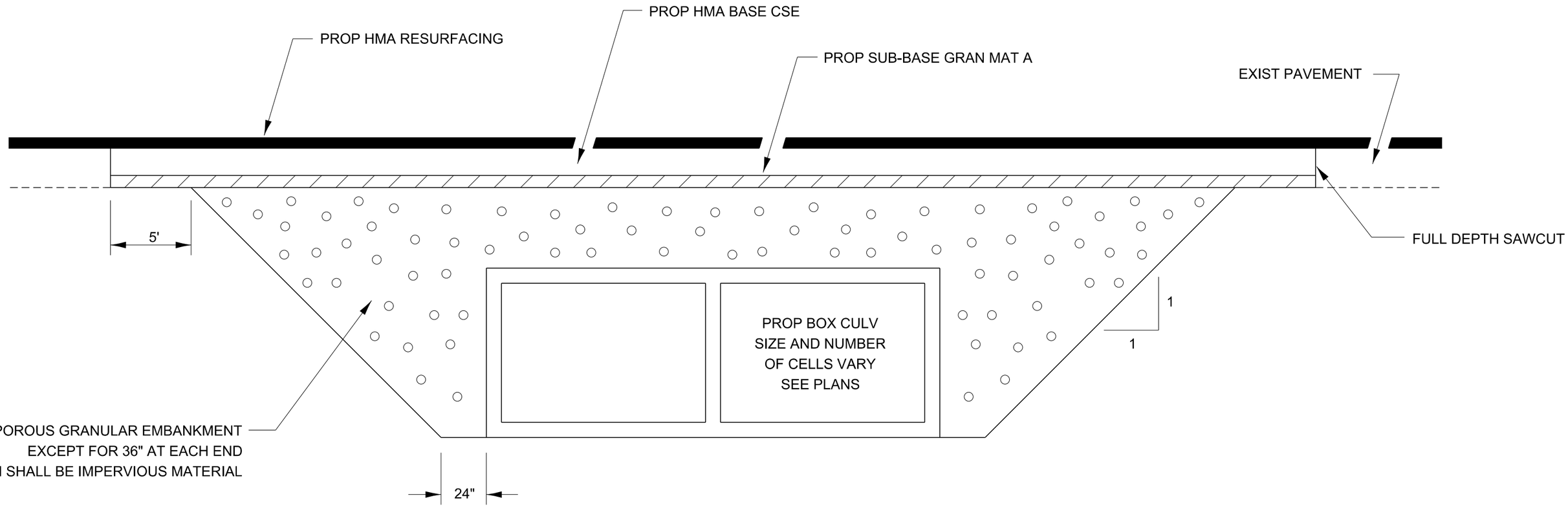
MODEL: dist 3 details
FILE NAME: pw:\\dist-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS DGN\500-599 STRUCTURES.dgn



DESIGNER NOTE: SHOW EXISTING STRUCTURE TO BE REMOVED.

* DESIGNER NOTE: NO EMBANKMENT REQUIRED FOR PCC PAVEMENT ON TOP OF CULVERT.

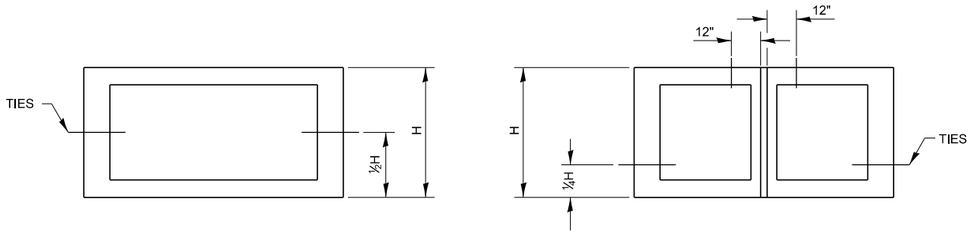
SECTION THROUGH PRECAST BOX CULVERT



DESIGNER NOTE: SHOW EXISTING STRUCTURE TO BE REMOVED.

SECTION THROUGH CAST-IN-PLACE BOX CULVERT

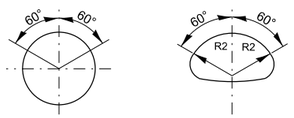
THE CULVERT TIES SHALL BE INCLUDED IN THE COST OF THE CONCRETE PIPE CULVERTS OR THE PRECAST CONCRETE BOX CULVERT. THE MECHANICAL TIES SHALL BE ON THE OUTSIDE OF THE CULVERT. THE NUTS AND WASHERS SHALL BE PLACED ON THE INSIDE OF THE CULVERT AND COVERED WITH MASTIC JOINT SEALER CONFORMING TO ARTICLES 1055 OR 1056 IN THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

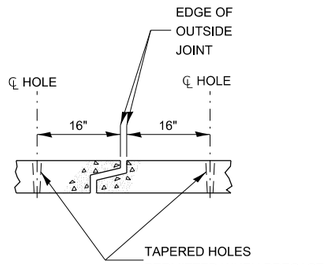


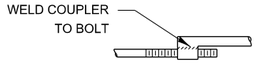
PLACEMENT OF HOLES		
BOX CULVERT FEET	PIPE SIZE INCHES	THREAD DIAMETER INCHES
	12	5/8 ROLLED THREADS (SEE NOTE 4)
	15	
	18	
	21	
	24	
	27	
	30	3/4 CUT OR ROLLED
3 x 2	33	
3 x 3	36	
4 x 2	42	
4 x 3	48	
4 x 4	54	
5 x 3	60	
5 x 4	66	
5 x 5	72	1 CUT OR ROLLED
6 x *	78	
7 x *	84	
8 x *	90	
9 x *	96	
10 x *	102	
	108	
	120	
	132	
11 x * AND GREATER	138 AND GREATER	1 1/4

NOTES:

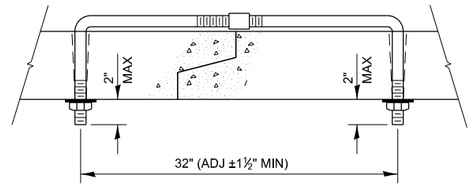
1. HOLES SHALL BE CAST-IN OR DRILLED 16" FROM OUTSIDE EDGE OF JOINT.
2. NUTS AND WASHERS ARE NOT REQUIRED ON INSIDE OF 27" DIAMETER PIPE OR LESS.
3. TIES ARE NOT REQUIRED FOR BELL PIPE 24" AND SMALLER. ON OTHER SIZES TIE MAY BE INSERTED FROM INSIDE.
4. CUT THREADS MAY BE USED IF WASHER AND NUT ARE USED.
5. PIPE SIZE LISTED IS INSIDE DIAMETER OF ROUND PIPE OR EQUIVALENT DIAMETER OF PIPE ARCH OR ELLIPTICAL.
6. GALVANIZING OF TIES IS REQUIRED.



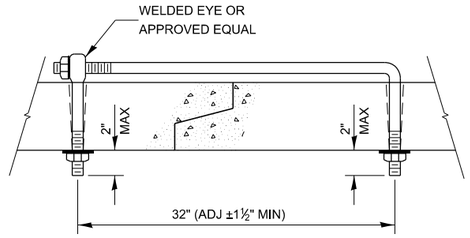




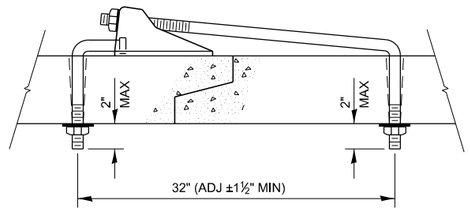
TOP VIEW



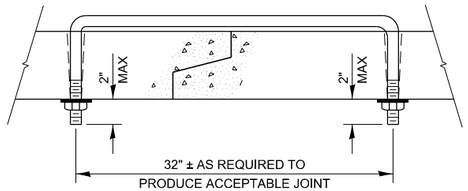
ADJUSTABLE TIE



EYE BOLT TIE



CANOPY TIE



U BOLT TIE

540-22

USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

MECHANICAL JOINTS FOR CONCRETE PIPE AND BOX CULVERTS

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

MODEL: dist 3 details
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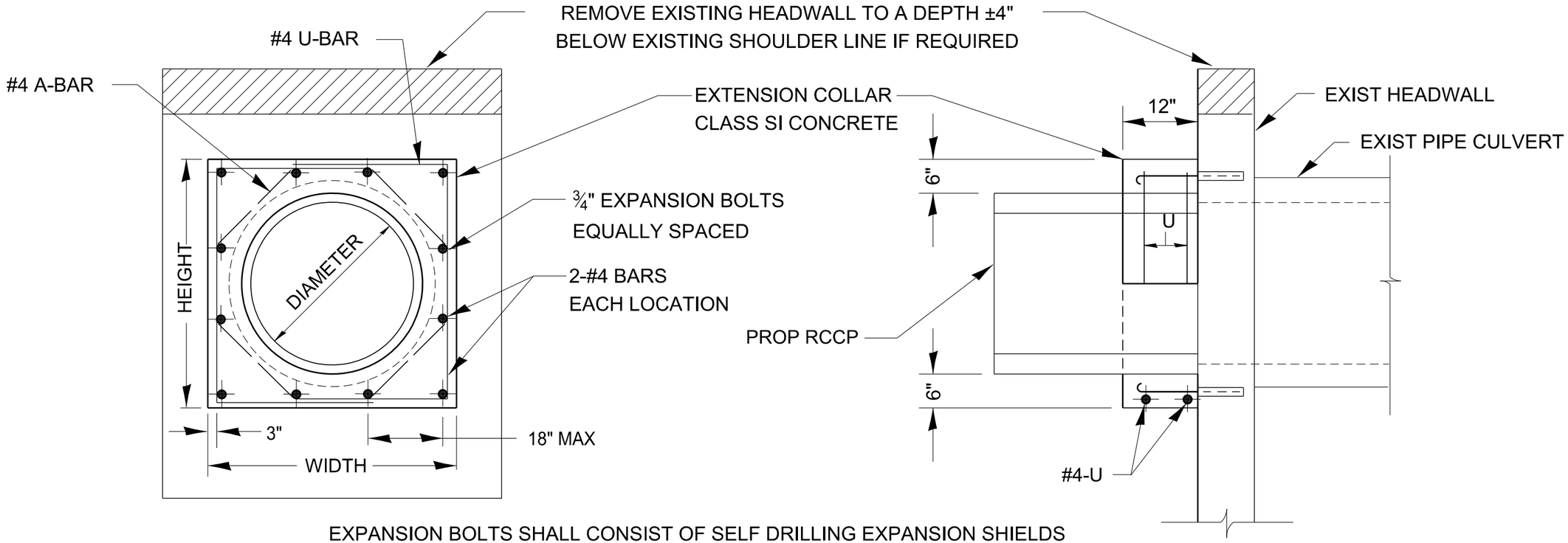
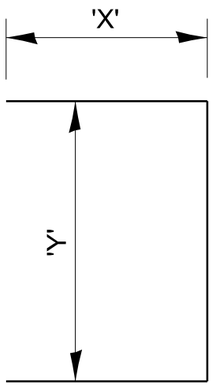
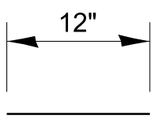


EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND ¾" DIA HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE.

MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS



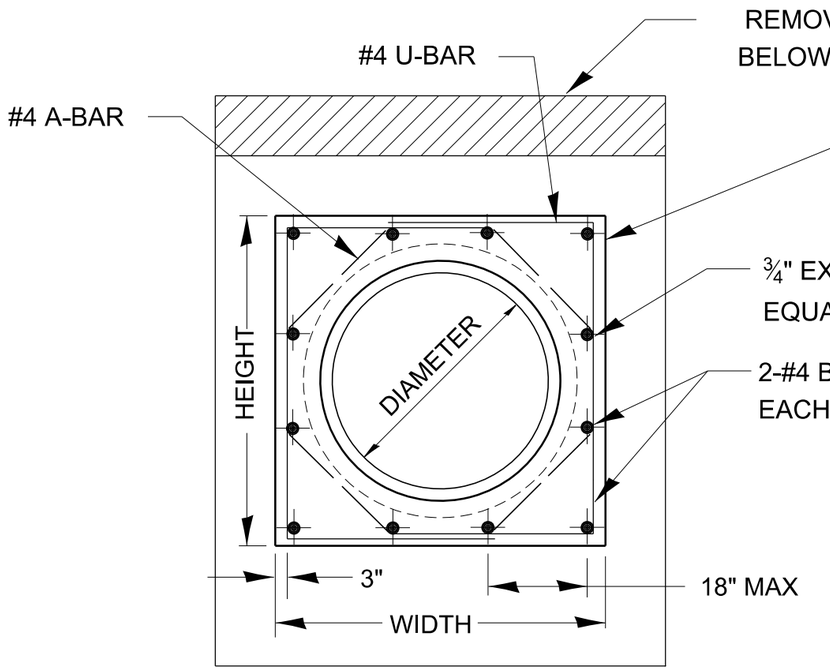
U-BAR

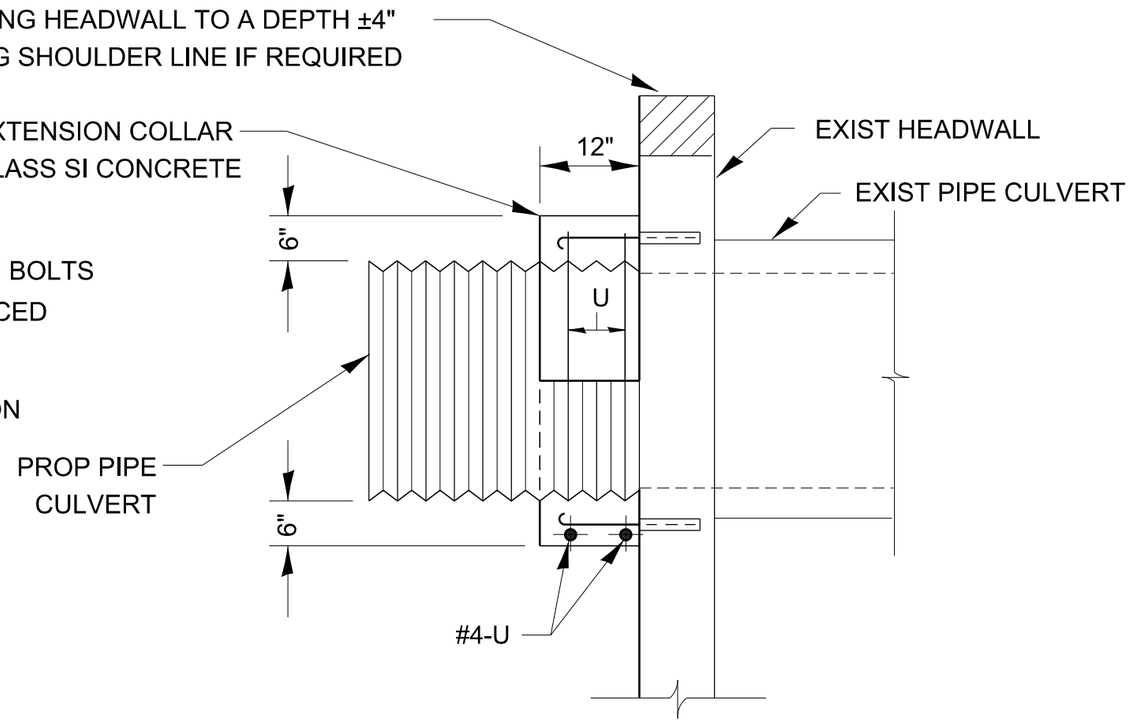


A-BAR

LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION	PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		QUANTITIES ARE FOR ONE SIDE ONLY		
				WIDTH	HEIGHT	12	'X'	'Y'	CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
	DIA IN	DIA IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAIL (R.C.C.P. EXTENSION OF PIPE CULVERT)





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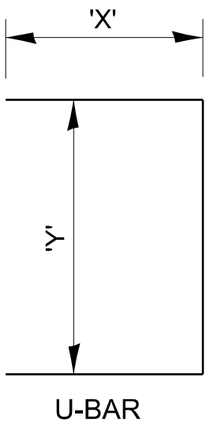
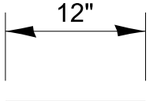


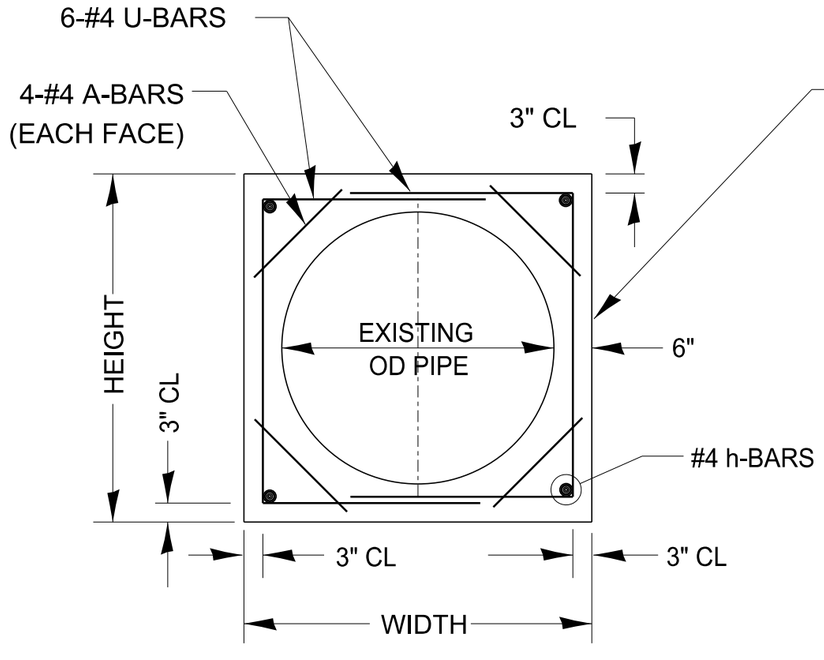
U-BAR

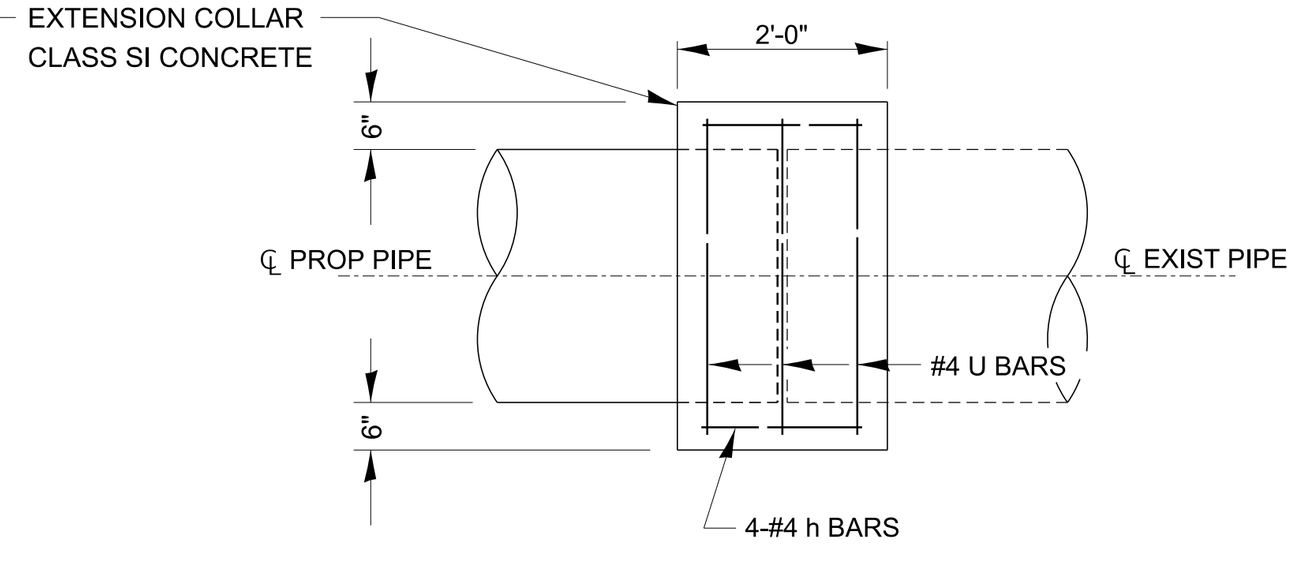


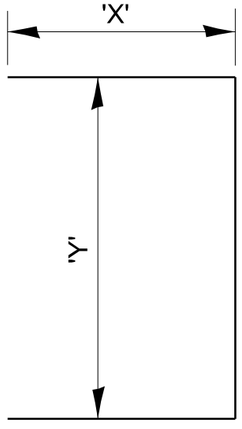
A-BAR

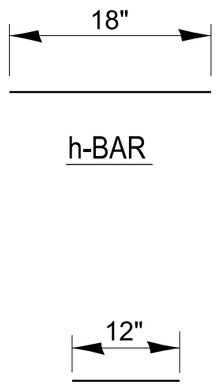
LOCATION	EXISTING CULVERT SIZE	PIPE DIMENSION	PIPE AREA	EXTENSION COLLAR		A-BAR	U-BAR		QUANTITIES ARE FOR ONE SIDE ONLY: CLASS SI CONC COLLAR	REINFORCEMENT BARS	¾" DIA EXPANSION BOLTS
				WIDTH	HEIGHT	12	'X'	'Y'			
	DIA IN	DIA IN	SQ FT	IN	IN	IN	IN	IN	CU YD	POUND	EACH

