



CITY OF HOUSTON

John Whitmire

Mayor



HOUSTON AIRPORT SYSTEM

George Bush Intercontinental ~ William P. Hobby ~ Ellington Airport

Mario C. Diaz
Director of Aviation

January 08, 2024

SUBJECT: Addendum No. 1

REFERENCE: Invitation To Bid (ITB) for EFD Drainage Rehabilitation and Upgrade,
Solicitation No. HOA-RODSEA-2024-011; Project No.954

To: All Prospective Bidders:

This Addendum is issued for the following reason:

I. Add: The attached plan set to the bidding documents.

When issued, the Addendum shall automatically become part of the solicitation documents and shall supersede any previous specification(s) and/or provision(s) in conflict with the Addendum. The addendum will be incorporated into the Agreement as applicable. The bidder(s) is responsible for ensuring that it has obtained all such letter(s). By submitting a bid on this project, bidder(s) shall be deemed to have received all Addenda and to have incorporated them into their bid.

If further clarification is needed regarding this solicitation, please contact Senior Procurement Specialist, Ola Alhammami via email at ola.alhammami@houstontx.gov.

DS
AP

DocuSigned by:

Cathy Vander Plaats

02232028DE90414

Cathy Vander Plaats
Aviation Procurement Officer
Houston Airport System

CVP/oa

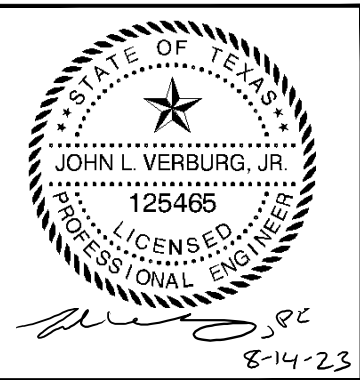
cc: Alfredo Oracion
Solicitation File

Attachment: Culvert reconstruction plan set

REVISIONS		
NO.	DESCRIPTION	DATE BY

**ELLINGTON AIRPORT (EFD)
CULVERT RECONSTRUCTION
COVER SHEET**

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

G001



HOUSTON AIRPORT SYSTEM

MAYOR
SYLVESTER TURNER

CITY COUNCIL MEMBERS

District A - AMY PECK
District B - TARSHA JACKSON
District C - ABBIE KAMIN
District D - CAROLYN EVANS-SHABAZZ
District E - DAVE MARTIN
District F - TIFFANY THOMAS
District G - MARY NAN HUFFMAN
District H - KARLA CISNEROS

CONTROLLER
CHRIS B. BROWN

CITY COUNCIL MEMBERS

District I - ROBERT GALLEGOS
District J - EDWARD POLLARD
District K - MARTHA CASTEX-TATUM

AT-LARGE POSITIONS

At-Large 1 - MIKE KNOX
At-Large 2 - DAVID ROBINSON
At-Large 3 - MICHAEL KUBOSH
At-Large 4 - LETITIA PLUMMER
At-Large 5 - SALLIE ALCORN