COLLAR DETAILS (CMP EXTENSION OF PIPE CULVERT)



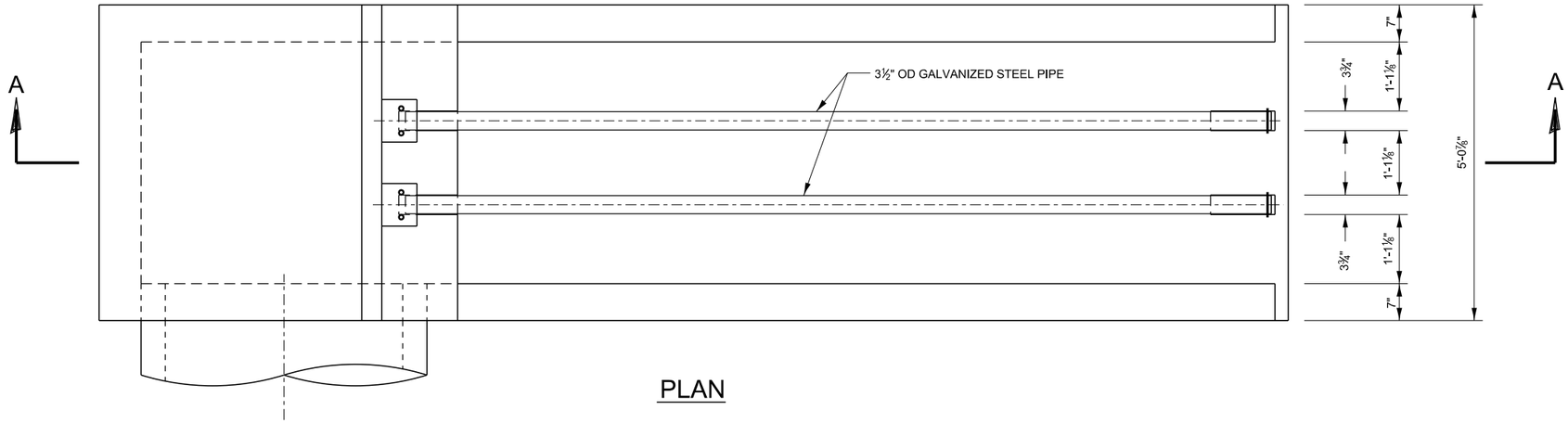




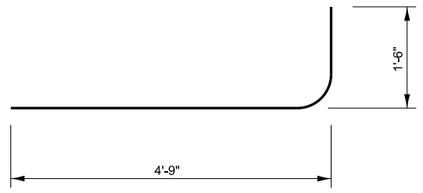


LOCATION	EXISTING CULVERT SIZE	EXTENSION COLLAR		A-BAR	U-BAR		h-BAR	CONC COLLAR	REINFORCEMENT BARS
		WIDTH	HEIGHT	12	'X'	'Y'	18		
	FT x FT	IN	IN	IN	IN	IN	IN.	CU YD	POUND

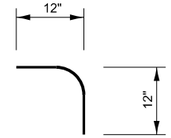
COLLAR DETAIL (DIRECT PIPE CULVERT EXTENSION)



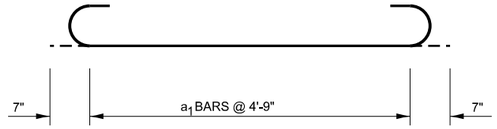
PLAN



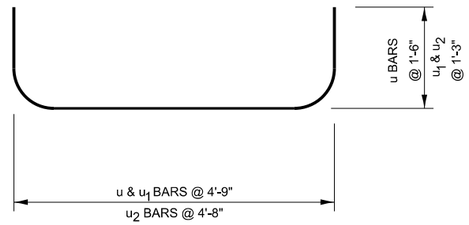
#15 L bars



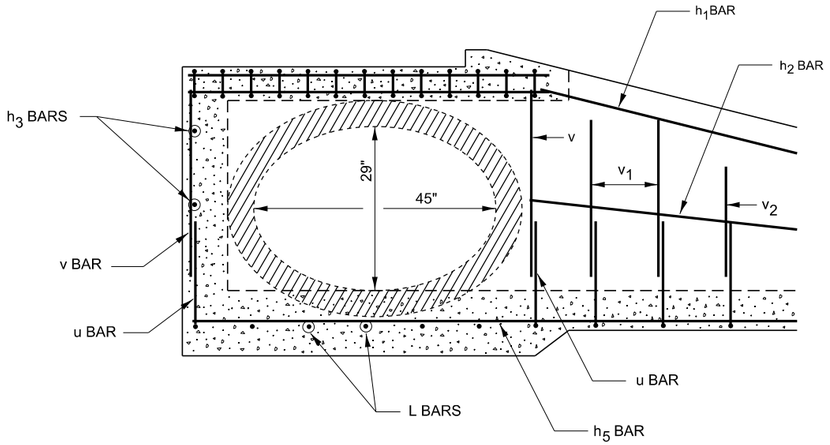
#15 L_1 bars



#15 a_1 bars



#15 U, U_1 & U_2



SECTION B-B

CLASS SI CONCRETE OR PRECAST CONCRETE SHALL BE USED THROUGHOUT.

PRECAST CONCRETE SHALL BE IN ACCORDANCE WITH SECTION 504 OF THE STANDARD SPECIFICATIONS.

A 3" DEEP SAND BEDDING CONFORMING TO ARTICLE 1003.01 (FA-1 OR FA-2) SHALL BE PROVIDED UNDER FULL LENGTH AND WIDTH OF PRECAST UNIT. ALL VOIDS AROUND PIPE ENTRANCE, BOTH INSIDE AND OUTSIDE, SHALL BE SEALED WITH MORTAR.

FOR BACKFILLING AND EMBANKMENT, SEE STANDARD SPECIFICATIONS.

GALVANIZED STEEL PIPE SHALL MEET THE REQUIREMENTS OF ASTM A-53, GRADE B, SCHEDULE 40 OR APPROVED EQUAL.

GALVANIZED U-BOLTS, NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF ARTICLE 706.27 (f) OF THE STANDARD SPECIFICATIONS.

STEEL PLATE SHALL MEET THE REQUIREMENTS OF ARTICLE 1006.04 OF THE STANDARD SPECIFICATIONS AND BE GALVANIZED IN ACCORDANCE WITH AASHTO M111 AFTER FABRICATION.

EXPOSED EDGES SHALL BE BEVELED ¾".

MINIMUM BAR LAPS SHALL BE 1'-1" UNLESS OTHERWISE SPECIFIED.

THE CONTRACT UNIT PRICE "EACH" FOR INLET BOX, SPECIAL, IN PLACE SHALL INCLUDE CLASS SI OR PRECAST CONCRETE, REINFORCEMENT BARS, BEDDING WHEN REQUIRED, GALVANIZED PIPE AND GALVANIZED HARDWARE.

542-4A

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOTDocuments\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS_DGN\500-599 STRUCTURES.dgn

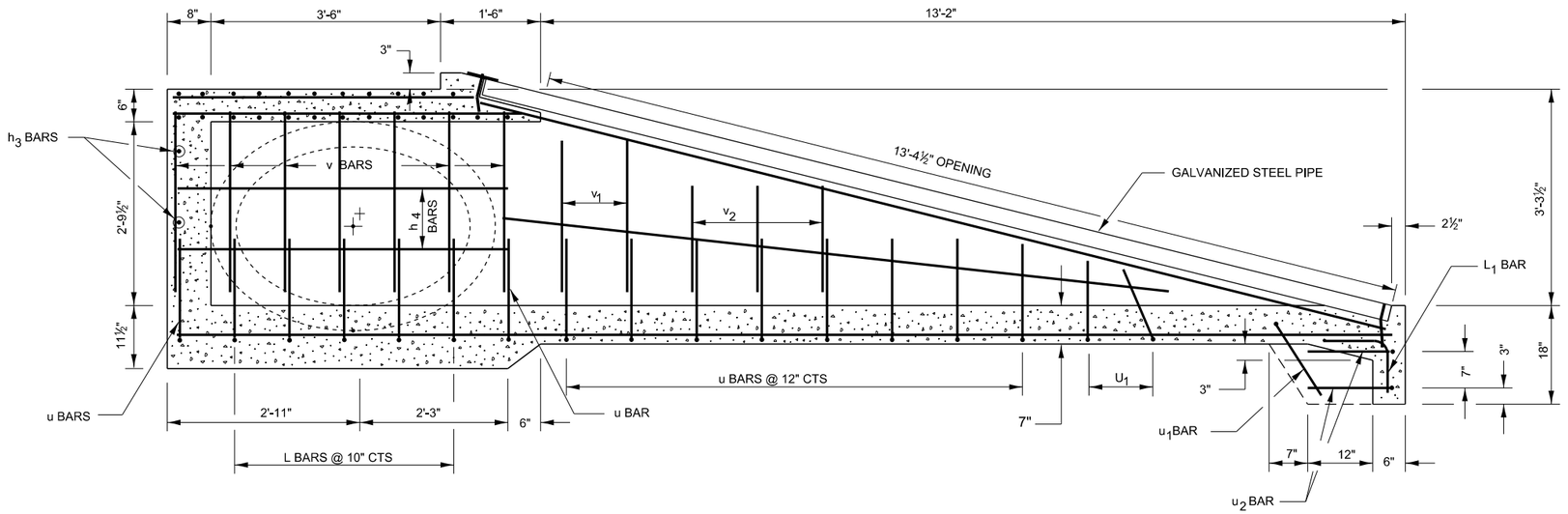
USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

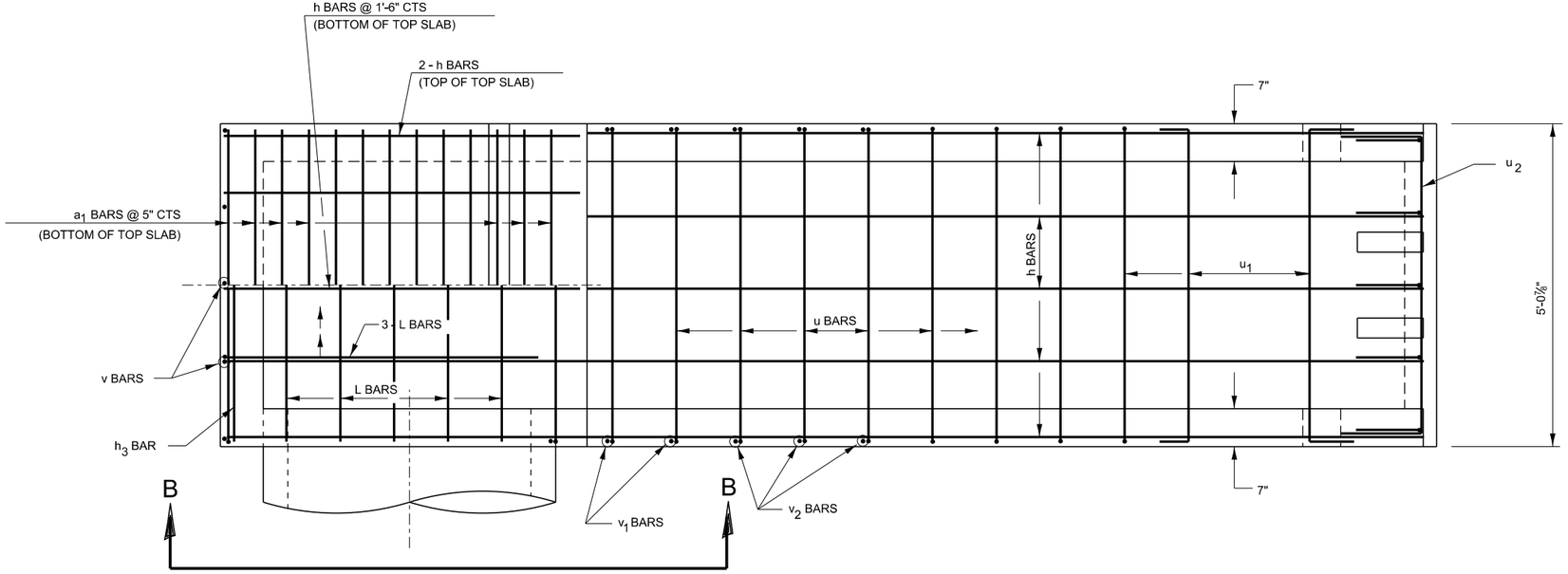
INLET BOX, SPECIAL

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



SECTION A-A



PLAN OF REINFORCEMENT

FOR INFORMATION ONLY

BAR	NO	SIZE	LENGTH
a_1	13	#4	5'-11"
h	5	#4	5'-5"
h_1	2	#4	13'-6"
h_2	2	#4	10'-3"
h_3	2	#4	4'-9"
h_4	2	#4	5'-4"
h_5	5	#4	18'-6"
L	8	#4	6'-3"
L_1	5	#4	2'-0"
U	10	#4	7'-9"
U_1	3	#4	6'-0"
U_2	2	#4	5'-11"
V	12	#4	2'-9"
V_1	4	#4	2'-3"
V_2	6	#4	1'-6"
GALV STEEL PIPE 3½" OD	2	LENGTH	14'-3"
REINFORCEMENT BARS		LBS	323
CLASS SI CONCRETE		CU YD	4.9

542-4B

USER NAME = ronald.pohar	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 3/18/2024	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

INLET BOX, SPECIAL

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

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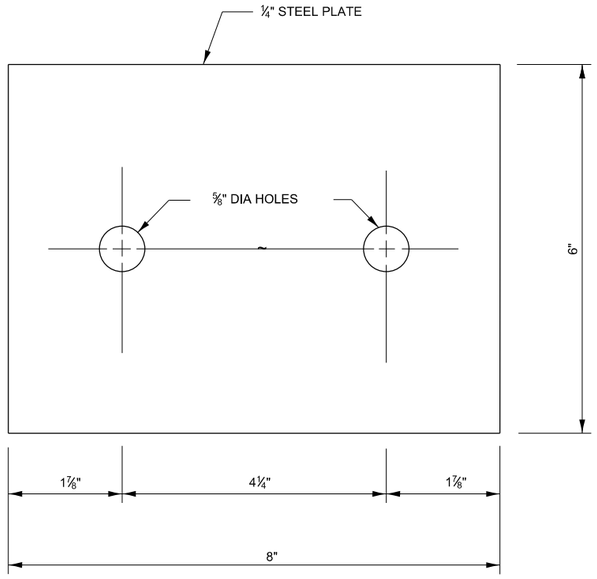
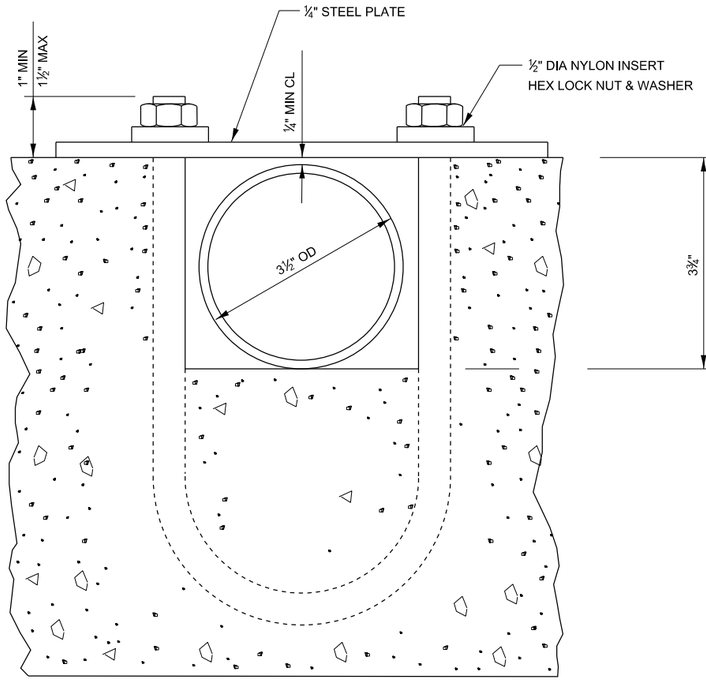
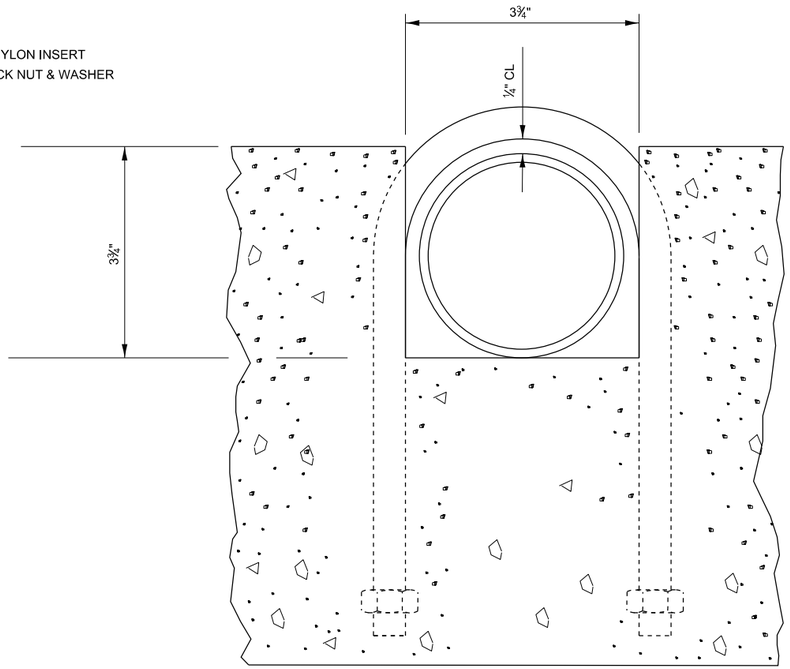


TOP ANCHOR PLATE

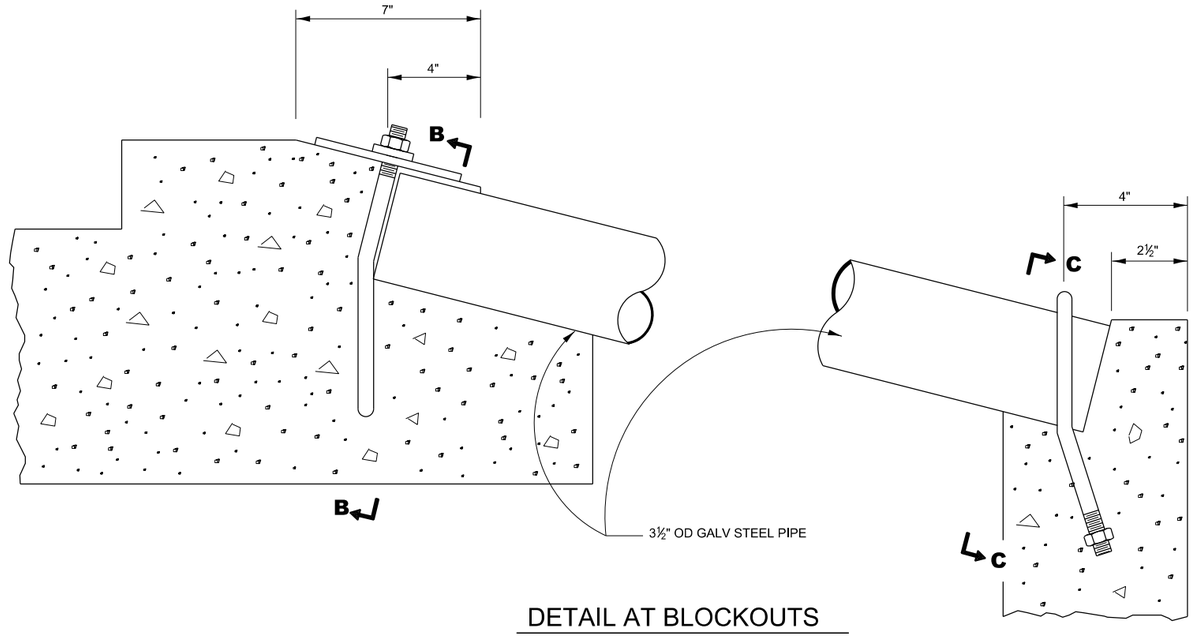
(1 - REQUIRED)



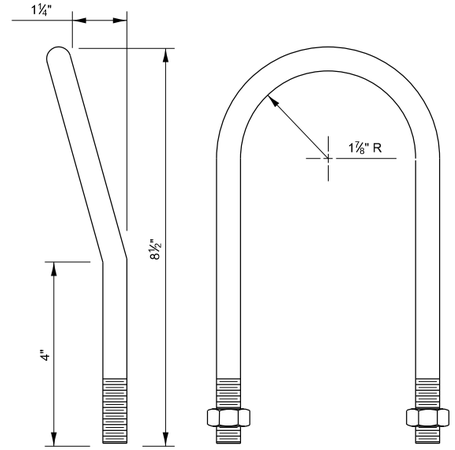
SECTION B-B



SECTION C-C



DETAIL AT BLOCKOUTS



½" DIA U BOLT

(2- REQUIRED)

542-4C

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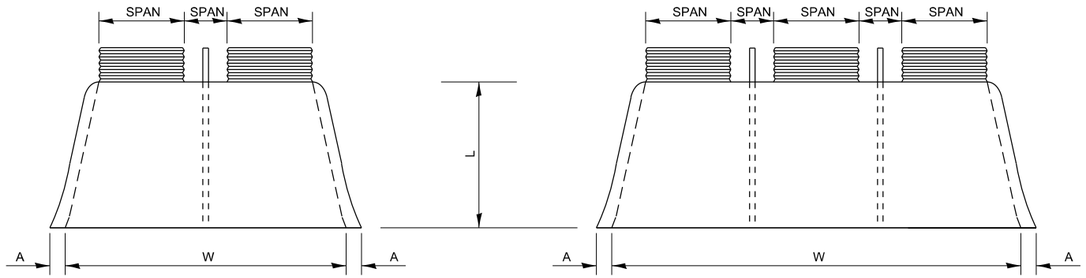
USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

INLET BOX, SPECIAL

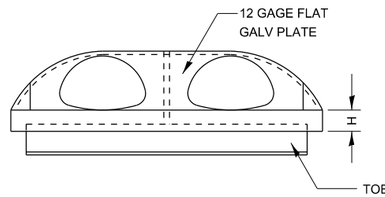
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

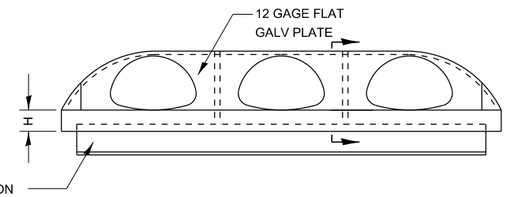


PLAN

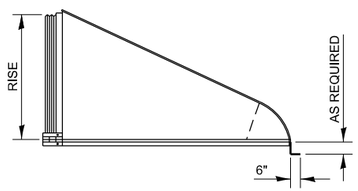
PLAN



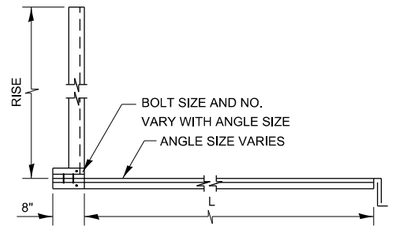
ELEVATION



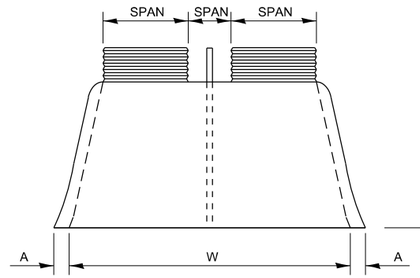
ELEVATION



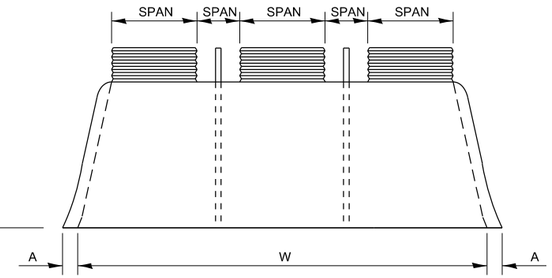
SIDE VIEW



SECTION VIEW



PLAN



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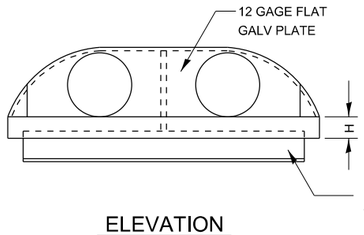

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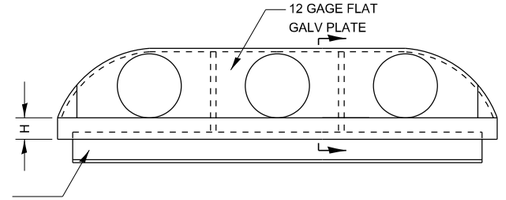

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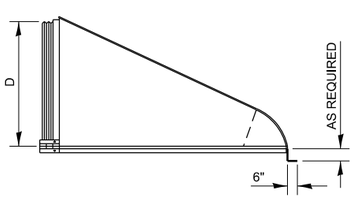
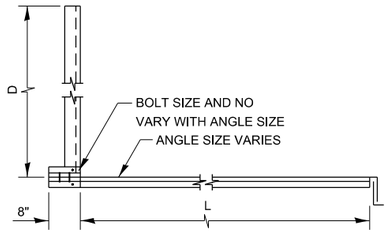


SIDE VIEW



ANGLE SECTION VIEW

PIPE-ARCH
MULTIPLE INLET END SECTIONS

SPAN x RISE 2-2/3" x ½"	EQUIV ROUND	GAGE	SPA (IN)	A (IN)	H (IN)	L (IN)	DOUBLE W	TRIPLE W	REINFORCING ANGLE
17 x 13	15	16	12	6½	6	20	59	88	2 x 2 x ¼
21 x 15	18	16	12	7½	6	24	69	102	2 x 2 x ¼
24 x 18	21	16	12	8	6	28	78	114	2 x 2 x ¼
28 x 20	24	16	12	8	6	32	88	128	5 x 3 x ¼
35 x 24	30	14	12	10	6	39	107	154	5 x 3 x ¼
42 x 29	36	14	14	12	7½	46	131	187	5 x 3 x ¼
49 x 33	42	12	17	13½	9	53	150	216	5 x 3 x ¼
57 x 38	48	12	19	18½	12	62	166	242	6 x 4 x ⅜
64 x 43	54	12	22	18	12	69	188	274	6 x 4 x ⅜
71 x 47	60	12/10	24	18½	12	77	209	304	6 x 4 x ⅜
77 x 62	66	12/10	26	18	12	77	229	332	6 x 4 x ⅜
83 x 67	72	12/10	28	18	12	77	243	354	6 x 4 x ⅜
SPAN x RISE 3"x1" & 5"x1"	EQUIV ROUND	GAGE	SPA (IN)	A (IN)	H (IN)	L (IN)	DOUBLE W	TRIPLE W	REINFORCING ANGLE
60 x 46	54	12	20	18	12	70	182	262	6 x 4 x ⅜
66 x 51	60	12/10	22	18	12	77	202	290	6 x 4 x ⅜
73 x 55	66	12/10	25	18	12	77	224	322	6 x 4 x ⅜
81 x 69	72	12/10	27	18	12	77	246	354	6 x 4 x ⅜

ROUND PIPE
MULTIPLE INLET END SECTIONS

PIPE DIA (D) (IN)	GAGE	SPA (IN)	A (IN)	H (IN)	L (IN)	DOUBLE W	TRIPLE W	REINFORCING ANGLE
12	16	12	6½	6	21	48	72	2 x 2 x ¼
15	16	12	7½	6	26	57	84	2 x 2 x ¼
18	16	12	8	6	31	66	96	2 x 2 x ¼
21	16	12	10	6	36	75	108	2 x 2 x ¼
24	16	12	10	6	41	84	120	5 x 3 x ¼
30	14	15	12¼	8	51	102	147	5 x 3 x ¼
36	14	18	14½	9	60	126	180	5 x 3 x ¼
42	12	21	17	10½	69	147	210	5 x 3 x ¼
48	12	24	18½	12	79	162	234	6 x 4 x 7/16
54	12	27	18½	12	84	183	264	6 x 4 x 7/16
60	12/10	30	18	12	88	204	294	6 x 4 x 7/16
66	12/10	33	18	12	87	219	318	6 x 4 x 7/16
72	12/10	36	18	12	88½	228	336	6 x 4 x 7/16
78	12/10	36	18	12	87½	252	366	6 x 4 x 7/16
84	12/10	36	18	12	87½	254	384	6 x 4 x 7/16

542-8

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWDOT1\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS .DGN\500-599 STRUCTURES.dgn

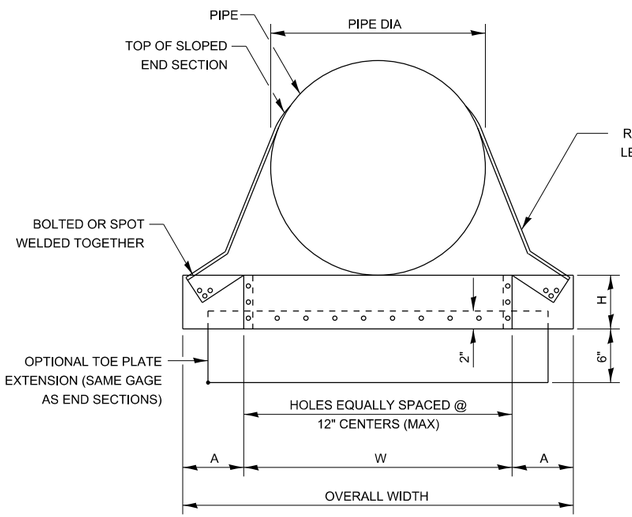
USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

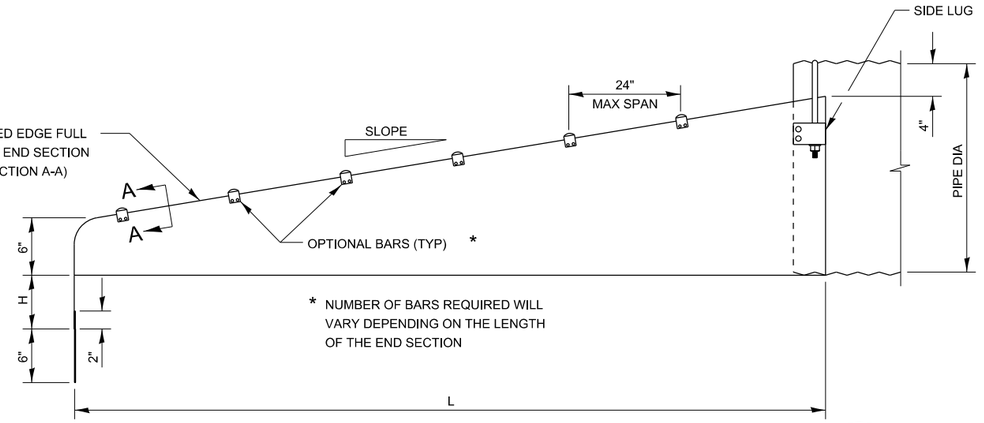
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CORRUGATED STEEL PIPE MULTIPLE END SECTIONS

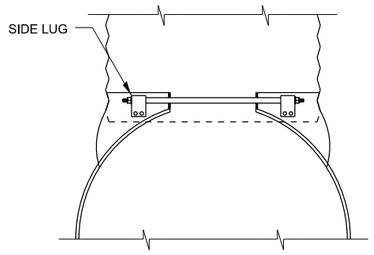
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		





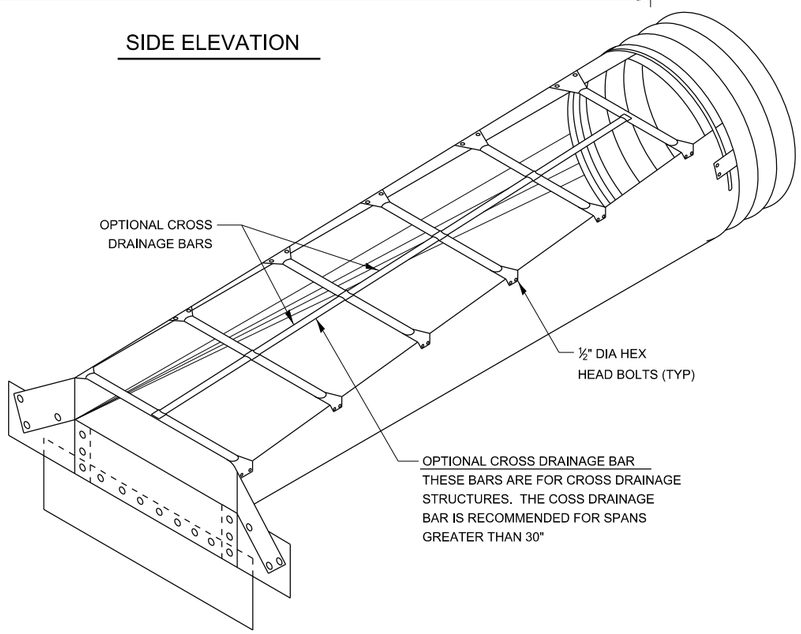
SIDE ELEVATION



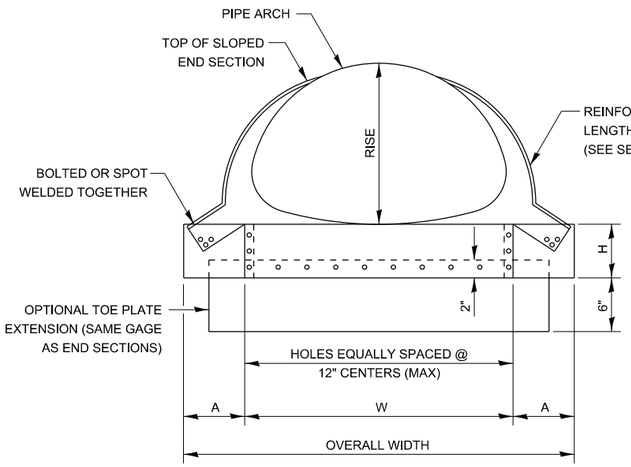
TYPE #2 CONNECTOR DETAIL

TYPE #1 CONNECTOR DETAILS
THRU 24"
GALVANIZED STRAP

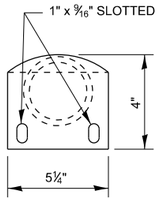
TYPE #2 CONNECTOR DETAILS (SHOWN)
FOR 30" AND LARGER
21" x 15" AND LARGER
½" THREADED ROD W/FLANGED
NUT AND SIDE LUG

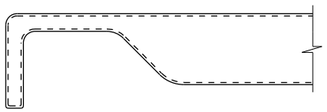


CIRCULAR PIPE ISOMETRIC VIEW



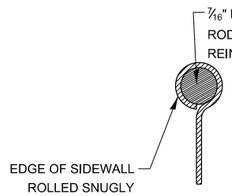
FRONT VIEW PIPE ARCH





3" GALVANIZED PIPE FLATTEN END,
THEN BEND OUTSIDE 4" TO MATCH
END SECTION SIDES.

DETAIL OF OPTIONAL BARS



SECTION A-A

GENERAL NOTES

1. CONNECTORS - ROUND SIZES THRU 24" ATTACH TO PIPE WITH TYPE #1 STRAPS, ALL OTHER SIZES ATTACH WITH TYPE #2 RODS AND LUGS.
2. TOE PLATE EXTENSIONS - WHEN REQUIRED, TOE PLATE EXTENSIONS ARE TO BE THE SAME GAGE AS END SECTIONS. DIMENSIONS SHALL BE OVERALL WIDTH LESS 6 INCHES BY 8 INCHES HIGH.
3. OPTIONAL BARS - BARS WHEN SPECIFIED, SHALL BE SCHEDULE 40 GALVANIZED STEEL PIPE.
4. TYPICALLY PARALLEL BARS ARE PLACED ON 24" CENTERS.
5. TYPICALLY THE CROSS BARS ARE USED ON CROSS DRAIN APPLICATIONS.
6. HOLES FOR BAR ATTACHMENTS SHALL BE PROVIDED ON ALL END SECTIONS.
7. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
8. THESE END SECTIONS WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH FOR SLOPED METAL END SECTIONS WITH GRATE OF THE DIAMETER SPECIFIED, WHICH SHALL INCLUDE FURNISHING AND INSTALLING THE END SECTION COMPLETE IN PLACE, INCLUDING THE TOE PLATE, EXCAVATING, BACKFILLING, CONNECTING TO THE PIPE, AND CROSS DRAINAGE BARS.