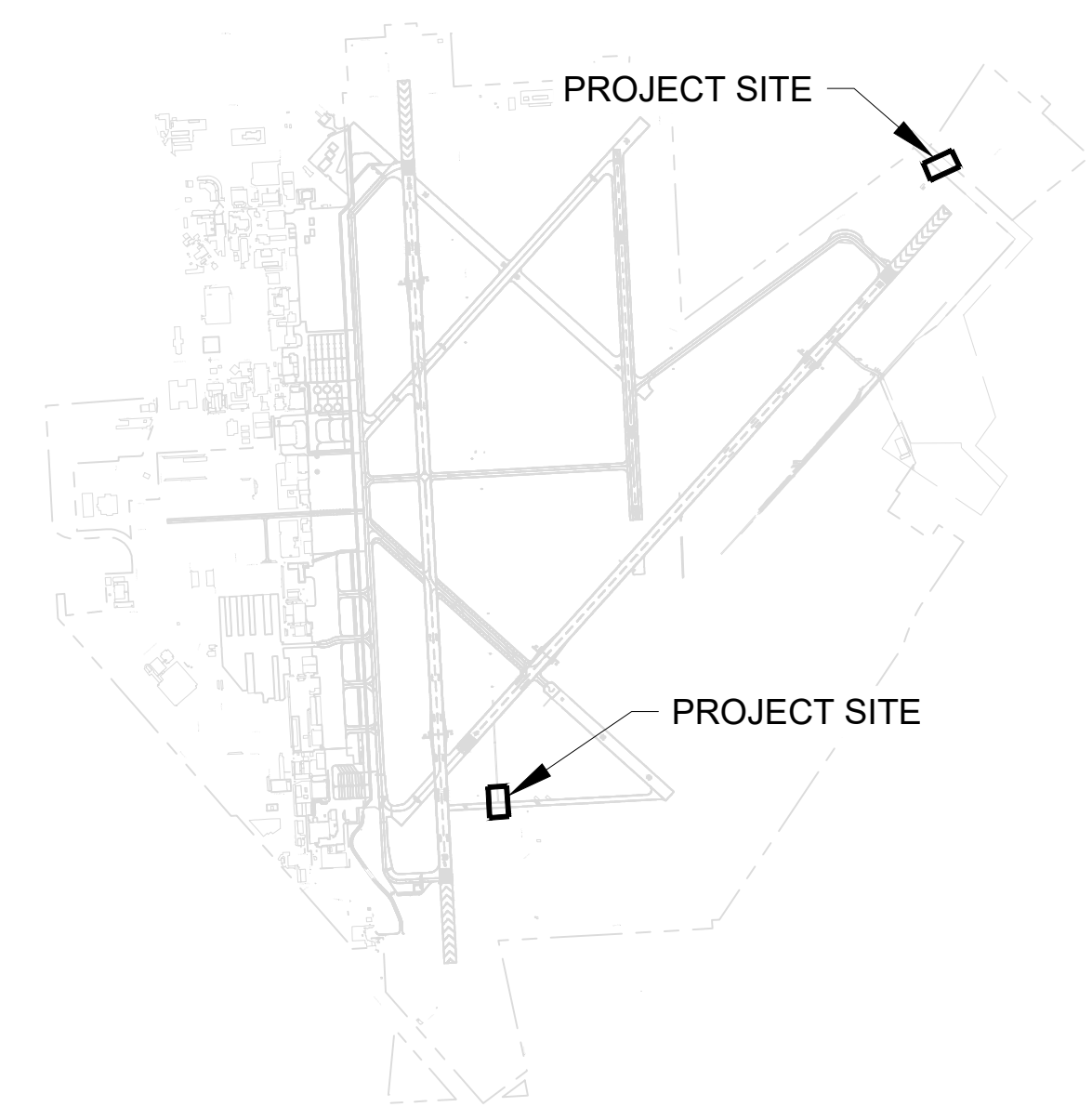
PLANS FOR CONSTRUCTION
OF
REHABILITATION OF DRAINAGE STRUCTURES
AT
ELLINGTON AIRPORT

PROJECT NO. 954
TIP-23-117-EFD

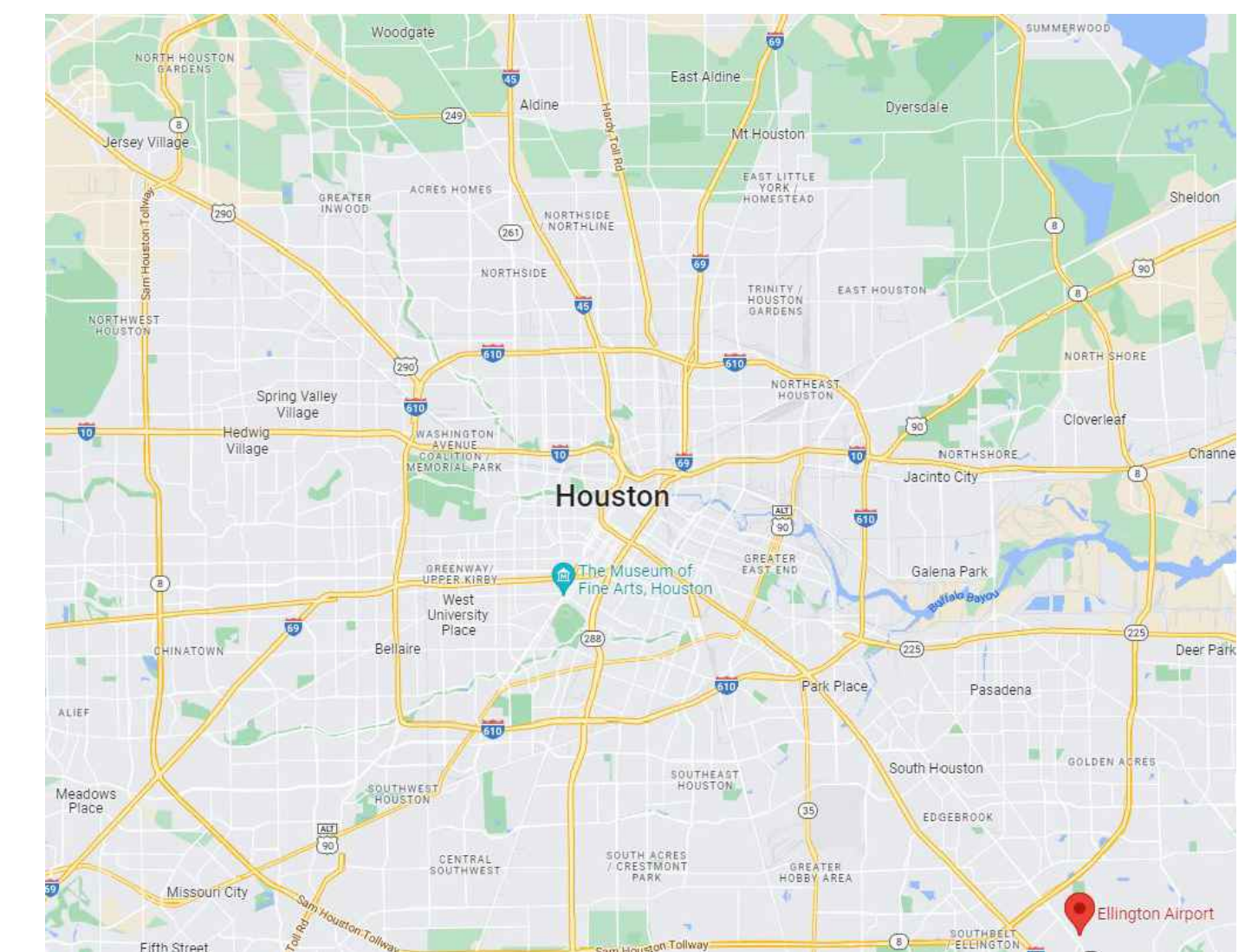
PREPARED BY



AUGUST 14, 2023
100% BID SET



VICINITY MAP
N.T.S.



LOCATION MAP
N.T.S.

ATKINS
Member of the SNC-Lavalin Group
LOCAL OFFICE:
920 MEMORIAL CITY WAY
STE. 400
HOUSTON, TX 77024
TEL: (713) 576-8500
ATKINS NORTH
AMERICA PE FIRM REG.
#F-000474
WWW.ATKINSGLOBAL.COM

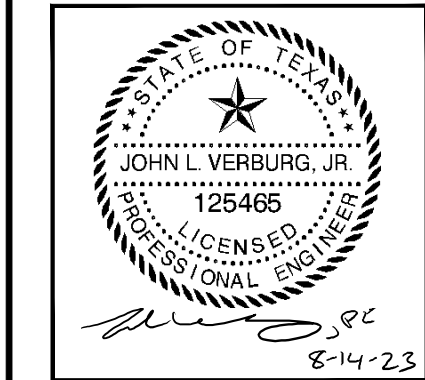
REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)

CULVERT RECONSTRUCTION & SHEET INDEX, ABBREVIATIONS & SUMMARY OF QUANTITIES

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467

A.I.P. NO.

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954

SHEET NO.