METAL END SECTIONS FOR ROUND PIPE

PIPE DIA (IN)	MIN THICK IN	MIN THICK GAGE	DIMENSIONS (INCHES) A	H	W	OVERALL WIDTH	L DIMENSIONS SLOPE	LENGTH (IN)	SLOPE	LENGTH (IN)
15	.064	16	8	6	21	37	6:1	30	4:1	20
18	.064	16	8	6	24	40	6:1	48	4:1	32
21	.064	16	8	6	27	43	6:1	66	4:1	44
24	.064	16	8	6	30	46	6:1	84	4:1	56
30	.109	12	12	9	36	60	6:1	120	4:1	80
36	.109	12	12	9	42	66	4:1	104	6:1	156
42	.109	12	16	12	48	80	4:1	128	6:1	192
48	.109	12	16	12	54	86	4:1	152	6:1	228
54	.109	12	16	12	60	92	4:1	176	6:1	264
60	.109	12	16	12	66	98	4:1	200	6:1	300

METAL END SECTIONS FOR PIPE ARCH

EQUIV DIA (IN)	(INCHES) SPAN	RISE	MIN THICK IN	GAGE	DIMENSIONS (INCHES) A	H	W	OVERALL WIDTH	L DIMENSIONS SLOPE	LENGTH (IN)	SLOPE	LENGTH (IN)
18	21	15	.064	16	8	6	27	43	6:1	30	4:1	20
21	24	18	.064	16	8	6	30	46	6:1	48	4:1	32
24	28	20	.064	16	8	6	34	50	6:1	60	4:1	40
30	36	24	.079	14	12	9	41	65	6:1	84	4:1	56
36	42	29	.109	12	12	9	48	72	6:1	114	4:1	76
42	49	33	.109	12	16	12	55	87	4:1	92	6:1	138
48	57	38	.109	12	16	12	63	95	4:1	112	6:1	168
54	64	43	.109	12	16	12	70	102	4:1	132	6:1	198
60	71	47	.109	12	16	12	77	109	4:1	148	6:1	222
72	83	57	.109	12	16	12	89	121	4:1	188	6:1	282

542-9

USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SLOPED METAL END SECTIONS WITH GRATE

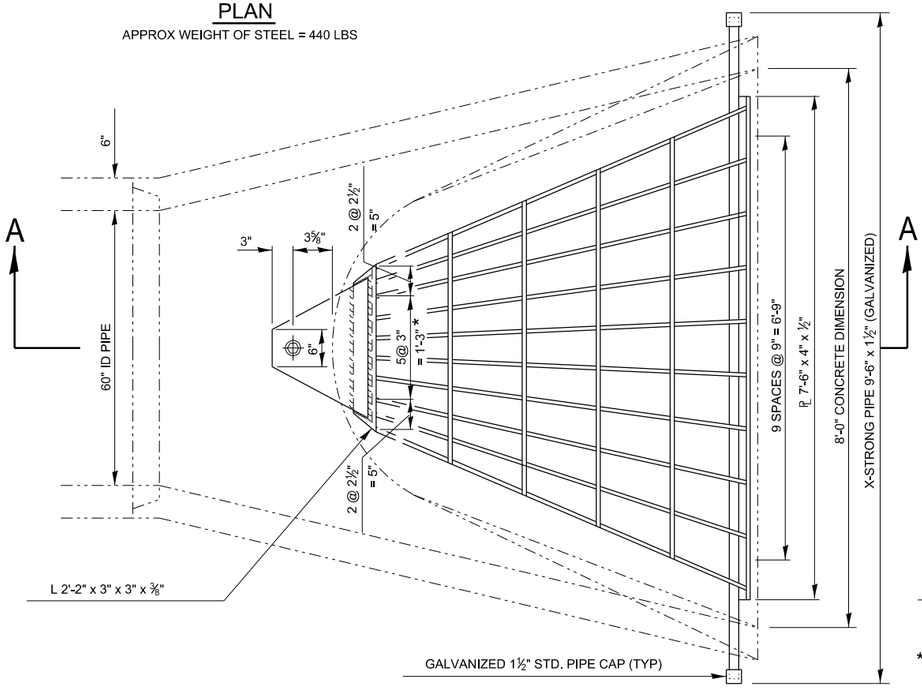
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS_DGN\500-599 STRUCTURES.dgn

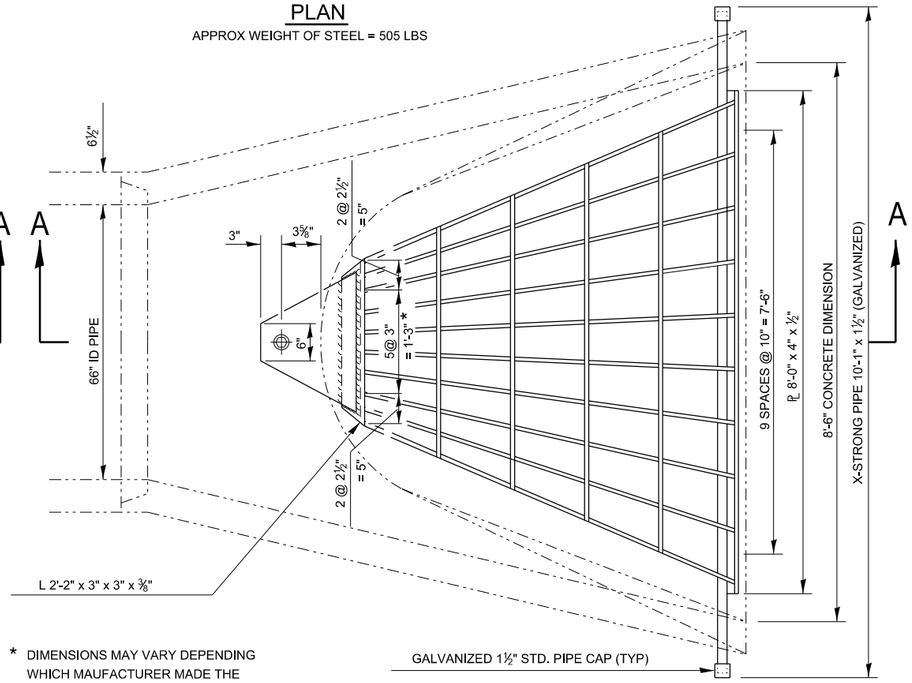
PLAN

APPROX WEIGHT OF STEEL = 440 LBS



PLAN

APPROX WEIGHT OF STEEL = 505 LBS



* DIMENSIONS MAY VARY DEPENDING WHICH MAUFACTURER MADE THE END SECTION

GENERAL NOTES

GRATING DETAILS SHOWN ARE INTENDED FOR USE WITH PARTICULAR SIZES OF PRECAST REINFORCED CONCRETE FLARED END SECTIONS AS SHOWN ON STANDARD 542001 & 542011.

STRUCTURAL STEEL SHAPES AND PLATES SHALL BE IN ACCORDANCE WITH ARTICLE 1006.04 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

GALVANIZED STEEL PIPE SHALL BE IN ACCORDANCE WITH ARTICLE 542.07 (d) OF THE STANDARD SPECIFICATIONS. STEEL PIPE SHALL CONFORM TO ASTM A-53 (TYPE E OR S) GRADE B SCHEDULE 40.

BOLTS, NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH ARTICLE 1006.08 OF THE STANDARD SPECIFICATIONS.

ALL FABRICATION SHALL BE COMPLETED AND READY FOR ASSEMBLY BEFORE GALVANIZING.

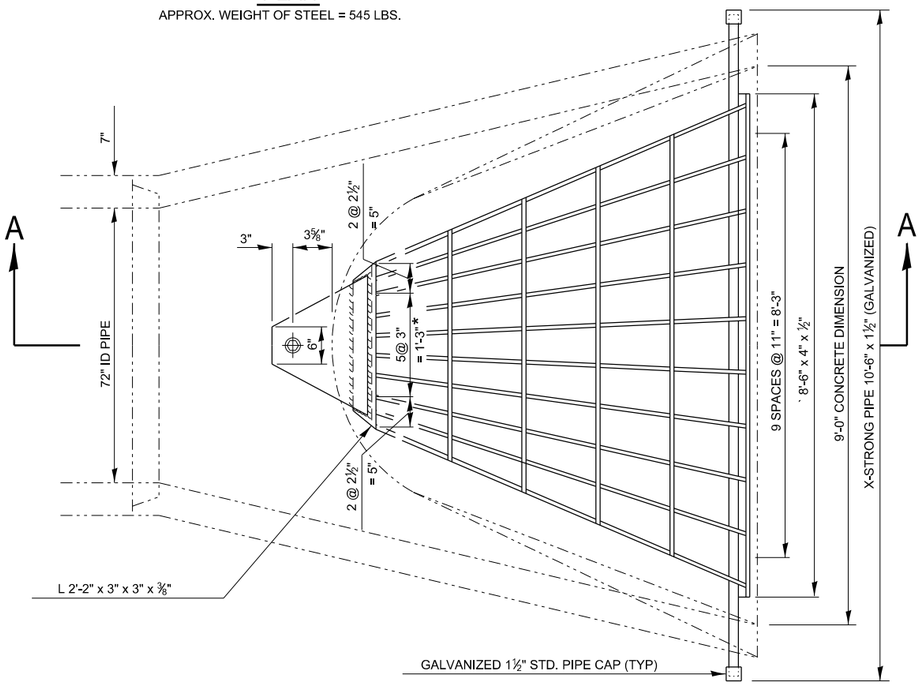
THE CORED HOLES IN THE PRECAST CONCRETE FLARED END SECTIONS SHALL BE TO THE DIAMETERS NOTED. IF CONE-OUT ON THE OTHER END OF THE HOLE OCCURS, THE HOLE SHALL BE FILLED WITH GROUT TO CORRECT DIAMETER OF THE HOLE.

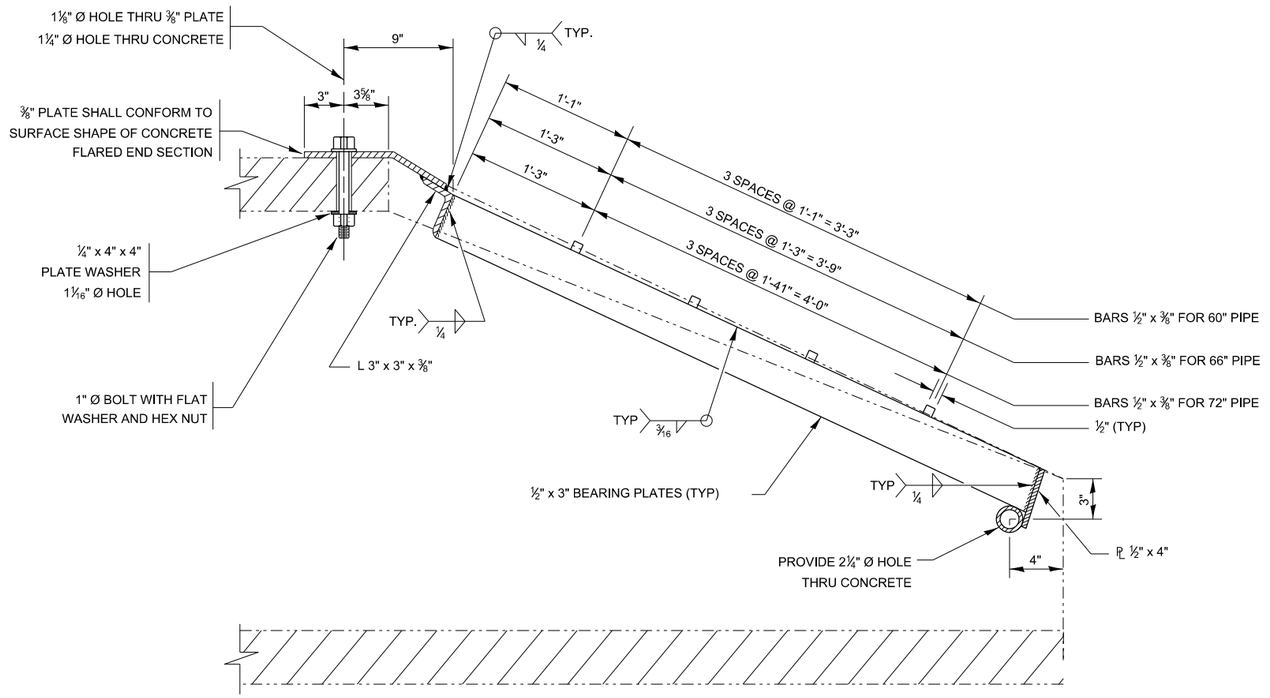
APPROXIMATE WEIGHT OF STEEL SHOWN INCLUDES TOTAL WEIGHT OF GRATING, BOLTS, WASHERS, NUTS AND STEEL PIPE.

THE CONTRACT UNIT PRICE "EACH" FOR GRATING FOR CONCRETE FLARED END SECTION EQUIVALENT ROUND-SIZE OF THE SIZE INDICATED SHALL INCLUDE FABRICATION AND INSTALLATION OF THE GRATING AS DETAILED HEREIN, INCLUDING FABRICATION OF THE NECESSARY MOUNTING HOLES IN THE FLARED END SECTION, THIS PRICE DOES NOT INCLUDE THE COST OF THE PRECAST CONCRETE FLARED END SECTIONS.

PLAN

APPROX. WEIGHT OF STEEL = 545 LBS.





SECTION A-A

542-10

USER NAME = ronald.pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

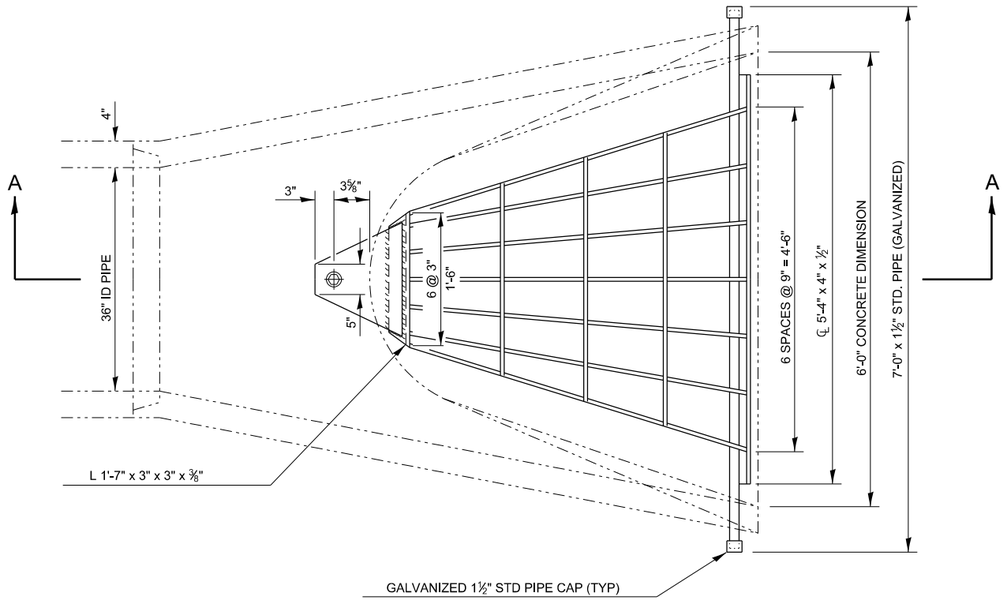
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GRATING FOR CONCRETE FLARED END SECTIONS (FOR 60",66" & 72" PIPE)

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

MODEL: dist 3 details
FILE NAME: pw:\\dot-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS (DCN5505-599 STRUCTURES).dgn



PLAN

APPROX WEIGHT OF STEEL = 270 LBS

GENERAL NOTES

GRATING DETAILS SHOWN ARE INTENDED FOR USE WITH PARTICULAR SIZES OF PRECAST REINFORCED CONCRETE FLARED END SECTIONS AS SHOWN ON STANDARD 542306.

STRUCTURAL STEEL SHAPES AND PLATES SHALL BE IN ACCORDANCE WITH ARTICLE 1006.04 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

GALVANIZED STEEL PIPE SHALL BE IN ACCORDANCE WITH ARTICLE 542.07 (d) OF THE STANDARD SPECIFICATIONS. STEEL PIPE SHALL CONFORM TO ASTM A-53 (TYPE E OR S) GRADE B SCHEDULE 40.

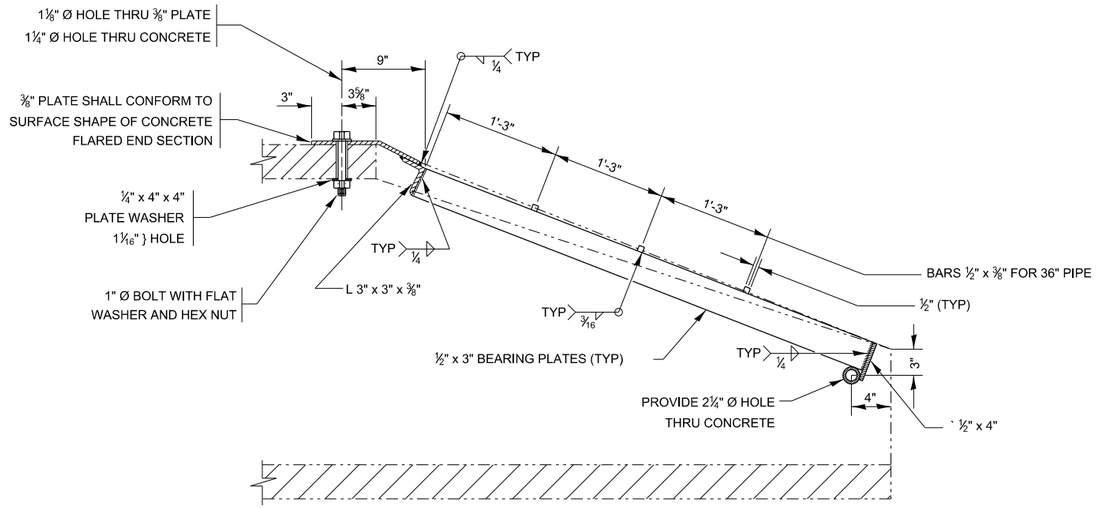
BOLTS, NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH ARTICLE 1006.08 OF THE STANDARD SPECIFICATIONS.

ALL FABRICATION SHALL BE COMPLETED AND READY FOR ASSEMBLY BEFORE GALVANIZING.

THE CORED HOLES IN THE PRECAST CONCRETE FLARED END SECTIONS SHALL BE TO THE DIAMETERS NOTED. IF CONE-OUT ON THE OTHER END OF THE HOLE OCCURS, THE HOLE SHALL BE FILLED WITH GROUT TO CORRECT DIAMETER OF THE HOLE.

APPROXIMATE WEIGHT OF STEEL SHOWN INCLUDES TOTAL WEIGHT OF GRATING, BOLTS, WASHERS, NUTS AND STEEL PIPE.

THE CONTRACT UNIT PRICE "EACH" FOR GRATING FOR CONCRETE FLARED END SECTION EQUIVALENT ROUND-SIZE OF THE SIZE INDICATED SHALL INCLUDE FABRICATION AND INSTALLATION OF THE GRATING AS DETAILED HEREIN, INCLUDING FABRICATION OF THE NECESSARY MOUNTING HOLES IN THE FLARED END SECTION, THIS PRICE DOES NOT INCLUDE THE COST OF THE PRECAST CONCRETE FLARED END SECTIONS.



SECTION A-A

542-11

USER NAME = ronald.pohar	DESIGNED -	REVISED -	**STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION**
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/18/2024	DATE -	REVISED -	

GRATING FOR HORIZONTAL ELLIPTICAL CONCRETE FLARED END SECTION (FOR EQUIV. ROUND SIZE 36" PIPE)

SCALE: | SHEET OF SHEETS | STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS	FED. AID PROJECT			

MODEL: dist 3 details
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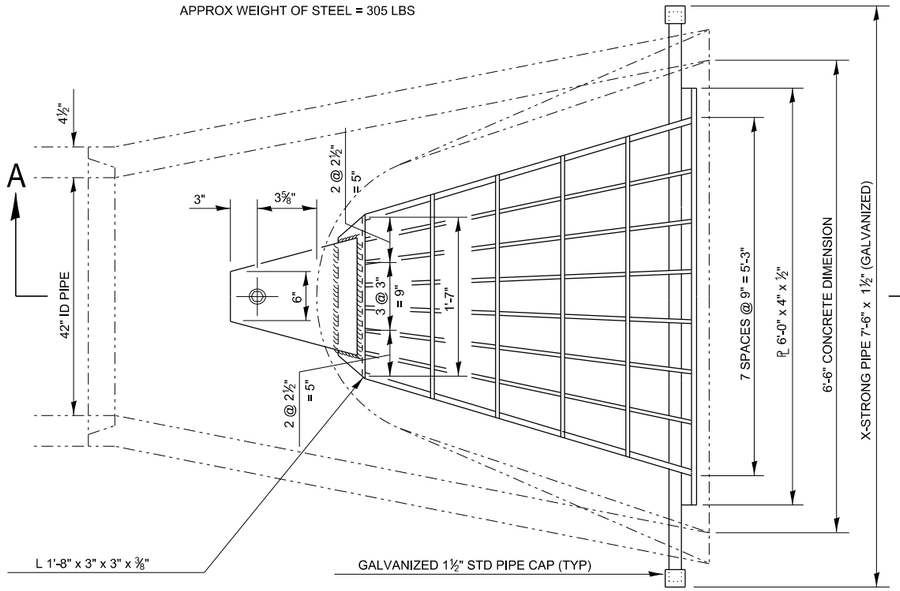
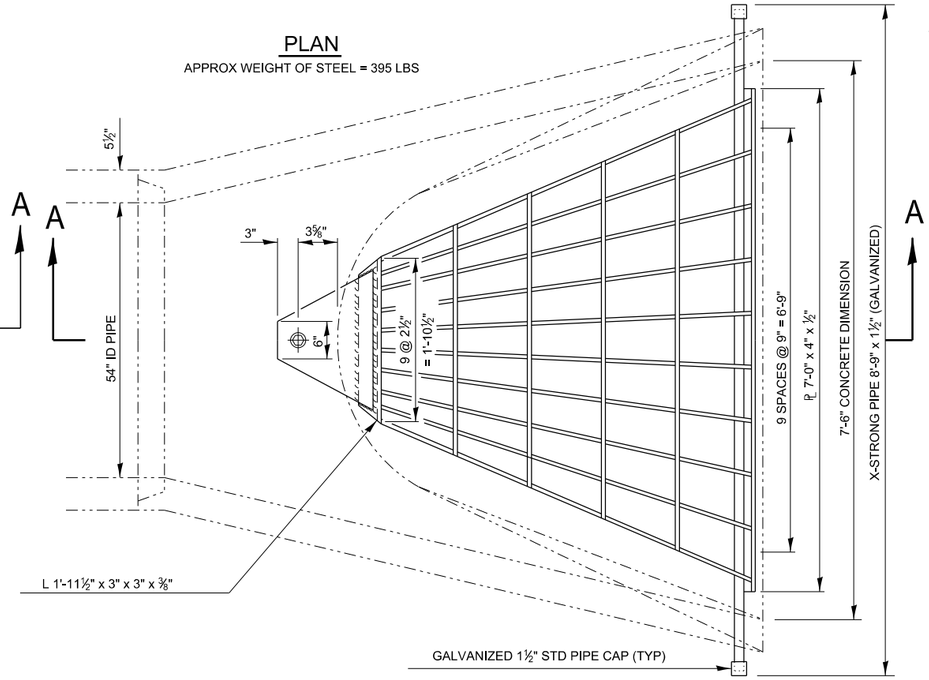
PLAN

APPROX WEIGHT OF STEEL = 305 LBS



PLAN

APPROX WEIGHT OF STEEL = 395 LBS



GENERAL NOTES

GRATING DETAILS SHOWN ARE INTENDED FOR USE WITH PARTICULAR SIZES OF PRECAST REINFORCED CONCRETE FLARED END SECTIONS AS SHOWN ON STANDARD 542306.

STRUCTURAL STEEL SHAPES AND PLATES SHALL BE IN ACCORDANCE WITH ARTICLE 1006.04 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

GALVANIZED STEEL PIPE SHALL BE IN ACCORDANCE WITH ARTICLE 542.07 (d) OF THE STANDARD SPECIFICATIONS. STEEL PIPE SHALL CONFORM TO ASTM A-53 (TYPE E OR S) GRADE B SCHEDULE 40.

BOLTS, NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH ARTICLE 1006.08 OF THE STANDARD SPECIFICATIONS.

ALL FABRICATION SHALL BE COMPLETED AND READY FOR ASSEMBLY BEFORE GALVANIZING.

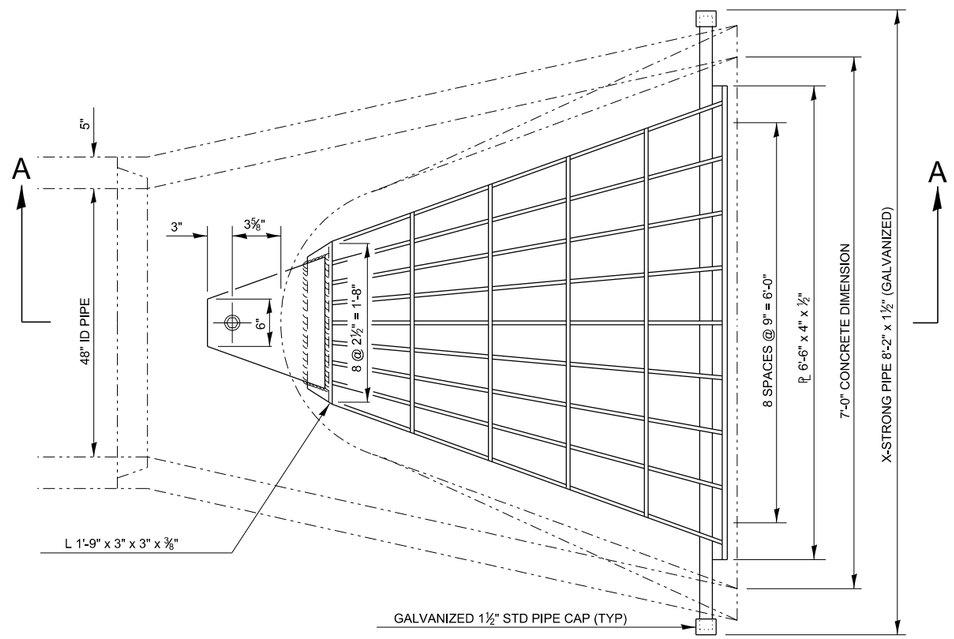
THE CORED HOLES IN THE PRECAST CONCRETE FLARED END SECTIONS SHALL BE TO THE DIAMETERS NOTED. IF CONE-OUT ON THE OTHER END OF THE HOLE OCCURS, THE HOLE SHALL BE FILLED WITH GROUT TO CORRECT DIAMETER OF THE HOLE.

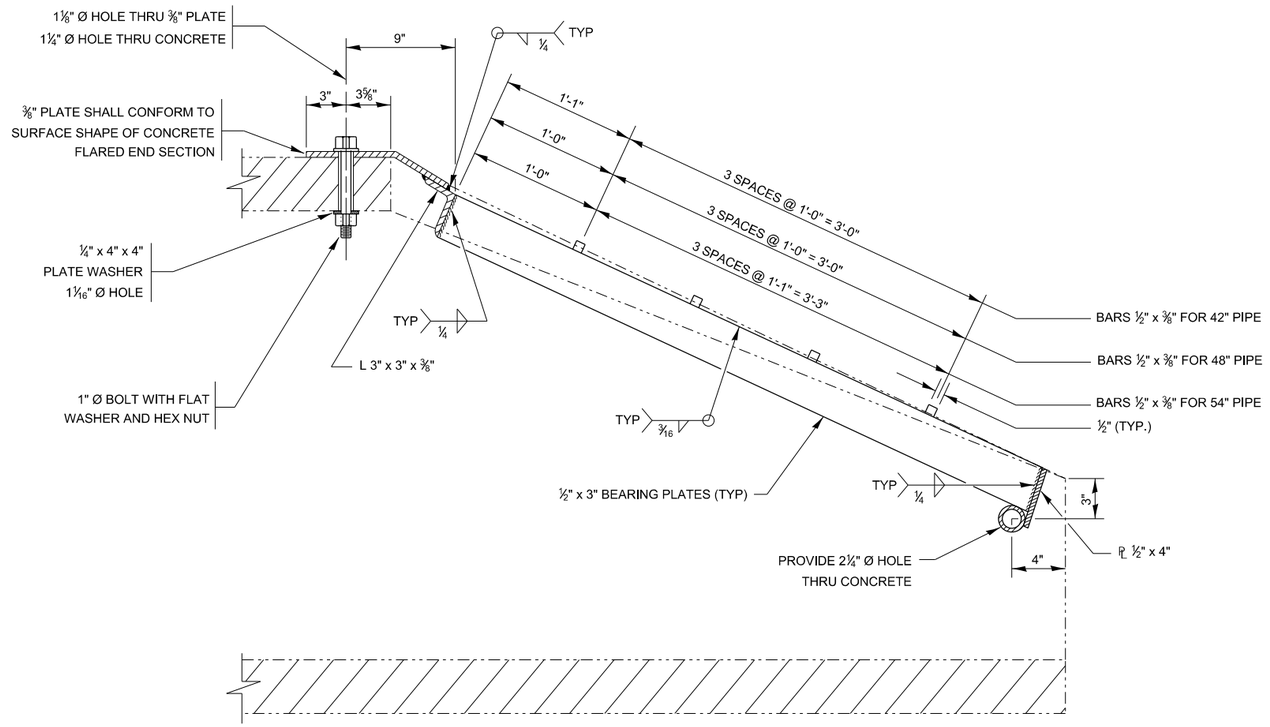
APPROXIMATE WEIGHT OF STEEL SHOWN INCLUDES TOTAL WEIGHT OF GRATING, BOLTS, WASHERS, NUTS AND STEEL PIPE.

THE CONTRACT UNIT PRICE "EACH" FOR GRATING FOR CONCRETE FLARED END SECTION EQUIVALENT ROUND-SIZE OF THE SIZE INDICATED SHALL INCLUDE FABRICATION AND INSTALLATION OF THE GRATING AS DETAILED HEREIN, INCLUDING FABRICATION OF THE NECESSARY MOUNTING HOLES IN THE FLARED END SECTION, THIS PRICE DOES NOT INCLUDE THE COST OF THE PRECAST CONCRETE FLARED END SECTIONS.

PLAN

APPROX WEIGHT OF STEEL = 335 LBS





SECTION A-A

542-12

MODEL: dist 3 details
FILE NAME: pw:\\fdot-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS - DGN\500-599 STRUCTURES.dgn

USER NAME = Ronald.Pohar	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 3/25/2024	DATE -	REVISED -

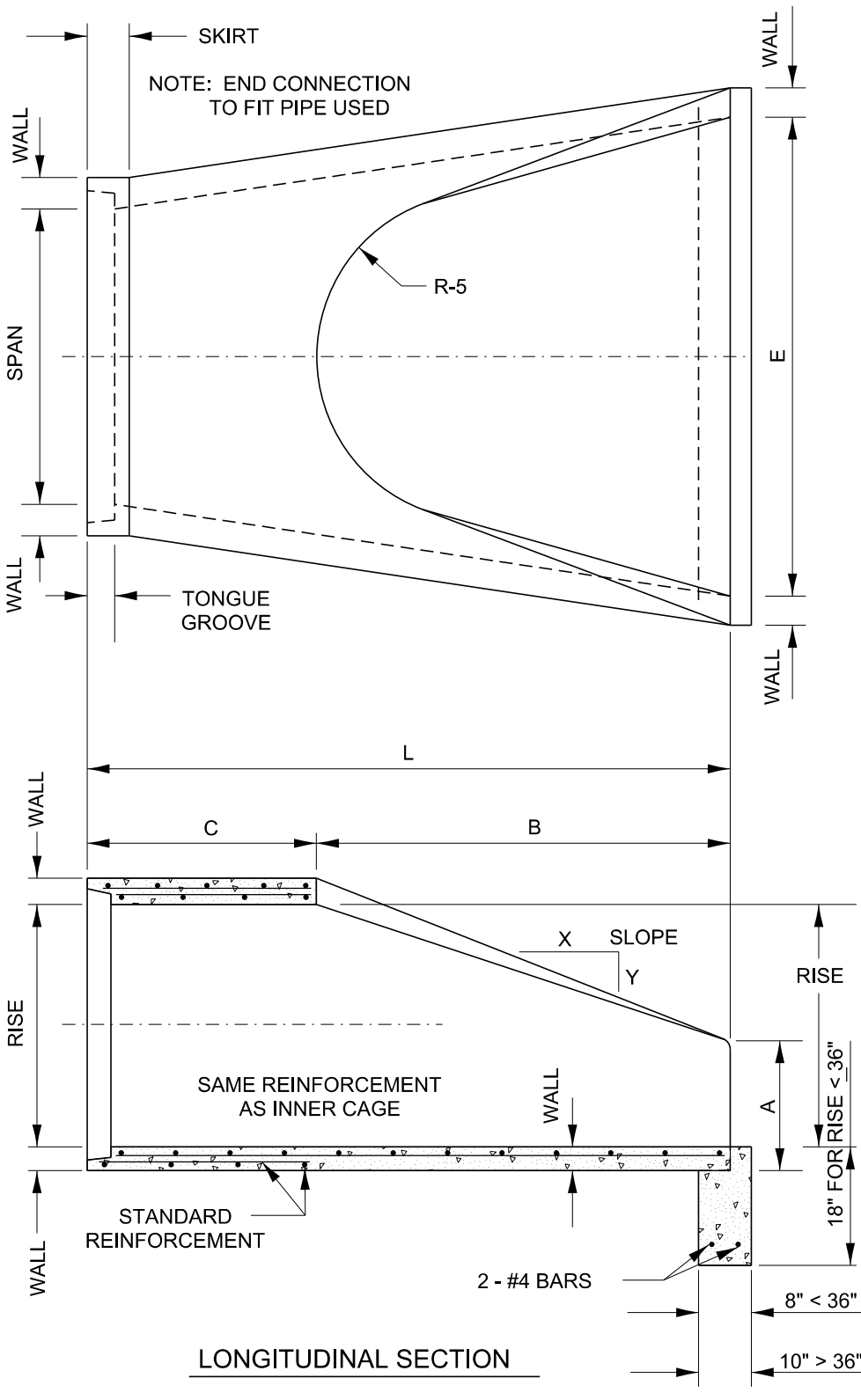
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GRATING FOR HORIZONTAL ELLIPTICAL CONCRETE FLARED END SECTION (FOR EQUIV. ROUND SIZE 42",48" & 54" PIPE)

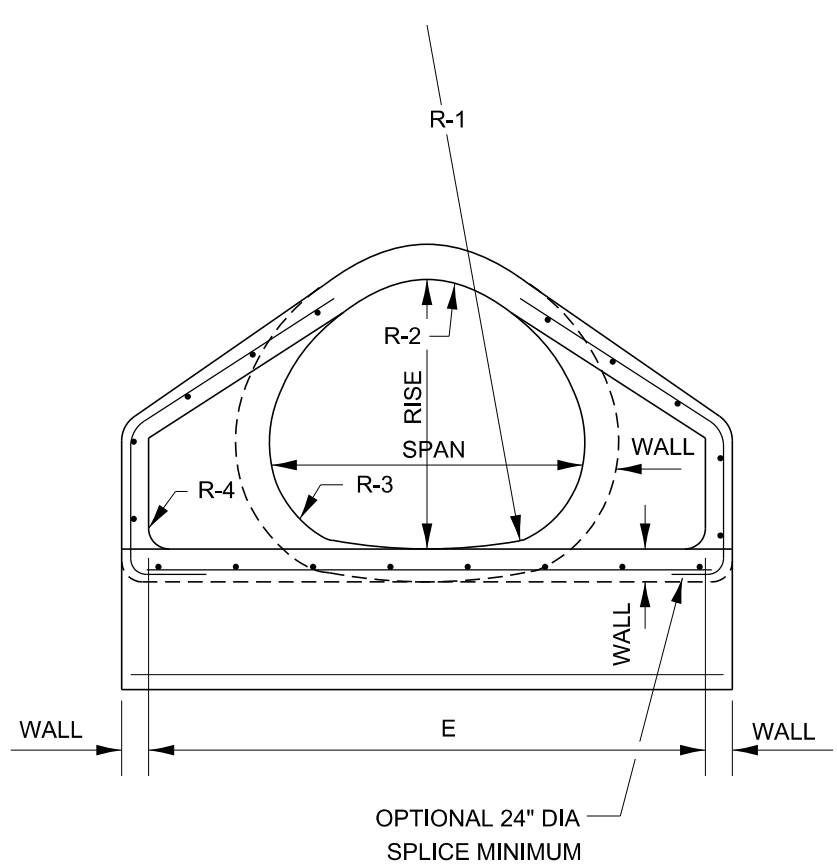
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

SIZE	WALL	SPAN	RISE	L	B	C	E	A	SLOPE	R-1	R-2	R-3	R-4	R-5
18"	2½"	22"	13½"	72"	27"	45"	36"	7"	2.16:1	27½"	13¾"	5¼"	2"	12"
24"	3"	28½"	18"	72"	39"	33"	48"	8"	2.29:1	40 1/16"	14 9/16"	4 19/32"	3"	14"
30"	3½"	36¼"	22½"	72"	48"	24"	60"	10"	2.34:1	51"	18¾"	6⅛"	3"	15"
36"	4"	43¾"	26⅝"	96"	60"	36"	72"	10⅝"	2.4:1	62"	22½"	6½"	6"	20"
42"	4½"	51⅛"	31 5/16"	96"	60"	36"	78"	15 13/16"	2.35:1	73"	26¼"	7¾"	6"	22"
48"	5"	58½"	36"	96"	60"	36"	84"	21"	2.31:1	84"	30"	8⅞"	6"	22"
54"	5½"	65"	40"	96"	60"	36"	90"	25½"	2.26:1	92½"	33⅜"	10"	6"	24"
60"	6"	73"	45"	96"	75"	21"	96"	26"	2.34:1	105"	37½"	11 1/16"	6"	21"
72"	7"	88"	54"	100"	78"	22"	120"	35"	2.29:1	126"	45"	13 5/16"	6"	24"



LONGITUDINAL SECTION



END VIEW

NOTES:

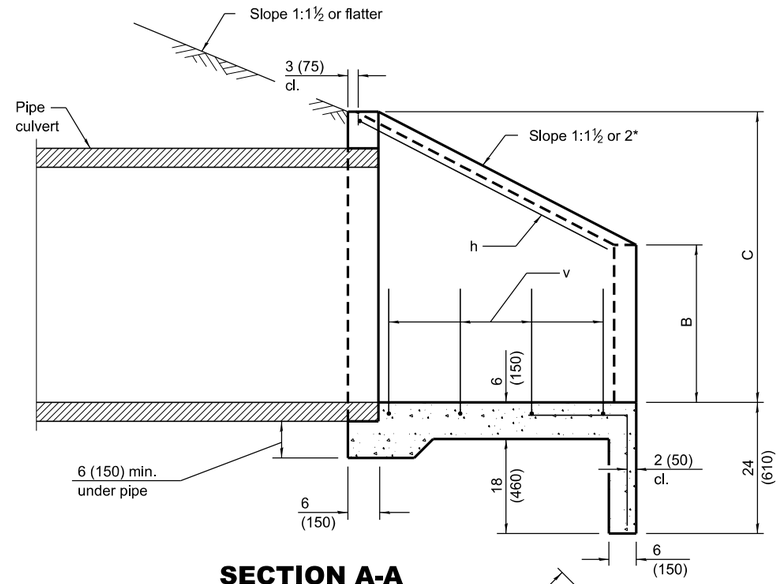
PRECAST CONCRETE FLARED END SECTIONS SHALL CONFORM TO THE APPLICABLE REQUIREMENT OF AASHTO M-206.

PRECAST CONCRETE FLARED END SECTION FOR PIPE ARCH DIAMETER REQUIRED SHALL BE AS INDICATED ON DETAIL PLAN FOR EACH INDIVIDUAL INSTALLATION.