SUMMARY OF QUANTITIES				
ITEM NUMBER	SPEC. ITEM	DESCRIPTION	UNIT	QUANTITY
1	1555-100	TRAFFIC CONTROL AND REGULATION	LS	1
2	1555-300	FLAGMEN	LS	1
3	1578-101	CONTROL OF GROUND AND SURFACE WATER (OPEN-CUT EXCAVATION)	LS	1
4	2260-100	TRENCH SAFETY SYSTEM FOR TRENCH EXCAVATIONS	LF	25
5	2714-103	FLEXIBLE BASE COURSE FOR TEMPORARY DRIVEWAYS, CUSTOM PROPERTY	EA	1
6	2741-250	TYPE D HOT MIX ASPHALT CONCRETE SURFACING	TON	30
7	C-102-5.1	TEMPORARY EROSION CONTROL	LS	1
8	C-105-6.1	MOBILIZATION	LS	1
9	P-101-5.1	REMOVAL OF ASPHALT PAVEMENT	SY	305
10	P-101-5.2	REMOVAL OF 24-INCH PIPE	LF	37
11	P-101-5.3	REMOVAL OF 48-INCH PIPE	LF	16
12	P-101-5.4	REMOVAL OF 60-INCH PIPE	LF	250
13	P-151-4.1	CLEARING AND GRUBBING	AC	1.75
14	P-151-4.2	REMOVAL OF WOOD DEBRIS	CY	170
15	P-151-4.3	REMOVAL OF CONCRETE STRUCTURES	CY	45
		SOUTH CULVERT	AC	1
		NORTH CULVERT	AC	0.75
16	P-152-4.1	EXCAVATION, SUBGRADE, AND EMBANKMENT	CY	2800
		SOUTH CULVERT	CY	2500
		NORTH CULVERT	CY	300
17	P-155-8.1	LIME-TREATED SUBGRADE	SY	367
18	P-155-8.2	LIME - FOR LIME-TREATED SUBGRADE	LB	24000
19	P-219-5.1	RECYCLED CONCRETE AGGREGATE BASE COURSE	TON	95
20	D-701-5.1	24-INCH DIAMETER RCP STORM SEWER BY OPEN CUT	LF	36
21	D-701-5.2	24-INCH DIAMETER CMP STORM SEWER OUTFALL	LF	62
22	D-701-5.3	48-INCH DIAMETER CMP STORM SEWER OUTFALL	LF	16
23	D-701-5.4	8-FOOT BY 8-FOOT BOX STORM SEWER BY OPEN CUT	LF	192
24	D-751-5.1	TYPE E INLET (PRECAST)	EA	1
25	D-752-5.1	HEADWALL INCLUDING WINGWALLS (CAST-IN-PLACE) [NORTH]	EA	1
26	D-752-5.2	HEADWALL INCLUDING WINGWALLS (CAST-IN-PLACE) [SOUTH]	EA	2
27	T-901-5.1	SEEDING	AC	1.5
		SOUTH CULVERT	AC	1
		NORTH CULVERT	AC	0.5
28	T-904-5.1	SODDING	SY	630
		SOUTH CULVERT	SY	500
		NORTH CULVERT	SY	130
29	HCFC02376-02	CONCRETE CHANNEL LINING, 5-INCH NOMINAL THICKNESS	SY	95
30	HCFC02376-06	BACKSLOPE INTERCEPTOR STRUCTURE	SY	12
31	TxDOT 432-6026	RIPRAP (STONE COMMON)(DRY)(18-INCH)	CY	175
32	TxDOT 169-6001	SOIL RETENTION BLANKET	SY	3300
33	TxDOT 540-6002	METAL W-BEAM GUARD FENCE (STEEL POST)	LF	82
34	TxDOT 540-6005	TERMINAL ANCHOR SECTION	EA	2