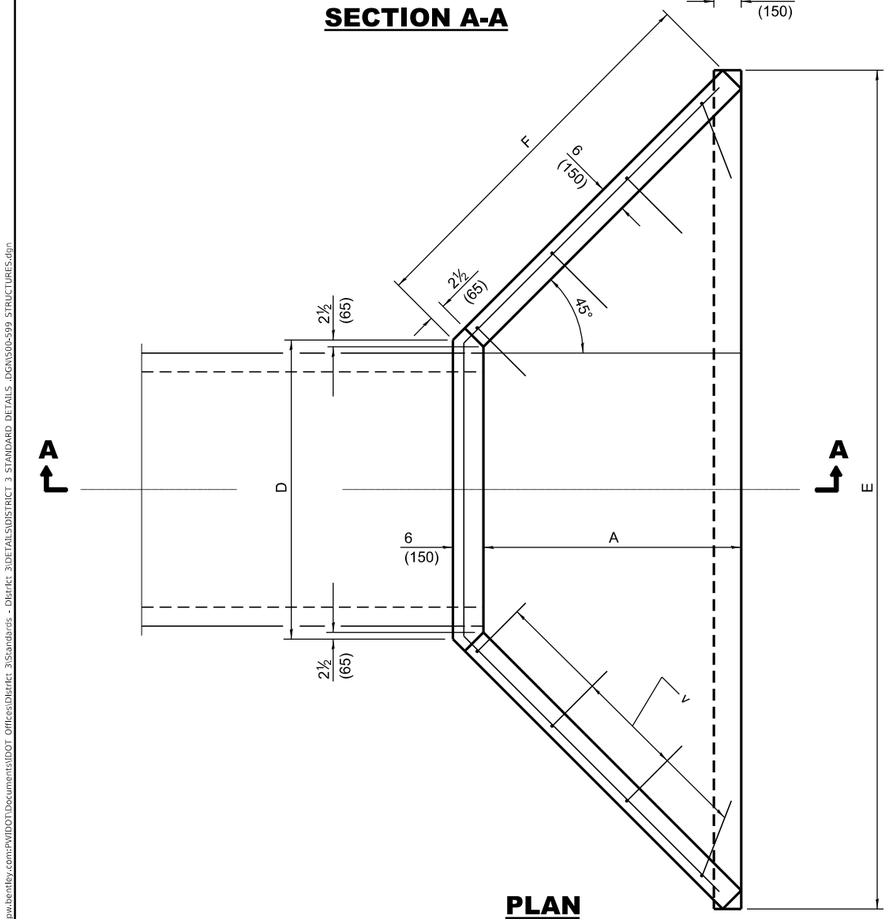
THE END BLOCK SHALL BE PLACED PRIOR TO THE INSTALLATION OF THE FLARED END SECTION. THE END BLOCK SHALL BE BACKFILLED IN ACCORDANCE WITH ARTICLE 502.10 OF THE STANDARD SPECIFICATIONS, COST INCLUDED IN THE END SECTION.

PRECAST REINFORCED CONCRETE ARCH DIAMETER FLARED END SECTION

542-13



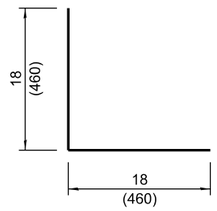
SECTION A-A



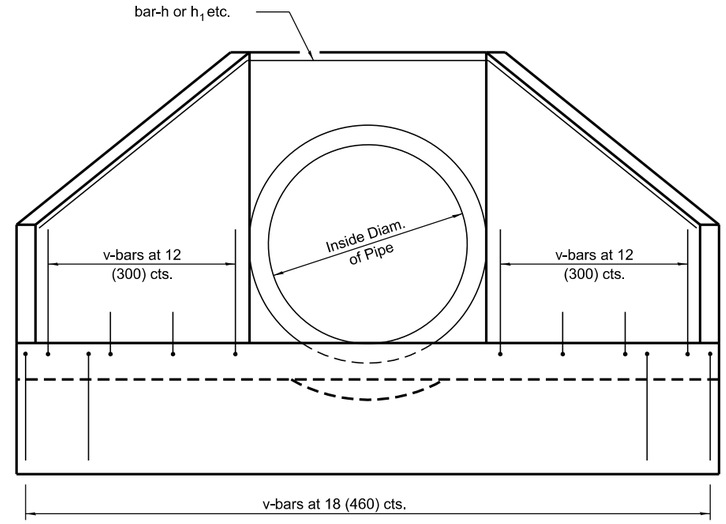
PLAN

DIMENSIONS OF BARS-h to h_9

Bar	a	b
h	22 (560)	29½ (750)
h_1	22 (560)	38½ (980)
h_2	25 (640)	29½ (750)
h_3	25 (640)	38½ (980)
h_4	33 (840)	39 (990)
h_5	33 (840)	4'-1½" (1.26 m)
h_6	39 (990)	3'-10½" (1.18 m)
h_7	39 (990)	4'-10½" (1.50 m)
h_8	3'-11" (1.19 m)	4'-8" (1.42 m)
h_9	3'-11" (1.19 m)	5'-9½" (1.77 m)



BAR v

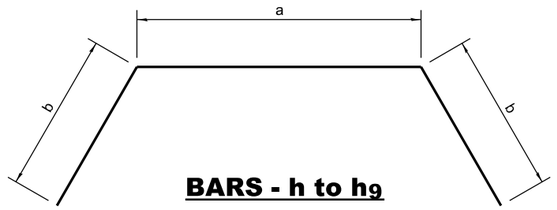


END VIEW

DIMENSIONS AND QUANTITIES

Design No.	Nominal Inside Dia. of Pipe	Slope of Wing Walls	Dimensions						Concrete 2 End Secs. cu. yds. (m^3)	Reinforcement Bars - No. 4 (No. 13)			
										h-Bars		v-Bars No.	Total Wt. 2 End Secs. lbs. (kg)
			A	B	C	D	E	F		Bar	Length		
D15-1½ (D375-1½)	15 (375)	1:1½	19 (485)	10 (260)	23 (590)	24 (610)	5'-5½" (1.67 m)	29½ (750)	0.9 (0.7)	h	6'-9" (2.06 m)	16	40 (18.1)
D15-2 (D375-2)	15 (375)	1:2	26 (660)	10 (260)	23 (590)	24 (610)	6'-7½" (2.02 m)	3'-3¼" (1 m)	1.2 (0.9)	h_1	8'-3" (2.52 m)	22	60 (27.2)
D18-1½ (D450-1½)	18 (450)	1:1½	19 (485)	13 (330)	26 (660)	27 (690)	5'-8½" (1.75 m)	29½ (750)	1.3 (1.0)	h_2	7'-0" (2.14 m)	16	40 (18.1)
D18-2 (D450-2)	18 (450)	1:2	26 (660)	13 (330)	26 (660)	27 (690)	6'-10½" (2.11 m)	3'-3¼" (1 m)	1.3 (1.0)	h_3	8'-6" (2.6 m)	22	60 (27.2)
D24-1½ (D600-1½)	24 (600)	1:1½	25 (640)	16 (410)	33 (840)	35 (890)	7'-4½" (2.26 m)	38 (970)	1.5 (1.1)	h_4	9'-3" (2.82 m)	22	60 (27.2)
D24-2 (D600-2)	24 (600)	1:2	34 (865)	16 (410)	33 (840)	35 (890)	8'-10½" (2.72 m)	4'-2½" (1.29 m)	2.0 (1.5)	h_5	11'-0" (3.24 m)	28	70 (31.8)
D30-1½ (D750-1½)	30 (750)	1:1½	30 (770)	19 (480)	39 (990)	3'-5" (1.05 m)	8'-8½" (2.68 m)	3'-9" (1.15 m)	2.0 (1.5)	h_6	11'-0" (3.39 m)	28	70 (31.8)
D30-2 (D750-2)	30 (750)	1:2	3'-4" (1.01 m)	19 (480)	39 (990)	3'-5" (1.05 m)	10'-4½" (3.17 m)	4'-11" (1.5 m)	2.6 (2.0)	h_7	13'-0" (3.99 m)	34	80 (36.3)
D36-1½ (D900-1½)	36 (900)	1:1½	36 (915)	22 (560)	3'-10" (1.17 m)	4'-1" (1.25 m)	10'-4½" (3.17 m)	4'-5½" (1.36 m)	2.6 (2.0)	h_8	13'-3" (4.03 m)	30	80 (36.3)
D36-2 (D900-2)	36 (900)	1:2	4'-0" (1.22 m)	22 (560)	3'-10" (1.17 m)	4'-1" (1.25 m)	12'-4½" (3.78 m)	5'-10½" (1.79 m)	3.5 (2.7)	h_9	15'-6" (4.73 m)	40	100 (45.4)

* If embankment slope above headwall is flatter than 1:2, provide wings for 1:2 slope.



BARS - h to h_9

Bend in field
one required in each headwall

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

542-14

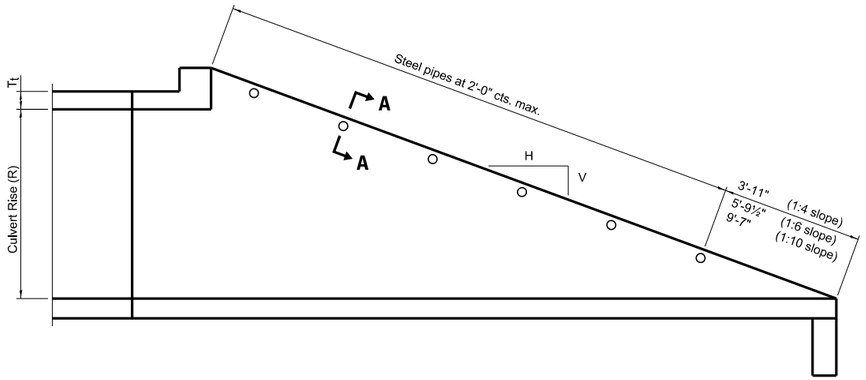
USER NAME = Ronald.Pohar	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/25/2024	DATE -	REVISED -	

REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 36" (900 mm) DIA. AT RIGHT ANGLES WITH ROADWAY

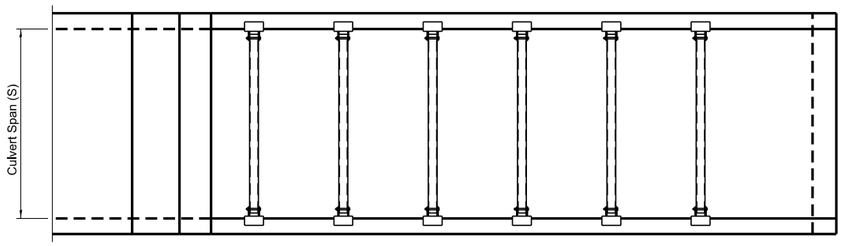
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE



LONGITUDINAL SECTION



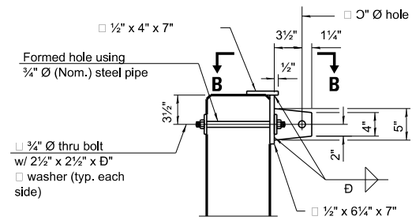
PLAN VIEW

GENERAL NOTES

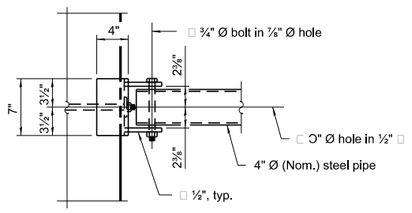
The minimum edge distance from the center of a hole to the free edge of a structural shape or plate shall be 1½" unless noted otherwise.

This standard shall only be used on concrete end sections for parallel drainage structures.

The Contractor may install the thru bolts using drilling and grouting in lieu of providing a formed hole using steel pipe. Installation shall be in accordance with Article 509.06 using a method that results in the annulus surrounding the bolt being completely filled with adhesive. The method of drilling shall not result in spalled concrete at the exit face. Epoxy grouted thru bolts shall be snug tightened followed by an additional 1/3 turn on the interior nut at final installation. Cost included with Traversable Pipe Grate.



SECTION A-A
(4" Ø pipe not shown for clarity.)



VIEW B-B

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE SHEET 1 OF 5

542-15A

MODEL: ####
FILE NAME: c:\pw_work\pwkdt\poharrg\dms4156\0500-599 STRUCTURES.dgn

USER NAME = Anthony.Grunstad	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
	CHECKED -	REVISED -	
PLOT DATE = 2/28/2025	DATE -	REVISED -	

SCALE:	SHEET #### OF SHEETS	STA.	TO STA.	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS / SHEET NO.
							CONTRACT NO.
						ILLINOIS	FED. AID PROJECT

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE

PIPE GRATE SCHEDULE FOR PARALLEL BOX CULVERTS

(<2 FT COVER)							
BOX SIZE		SLOPE OF END SECTION					
		1:4		1:6		1:10	
SPAN (FT.)	RISE (FT.)	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
3	2	5 @ 2'-7"	12'-11"	8 @ 2'-7"	20'-8"	12 @ 2'-7"	31'-0"
3	3	7 @ 2'-7"	18'-1"	11 @ 2'-7"	28'-5"	17 @ 2'-7"	43'-11"
4	2	5 @ 3'-7"	17'-11"	8 @ 3'-7"	28'-8"	13 @ 3'-7"	46'-7"
4	3	8 @ 3'-7"	28'-8"	11 @ 3'-7"	39'-5"	18 @ 3'-7"	64'-6"
4	4	10 @ 3'-7"	35'-10"	14 @ 3'-7"	50'-2"	23 @ 3'-7"	82'-5"
5	2	6 @ 4'-7"	27'-6"	8 @ 4'-7"	36'-8"	13 @ 4'-7"	59'-7"
5	3	8 @ 4'-7"	36'-8"	11 @ 4'-7"	50'-5"	18 @ 4'-7"	82'-6"
5	4	10 @ 4'-7"	45'-10"	14 @ 4'-7"	64'-2"	23 @ 4'-7"	105'-5"
5	5	12 @ 4'-7"	55'-0"	17 @ 4'-7"	77'-11"	28 @ 4'-7"	128'-4"
6	2	6 @ 5'-7"	33'-6"	8 @ 5'-7"	44'-8"	13 @ 5'-7"	72'-7"
6	3	8 @ 5'-7"	44'-8"	11 @ 5'-7"	61'-5"	18 @ 5'-7"	100'-6"
6	4	10 @ 5'-7"	55'-10"	14 @ 5'-7"	78'-2"	23 @ 5'-7"	128'-5"
6	5	12 @ 5'-7"	67'-0"	17 @ 5'-7"	94'-11"	28 @ 5'-7"	156'-4"
6	6	14 @ 5'-7"	78'-2"	20 @ 5'-7"	111'-8"	33 @ 5'-7"	184'-3"
7	2	6 @ 6'-7"	39'-6"	8 @ 6'-7"	52'-8"	13 @ 6'-7"	85'-7"
7	3	8 @ 6'-7"	52'-8"	11 @ 6'-7"	72'-5"	18 @ 6'-7"	118'-6"
7	4	10 @ 6'-7"	65'-10"	14 @ 6'-7"	92'-2"	23 @ 6'-7"	151'-5"
7	5	12 @ 6'-7"	79'-0"	17 @ 6'-7"	111'-11"	28 @ 6'-7"	184'-4"
7	6	14 @ 6'-7"	92'-2"	20 @ 6'-7"	131'-8"	33 @ 6'-7"	217'-3"
7	7	16 @ 6'-7"	105'-4"	23 @ 6'-7"	151'-5'	38 @ 6'-7"	250'-2"
8	2	6 @ 7'-7"	45'-6"	8 @ 7'-7"	60'-8"	13 @ 7'-7"	98'-7"
8	3	8 @ 7'-7"	60'-8"	11 @ 7'-7"	83'-5"	18 @ 7'-7"	136'-6"
8	4	10 @ 7'-7"	75'-10"	14 @ 7'-7"	106'-2"	23 @ 7'-7"	174'-5"
8	5	12 @ 7'-7"	91'-0"	17 @ 7'-7"	128'-11"	28 @ 7'-7"	212'-4"
8	6	14 @ 7'-7"	106'-2"	20 @ 7'-7"	151'-8"	33 @ 7'-7"	250'-3"
8	7	16 @ 7'-7"	121'-4"	23 @ 7'-7"	174'-5"	38 @ 7'-7"	288'-2"
8	8	18 @ 7'-7"	136'-6"	26 @ 7'-7"	197'-2"	43 @ 7'-7"	326'-1"
9	2	6 @ 8'-7"	51'-6"	8 @ 8'-7"	68'-8"	13 @ 8'-7"	111'-7"
9	3	8 @ 8'-7"	68'-8"	11 @ 8'-7"	94'-5"	18 @ 8'-7"	154'-6'
9	4	10 @ 8'-7"	85'-10"	14 @ 8'-7"	120'-2"	23 @ 8'-7"	197'-5"
9	5	12 @ 8'-7"	103'-0"	17 @ 8'-7"	145'-11"	28 @ 8'-7"	240'-4"
9	6	14 @ 8'-7"	120'-2"	20 @ 8'-7"	171'-8"	33 @ 8'-7"	283'-3"
9	7	16 @ 8'-7"	137'-4"	23 @ 8'-7"	197'-5"	38 @ 8'-7"	326'-2"
9	8	18 @ 8'-7"	154'-6"	26 @ 8'-7"	223'-2"	43 @ 8'-7"	369'-1"
9	9	20 @ 8'-7"	171'-8"	30 @ 8'-7"	257'-6"	48 @ 8'-7"	412'-0"
10	2	6 @ 9'-7"	57'-6"	9 @ 9'-7"	86'-3"	14 @ 9'-7"	134'-2"
10	3	8 @ 9'-7"	76'-8"	12 @ 9'-7"	115'-0"	19 @ 9'-7"	182'-1"
10	4	10 @ 9'-7"	95'-10"	15 @ 9'-7"	143'-9"	24 @ 9'-7"	230'-0"
10	5	12 @ 9'-7"	115'-0"	18 @ 9'-7"	172'-6"	29 @ 9'-7"	277'-11"
10	6	14 @ 9'-7"	134'-2"	21 @ 9'-7"	201'-3"	34 @ 9'-7"	325'-10"
10	7	16 @ 9'-7"	153'-4"	24 @ 9'-7"	230'-0"	39 @ 9'-7"	373'-9"
10	8	18 @ 9'-7"	172'-6"	27 @ 9'-7"	258'-9"	44 @ 9'-7"	421'-8"
10	9	20 @ 9'-7"	191'-8"	30 @ 9'-7"	287'-5"	49 @ 9'-7"	469'-7"
10	10	22 @ 9'-7"	210'-10"	33 @ 9'-7"	316'-3"	54 @ 9'-7"	517'-6"

PIPE GRATE SCHEDULE FOR PARALLEL BOX CULVERTS

(<2 FT COVER)							
BOX SIZE		SLOPE OF END SECTION					
		1:4		1:6		1:10	
SPAN (FT.)	RISE (FT.)	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
11	2	6 @ 10'-7"	63'-6"	9 @ 10'-7"	95'-3"	14 @ 10'-7"	148'-2"
11	3	8 @ 10'-7"	84'-8"	12 @ 10'-7"	127'-0"	19 @ 10'-7"	201'-1"
11	4	10 @ 10'-7"	105'-10"	15 @ 10'-7"	158'-9"	24 @ 10'-7"	254'-0"
11	6	14 @ 10'-7"	148'-2"	21 @ 10'-7"	222'-3"	34 @ 10'-7"	359'-10"
11	8	18 @ 10'-7"	190'-6"	27 @ 10'-7"	285'-9"	44 @ 10'-7"	465'-8"
11	10	23 @ 10'-7"	243'-5"	33 @ 10'-7"	349'-3"	54 @ 10'-7"	571'-6"
11	11	25 @ 10'-7"	264'-7"	36 @ 10'-7"	381'-0"	59 @ 10'-7"	624'-5"
12	2	6 @ 11'-7"	69'-6"	9 @ 11'-7"	104'-3"	15 @ 11'-7"	173'-9"
12	3	8 @ 11'-7"		12 @ 11'-7"	139'-0"	20 @ 11'-7"	231'-8"
12	4	10 @ 11'-7"	115'-10"	15 @ 11'-7"	173'-9" 92'-8"	25 @ 11'-7"	289'-7"
12	6	15 @ 11'-7"	173'-9"	21 @ 11'-7"	243'-3"	35 @ 11'-7"	405'-5"
12	8	19 @ 11'-7"	220'-1"	27 @ 11'-7"	312'-9"	45 @ 11'-7"	521'-3"
12	10	23 @ 11'-7"	266'-5"	33 @ 11'-7"	382'-3"	55 @ 11'-7"	637'-1"
12	12	27 @ 11'-7"	312'-9"	39 @ 11'-7"	451'-9"	65 @ 11'-7"	752'-11"

PIPE GRATE SCHEDULE FOR PARALLEL BOX CULVERTS

(>2 FT COVER)							
BOX SIZE		SLOPE OF END SECTION					
		1:4		1:6		1:10	
SPAN (FT.)	RISE (FT.)	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
3	2	5 @ 2'-7"	12'-11"	7 @ 2'-7"	18'-1"	11 @ 2'-7"	28'-5"
3	3	7 @ 2'-7"	18'-1"	10 @ 2'-7"	25'-10"	16 @ 2'-7"	41'-4"
4	2	5 @ 3'-7"	17'-11"	7 @ 3'-7"	25'-1"	12 @ 3'-7"	43'-0"
4	3	7 @ 3'-7"	25'-1"	10 @ 3'-7"	35'-10"	17 @ 3'-7"	60'-11"
4	4	9 @ 3'-7"	32'-3"	13 @ 3'-7"	46'-7"	22 @ 3'-7"	78'-10"
5	2	5 @ 4'-7"	22'-11"	7 @ 4'-7"	32'-1"	12 @ 4'-7"	55'-0"
5	3	7 @ 4'-7"	32'-1"	11 @ 4'-7"	50'-5"	17 @ 4'-7"	77'-11"
5	4	9 @ 4'-7"	41'-3"	14 @ 4'-7"	64'-2"	22 @ 4'-7"	100'-10"
5	5	11 @ 4'-7"	50'-5"	17 @ 4'-7"	77'-11"	27 @ 4'-7"	123'-9"
6	2	5 @ 5'-7"	27'-11"	8 @ 5'-7"	44'-8"	12 @ 5'-7"	67'-0"
6	3	7 @ 5'-7"	39'-1"	11 @ 5'-7"	61'-5"	17 @ 5'-7"	94'-11"
6	4	10 @ 5'-7"	55'-10"	14 @ 5'-7"	78'-2"	23 @ 5'-7"	128'-5"
6	5	12 @ 5'-7"	67'-0"	17 @ 5'-7"	94'-11"	28 @ 5'-7"	156'-4"
6	6	14 @ 5'-7"	78'-2"	20 @ 5'-7"	111'-8"	33 @ 5'-7"	184'-3"

Follow (<2 FT Cover) table for all other sizes

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE SHEET 2 OF 5

542-15B

MODEL: ####
FILE NAME: c:\pw_work\pwidot\poharng\d1ms4115600500-599 STRUCTURES.dgn

USER NAME = Anthony.Grunstad	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
	CHECKED -	REVISED -	
PLOT DATE = 2/28/2025	DATE -	REVISED -	

SCALE:	SHEET #### OF SHEETS	STA.	TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE

PIPE GRATE SCHEDULE FOR PARALLEL PIPE CULVERTS 15" THRU 84" DIA.

Pipe I.D.	SLOPE OF END SECTION					
	1:4		1:6		1:10	
	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
15"	3 @ 0'-11"	2'-9"	4 @ 0'-11"	3'-8"	6 @ 0'-11"	5'-6"
18"	3 @ 1'-1"	3'-3"	5 @ 1'-1"	5'-5"	7 @ 1'-1"	7'-7"
21"	4 @ 1'-5"	5'-8"	5 @ 1'-5"	7'-1"	9 @ 1'-5"	12'-9"
24"	5 @ 1'-7"	7'-11"	6 @ 1'-7"	9'-6"	10 @ 1'-7"	15'-10"
30"	6 @ 2'-1"	12'-6"	8 @ 2'-1"	16'-8"	13 @ 2'-1"	27'-1"
36"	7 @ 2'-7"	18'-1"	10 @ 2'-7"	25'-10"	15 @ 2'-7"	38'-9"
42"	8 @ 3'-1"	24'-8"	11 @ 3'-1"	33'-11"	18 @ 3'-1"	55'-6"
48"	9 @ 3'-7"	32'-3"	13 @ 3'-7"	46'-7"	21 @ 3'-7"	75'-3"
54"	10 @ 4'-1"	40'-10"	14 @ 4'-1"	57'-2"	23 @ 4'-1"	93'-11"
60"	11 @ 4'-7"	50'-5"	15 @ 4'-7"	68'-9"	25 @ 4'-7"	114'-7"
66"	12 @ 5'-1"	61'-0"	17 @ 5'-1"	86'-5"	28 @ 5'-1"	142'-4"
72"	13 @ 5'-7"	72'-7"	18 @ 5'-7"	100'-6"	30 @ 5'-7"	167'-6"
78"	14 @ 6'-1"	85'-2"	20 @ 6'-1"	121'-8"	33 @ 6'-1"	200'-9"
84"	15 @ 6'-7"	98'-9"	21 @ 6'-7"	138'-3"	35 @ 6'-7"	230'-5"

542-15C

MODEL: ####
FILE NAME: c:\pw_work\pwidot\poharrg\dms4156\0500-599 STRUCTURES.dgn

USER NAME = Anthony.Grunstad	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
	CHECKED -	REVISED -	
PLOT DATE = 2/28/2025	DATE -	REVISED -	

SCALE:	SHEET #### OF SHEETS	STA.	TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE

PIPE GRATE SCHEDULE FOR PARALLEL PIPE ARCH CULVERTS 15" THRU 84" DIA.

Pipe I.D.	SLOPE OF END SECTION					
	Table IIA, Corrugation : 2" x ½"					
	1:4		1:6		1:10	
	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
15"	2 @ 1'-1"	2'-2"	3 @ 1'-1"	3'-3"	5 @ 1'-1"	5'-5"
18"	3 @ 1'-5"	4'-3"	4 @ 1'-5"	5'-8"	6 @ 1-5"	8'-6"
21"	3 @ 1'-7"	4'-9"	5 @ 1'-7"	7'-11"	7 @ 1'-7"	11'-1"
24"	4 @ 1'-11"	7'-8"	5 @ 1'-11"	9'-7"	8 @ 1'-11"	15'-4"
30"	4 @ 2'-7"	10'-4"	6 @ 2'-7"	15'-6"	10 @ 2'-7"	25'-10"
36"	5 @ 3'-1"	15'-5"	7 @ 3'-1"	21'-7"	12 @ 3'-1"	37'-0"
42"	6 @ 3'-9"	22'-6"	9 @ 3'-9"	33'-9"	14 @ 3'-9"	52'-6"
48"	7 @ 4'-5"	30'-11"	10 @ 4'-5"	44'-2"	16 @ 4'-5"	70'-8"
54"	8 @ 4'-11"	39'-4"	11 @ 4'-11"	54'-1"	18 @ 4'-11"	88'-6"
60"	8 @ 5'-7"	44'-8"	12 @ 5'-7"	67'-0"	20 @ 5'-7"	111'-8"
66"	9 @ 6'-1"	54'-9"	13 @ 6'-1"	79'-1"	22 @ 6'-1"	133'-10"
72"	10 @ 6'-7"	65'-10"	15 @ 6'-7"	98'-9"	24 @ 6'-7"	158'-0"
78"	-	-	-	-	-	-
84"	-	-	-	-	-	-

PIPE GRATE SCHEDULE FOR PARALLEL PIPE ARCH CULVERTS 15" THRU 84" DIA.

Pipe I.D.	SLOPE OF END SECTION					
	Table IIA, Corrugation : 3" x 1"					
	1:4		1:6		1:10	
	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
15"	-	-	-	-	-	-
18"	-	-	-	-	-	-
21"	-	-	-	-	-	-
24"	-	-	-	-	-	-
30"	-	-	-	-	-	-
36"	6 @ 2'-11"	17'-6"	8 @ 2'-11"	23'-4"	13 @ 2'-11"	37'-11"
42"	7 @ 3'-5"	23'-11"	10 @ 3'-5"	34'-2"	15 @ 3'-5"	51'-3"
48"	8 @ 4'-1"	32'-8"	11 @ 4'-1"	44'-11"	18 @ 4'-1"	73'-6"
54"	9 @ 4'-7"	41'-3"	12 @ 4'-7"	55'-0"	20 @ 4'-7"	91'-10"
60"	9 @ 5'-1"	45'-9"	14 @ 5'-1"	71'-2"	22 @ 5'-1"	111'-10"
66"	10 @ 5'-9"	57'-6"	15 @ 5'-9"	86'-3"	24 @ 5'-9"	138'-0"
72"	11 @ 6'-5"	70'-7"	16 @ 6'-5"	102'-8"	26 @ 6'-5"	166'-10"
78"	12 @ 6'-11"	83'-0"	17 @ 6'-11"	117'-7"	28 @ 6'-11"	193'-8"
84"	12 @ 7'-7"	91'-0"	18 @ 7'-7"	136'-6"	30 @ 7'-7"	227'-6"

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE SHEET 4 OF 5

542-15D

MODEL: ####
FILE NAME: c:\pw_work\pw4lot\pothamg\dms4115605005-599 STRUCTURES.dgn

USER NAME = Anthony.Grunstad	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN -	REVISED -	
	CHECKED -	REVISED -	
PLOT DATE = 2/28/2025	DATE -	REVISED -	

SCALE:	SHEET #### OF SHEETS	STA.	TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

TRAVERSABLE PIPE GRATE FOR PARALLEL DRAINAGE STRUCTURE

PIPE GRATE SCHEDULE FOR PARALLEL ELLIPTICAL PIPE CULVERTS 15" THRU 72" DIA.

Plpe I.D.	SLOPE OF END SECTION					
	1:4		1:6		1:10	
	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe	Pipes No. / Length	Total Length of Pipe
15"	3 @ 2'-7"	7'-9"	5 @ 2'-7"	12'-11"	7 @ 2'-7"	18'-1"
18"	3 @ 2'-7"	7'-9"	5 @ 2'-7"	12'-11"	7 @ 2'-7"	18'-1"
21"	5 @ 3'-3"	16'-3"	7 @ 3'-3"	22'-9"	12 @ 3'-3"	39'-0"
24"	5 @ 3'-3"	16'-3"	7 @ 3'-3"	22'-9"	12 @ 3'-3"	39'-0"
27"	6 @ 3'-7"	21'-6"	8 @ 3'-7"	28'-8"	13 @ 3'-7"	46'-7"
30"	6 @ 3'-11"	23'-6"	9 @ 3'-11"	35'-3"	14 @ 3'-11"	54'-10"
36"	7 @ 4'-7"	32'-1"	10 @ 4'-7"	45'-10"	16 @ 4'-7"	73'-4"
42"	8 @ 5'-5"	43'-4"	11 @ 5'-5"	59'-7"	18 @ 5'-5"	97'-6"
48"	9 @ 6'-1"	54'-9"	13 @ 6'-1"	79'-1"	20 @ 6'-1"	121'-8"
54"	10 @ 6'-9"	67'-6"	14 @ 6'-9"	94'-6"	23 @ 6'-9"	155'-3"
60"	11 @ 7'-7"	83'-5"	15 @ 7'-7"	113'-9"	25 @ 7'-7"	189'-7"
66"	11 @ 8'-3"	90'-9"	17 @ 8'-3"	140'-3"	27 @ 8'-3"	222'-9"
72"	12 @ 8'-11"	107'-0"	18 @ 8'-11"	160'-6"	30 @ 8'-11"	267'-6"

542-15E

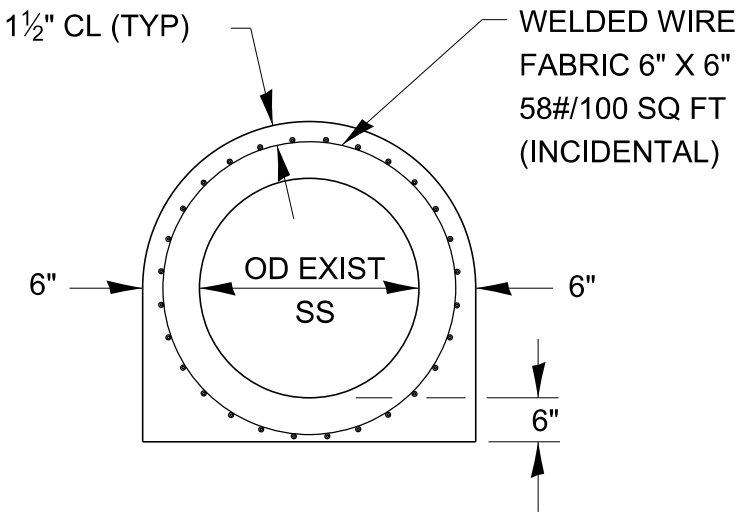
MODEL: ####
FILE NAME: c:\pw_work\pwidot\pohanrg\dms4156\0500-599 STRUCTURES.dgn

USER NAME = Anthony.Grunstad | DESIGNED - | REVISED -
DRAWN - | REVISED -
CHECKED - | REVISED -
PLOT DATE = 2/28/2025 | DATE - | REVISED -

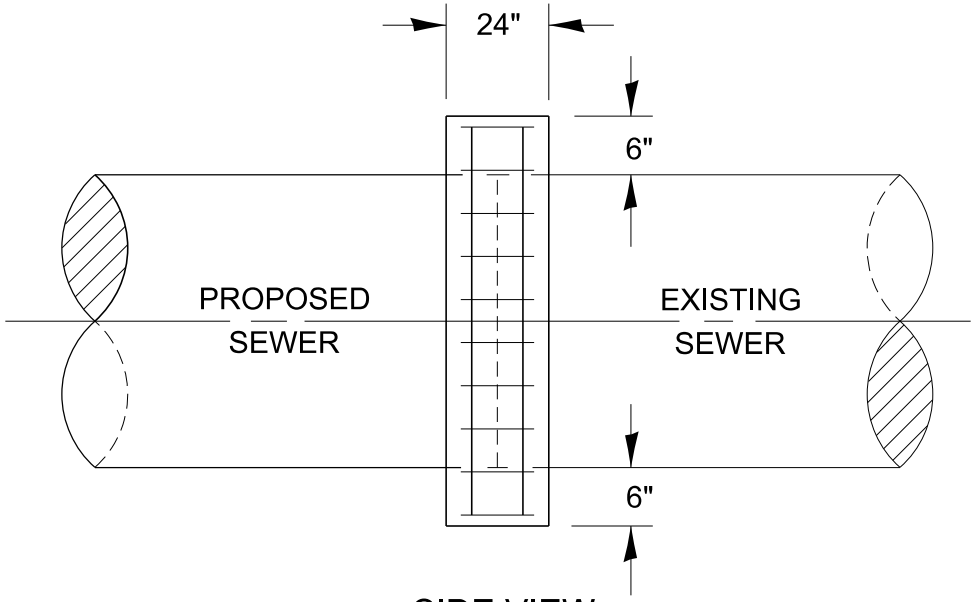
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE: | SHEET #### OF SHEETS | STA. | TO STA.

F.A. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO.
CONTRACT NO.
ILLINOIS | FED. AID PROJECT



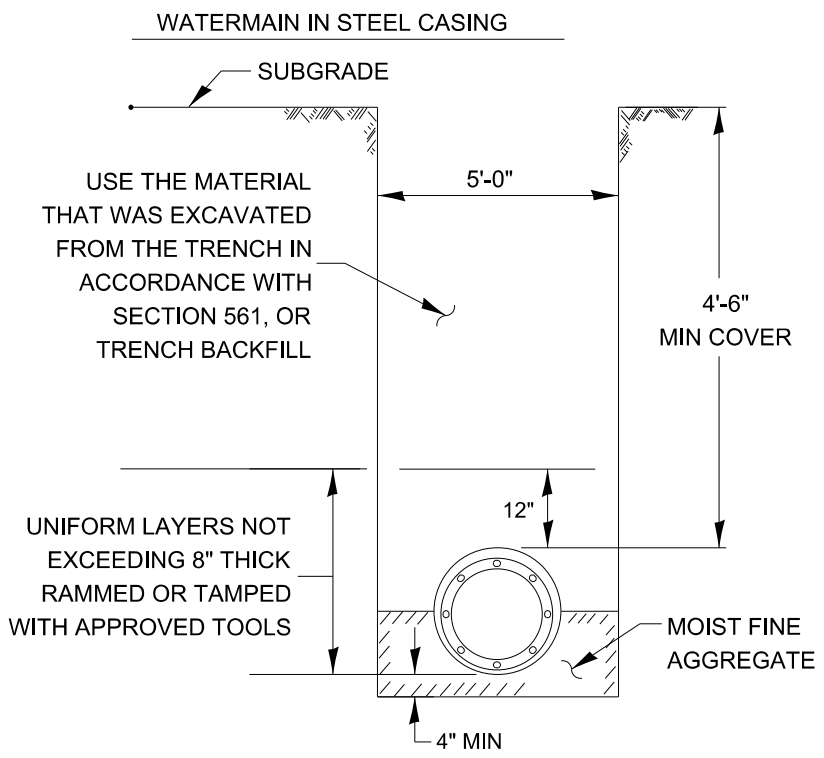
FRONT VIEW

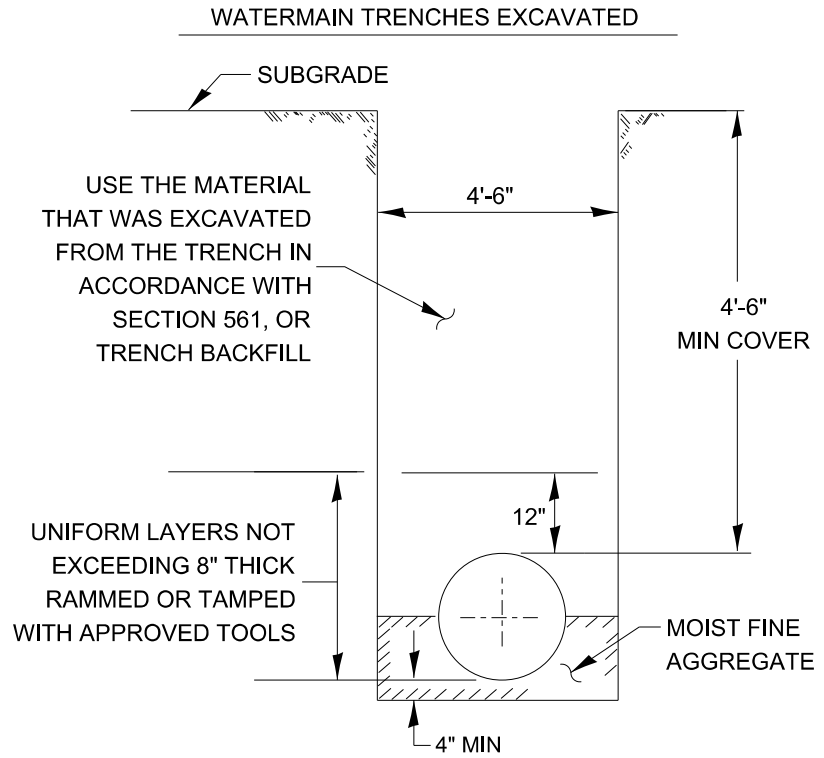


SIDE VIEW

CONCRETE COLLAR FOR SEWER CONNECTION

550-1





GENERAL NOTES:

1. ANY SOFT OR SPONGY MATERIAL ENCOUNTERED BELOW THE ELEVATION OF THE PIPE SHALL BE REMOVED AND REPLACED WITH WELL COMPACTED MOIST FINE AGGREGATE.

2. ANY ROCK ENCOUNTERED IN THE TRENCH SHALL BE REMOVED TO A DEPTH OF AT LEAST 8 INCHES BELOW THE PIPE GRADE AND REPLACED WITH WELL COMPACTED MOIST FINE AGGREGATE.

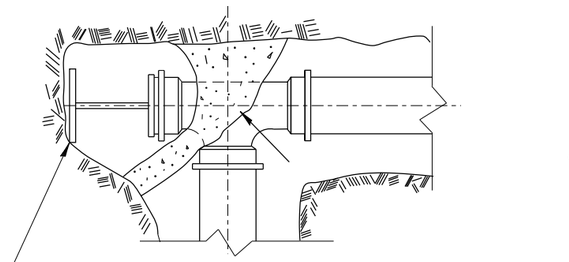
3. THE SIDES OF THE TRENCH MAY BE SLOPED OR BENCHED ABOVE A 5 FT TRENCH DEPTH OR ABOVE THE ELEVATION OR THE TOP OF PIPE, WHICHEVER IS GREATER, IN LIEU OF COMPLETE SHORING OR SHEETING OF THE FULL TRENCH DEPTH.

BACKFILL OPTIONS:

METHOD 1: UNIFORM LAYERS NOT EXCEEDING 12" THICK RAMMED OR TAMPED WITH APPROVED TOOLS
METHOD 2: UNIFORM LAYERS NOT EXCEEDING 12" THICK INUNDATED OR DEPOSITED IN WATER
METHOD 3: FILL TRENCH WITH LOOSE MATERIAL THEN JET WITH WATER, 6 FT SPACING OF HOLES.

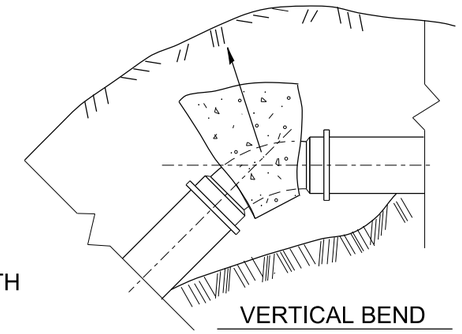
561-4

WATERMAIN INSTALLATION REQUIREMENTS

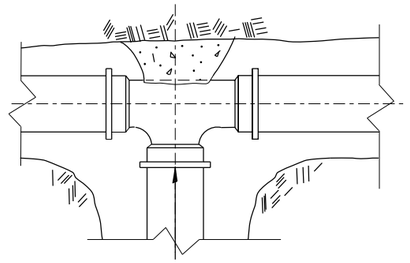


BRACE PLUG AGAINST UNDISTURBED EARTH

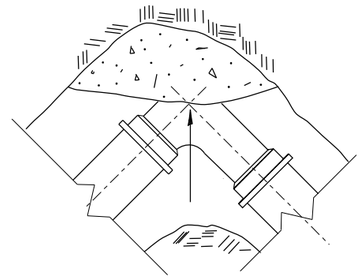
PLUGGED TEE



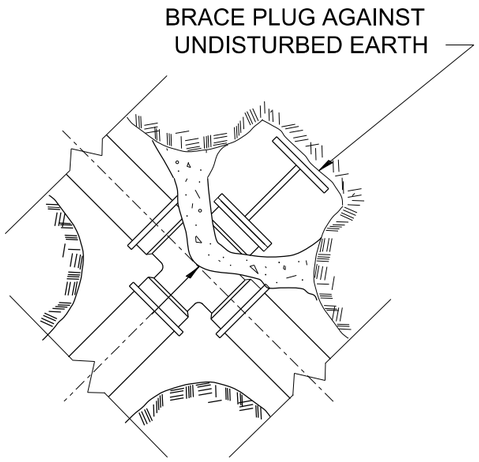
VERTICAL BEND



TEE



90° ELBOW



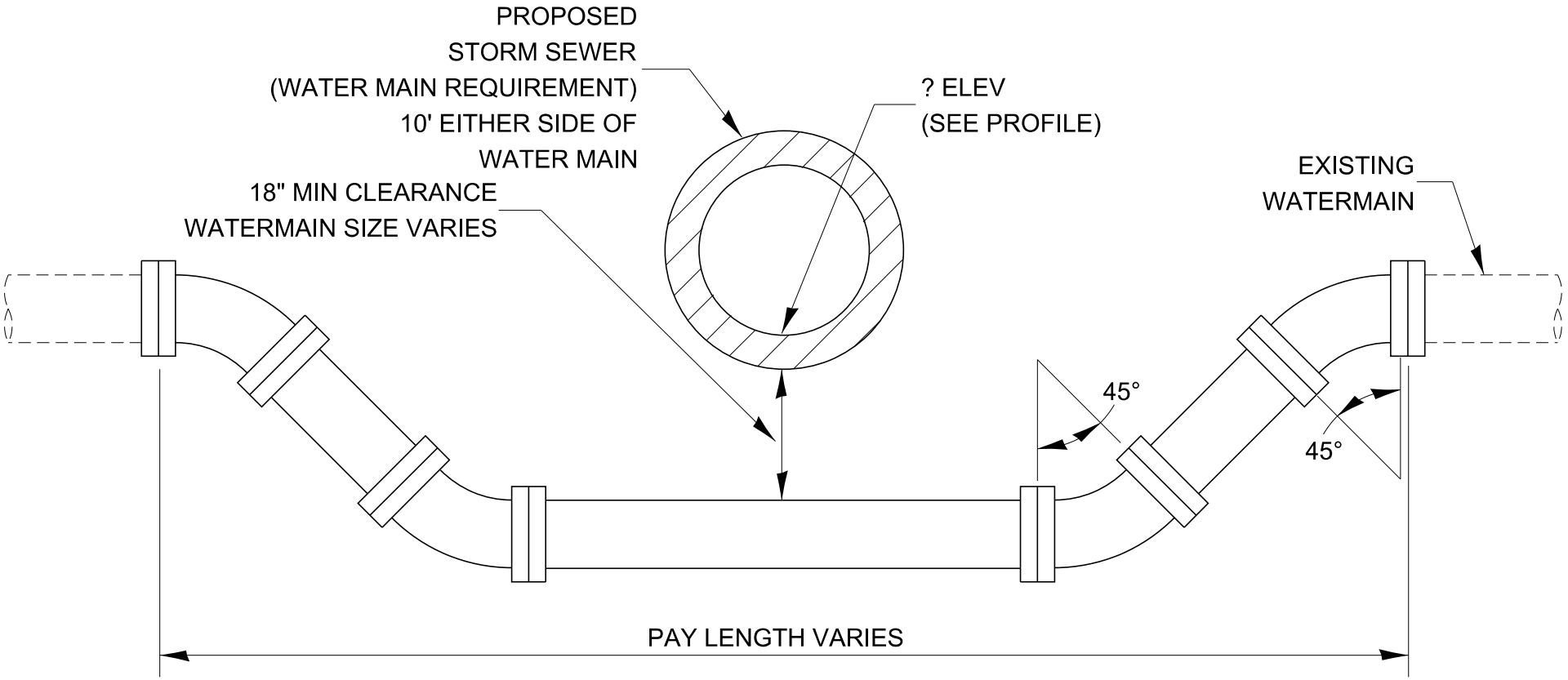
PLUGGED CROSS

NOTES:

ALL BLOCKS BEAR AGAINST UNDISTRUBED EARTH.
ALL BLOCKING SHALL BE 3,000 PSI POURED CONCRETE.
ARROWS INDICATE DIRECTION OF THRUST.
ALL FITTINGS SHOWN IN PLAN EXCEPT VERTICLE BEND.

TYPICAL THRUST BLOCK INSTALLATIONS

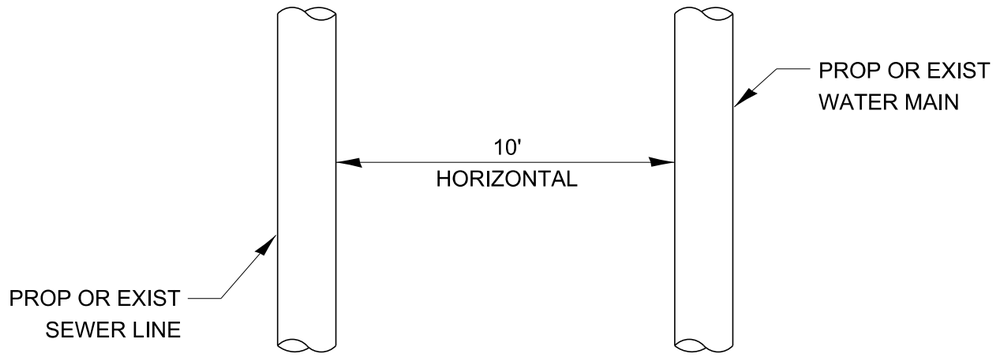
561-5



ADJUSTING WATERMAIN DETAIL

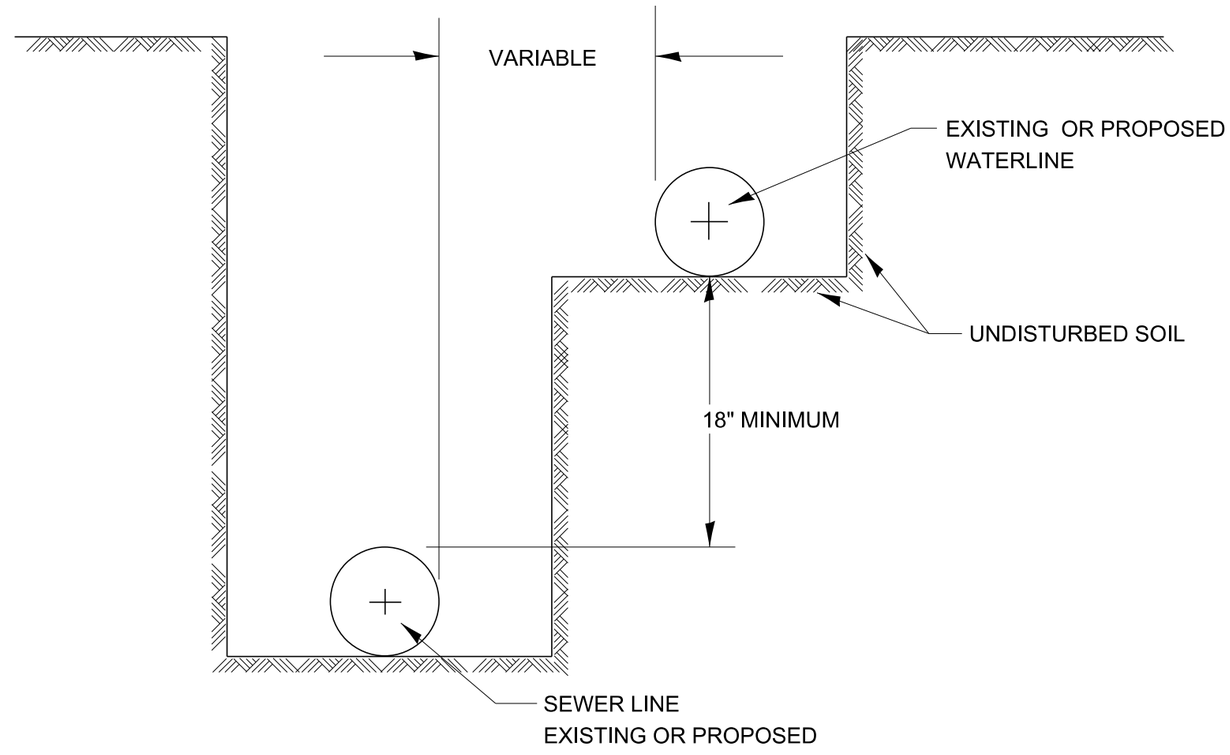
561-7

PROPOSED SEWER (OR WATER) IS LOCATED 10 FEET OR MORE FROM EXISTING WATER (OR SEWER).



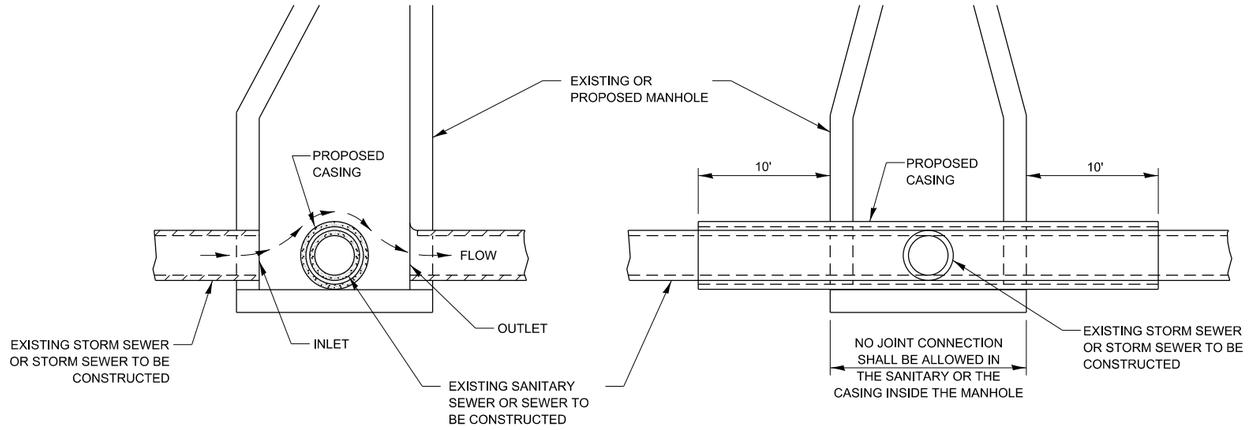
PLAN VIEW

PROPOSED SEWER (OR WATER) IS LOCATED LESS THAN 10 FEET FROM EXISTING WATER (OR SEWER).



WATER AND SEWER SEPARATION REQUIREMENTS - HORIZONTAL SEPARATION

563-3



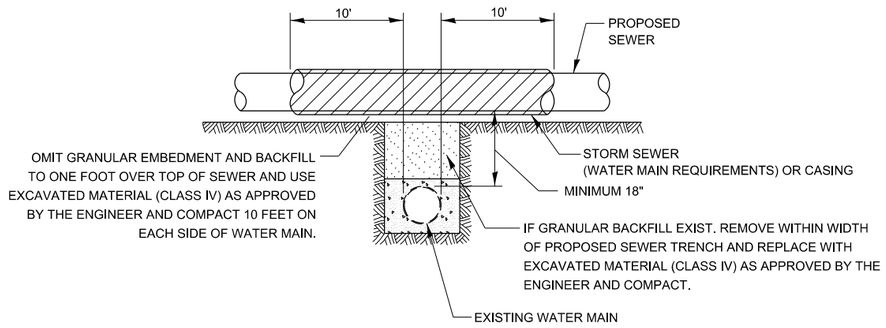
ELEVATION - ECCENTRIC

ELEVATION - CONCENTRIC

CASING SHALL BE CAST IRON WITH AN INSIDE DIAMETER 2" LARGER IN DIAMETER THAN ENCASED PIPE OUTSIDE DIAMETER WITH BOTH ENDS OF CASING SEALED

AT GRADE CROSSING OF SANITARY AND STORM SEWER

PROVIDE ADEQUATE SUPPORT FOR SEWER TO PREVENT SETTLING AND BREAKING THE WATER MAIN.

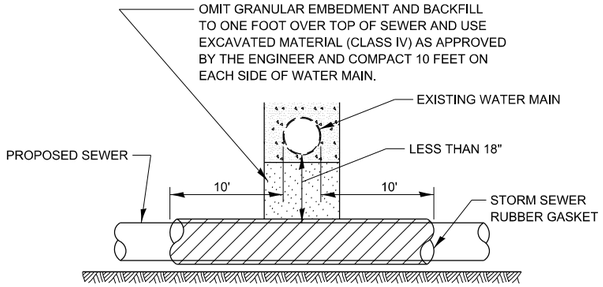


CASING SHALL BE OF WATERMAIN MATERIAL WITH AN INSIDE DIAMETER 2" LARGER IN DIAMETER THAN ENCASED PIPE OUTSIDE DIAMETER WITH BOTH ENDS OF CASING SEALED

PROPOSED SEWER LINE WITH MINIMUM 18" VERTICAL SEPARATION ABOVE EXISTING WATERMAIN

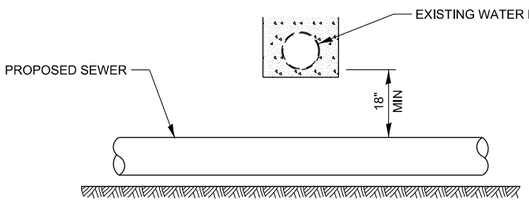
POINT LOADS SHALL NOT BE ALLOWED BETWEEN SEWER OR SEWER CASING AND WATER MAIN

PROVIDE ADEQUATE SUPPORT FOR EXISTING WATER MAIN TO PREVENT DAMAGE DUE TO SETTLEMENT OF SEWER TRENCH



PROVIDE ADEQUATE SUPPORT FOR EXISTING WATER MAIN TO PREVENT DAMAGE DUE TO SETTLEMENT OF SEWER TRENCH

MAINTAIN 18" MINIMUM VERTICAL SEPARATION FOR 10' HORIZONTALLY

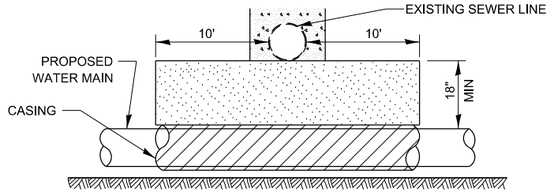


PROPOSED SEWER LINE BELOW EXISTING WATER MAIN

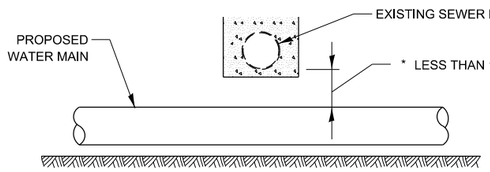
PROVIDE ADEQUATE SUPPORT FOR EXISTING SEWER LINE TO PREVENT DAMAGE DUE TO SETTLEMENT.

IF GRANULAR BACK FILL EXISTS, REMOVE WITHIN WIDTH OF EXISTING SEWER TRENCH AND REPLACE WITH EXCAVATED MATERIAL (CLASS IV) AS APPROVED BY THE ENGINEER AND COMPACT.

OMIT GRANULAR EMBEDMENT AND BACKFILL TO ONE FOOT OVER TOP OF WATER MAIN AND USE EXCAVATED MATERIAL (CLASS IV) AS APPROVED BY THE ENGINEER AND COMPACT FOR 10' EITHERSIDE OF SEWER LINE.



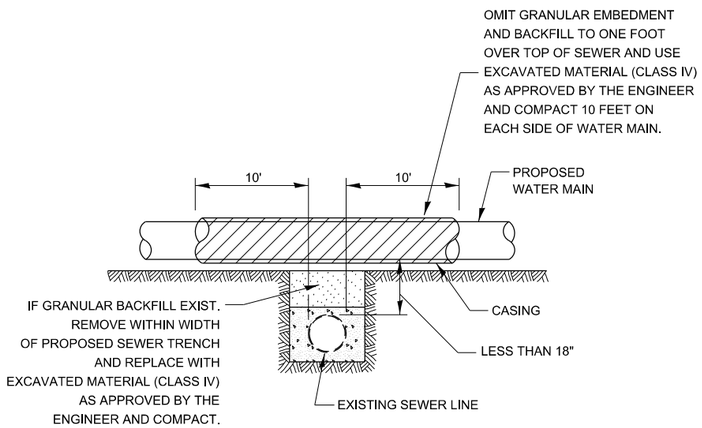
CASING SHALL BE OF WATER MAIN MATERIAL WITH AN INSIDE DIAMETER 2" LARGER IN DIAMETER THAN ENCASED PIPE OUTSIDE DIAMETER WITH BOTH ENDS OF CASING SEALED



* NOT ALLOWED
MUST MAINTAIN 18" VERTICAL SEPARATION

PROPOSED WATER MAIN BELOW EXISTING SEWER LINE

POINT LOADS SHALL NOT BE ALLOWED BETWEEN WATER MAIN CASING AND SEWER



CASING SHALL BE OF WATERMAIN MATERIAL WITH AN INSIDE DIAMETER 2" LARGER IN DIAMETER THAN ENCASED PIPE OUTSIDE DIAMETER WITH BOTH ENDS OF CASING SEALED

PROPOSED WATER MAIN ABOVE EXISTING SEWER LINE

USER NAME = Ronald.Pohar	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 100.000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 3/25/2024	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SEWER AND WATER MAIN CROSSING

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

MODEL: dist 3 details
FILE NAME: pw:\\fdot-pw.bentley.com:PWIDOT\Documents\IDOT Offices\District 3\Standards - District 3\DETAILS\DISTRICT 3 STANDARD DETAILS_DGN\500-599 STRUCTURES.dgn