ABBREVIATIONS			
@	AT	INV	INVERT
AC	ASPHALT CONCRETE	JT	JOINT
AGG	AGGREGATE	LF	LINEAR FEET
AGL	ABOVE GROUND LEVEL	MATL	MATERIAL
AOA	AIR OPERATIONS AREA	MAX	MAXIMUM
APPROX.	APPROXIMATE	MBC	MULTIPLE BOX CULVERT
ARFF	AIRCRAFT RESCUE FIREFIGHTING STATION	MH	MANHOLE
		MIN	MINIMUM
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS	NA	NOT APPLICABLE
		NASA	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ATCT	AIRPORT TRAFFIC CONTROL TOWER	NTS	NOT TO SCALE
BC	BEGIN CURB	OC/O.C	ON CENTER
BL	BASELINE	OFF	OFFSET
BLDG.	BUILDING	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
BLVD	BOULEVARD	PAPI	PRECISION APPROACH PATH INDICATOR
BP	BEGIN POINT	PC	POINT OF CURVATURE
BRL	BUILDING RESTRICTION LINE	PCC	PORTLAND CEMENT CONCRETE
BVCE	BEGIN VERTICAL CURVE ELEVATION	PI	POINT OF INTERSECTION
BVCS	BEGIN VERTICAL CURVE STATION	PM	PROJECT MANAGER
CJ	CONSTRUCTION JOINT	PT	POINT OF TANGENCY
CL	CENTERLINE	PVC	POLYVINYL CHLORIDE
CLR	CLEAR	PVMT	PAVEMENT
CLSM	CONTROLLED LOW STRENGTH MATERIAL	R	RADIUS
CMP	CORRIGATED METAL PIPE	R/W, RW	RUNWAY
		RCB	REINFORCED CONCRETE BOX
CRCP	CONSTRUCTION MANAGEMENT PLAN	RCP	REINFORCED CONCRETE PIPE
		RCCP	REINFORCED CONCRETE CEMENT PAVEMENT
		REINF	REINFORCED
CONC	CONCRETE	REQ'D	REQUIRED
DET	DETAIL	ROFA	RUNWAY OBJECT FREE AREA
DI	DROP INLET	RPR	RESIDENT PROJECT REPRESENTATIVE
DIA	DIAMETER	RSA	RUNWAY SAFETY AREA
DOD	DEPARTMENT OF DEFENCE	SAWS	SAN ANTONIO WATER SYSTEM
DWG	DRAWINGS	SD	STORM DRAIN
EA	EACH	SDDI	STORM DRAIN INLET
ELEV	ELEVATION	SDMH	STORM DRAIN MANHOLE
EOP	EDGE OF PAVEMENT	SF	SQUARE FEET
EP	END POINT	SS	SANITARY SEWER
EVCE	END VERTICAL CURVE STATION	SSMH	SANITARY SEWER MANHOLE
EVCS	END VERTICAL CURVE ELEVATION	STD	STANDARD
EW	EACH WAY	SY	SQUARE YARD
EX/EXIST.	EXISTING	SYMM	SYMMETRICAL
FAA	FEDERAL AVIATION ADMINISTRATION	TDG	TAXIWAY OR TAXILANE DESIGN GROUP
FG	FINISH GRADE	T&B	TOP AND BOTTOM
FL	FLOW	T/L, TL	TAXILANE
FO	FIBER OPTIC	T/W, TW	TAXIWAY
FT	FOOT/FEET	TOFA	TAXIWAY OBJECT FREE AREA
G	GAS	TSA	TAXIWAY SAFETY AREA
GALV	GALVANIZED	UON	UNLESS OTHERWISE NOTED
GB	GRADE BREAK	VC	VERTICAL CURVE
HMAC	HOT MIX ASPHALT CONCRETE	W/O	WITHOUT
HORIZ	HORIZONTAL	WWF	WELDED WIRE FABRIC
HT	HEIGHT		
ID	INSIDE DIAMETER		
I.E.	INVERT ELEVATION		
IN	INCH		

SHEET INDEX		
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6	G006	NORTH CONSTRUCTION SAFETY AND PHASING PLAN
7	G007	SURVEY CONTROL PLAN
8	G008	BORING LOG DETAILS
NORTH CULVERT CIVIL PLAN SHEETS AND DETAILS		
9	E101	EXISTING CONDITIONS PLAN
10	CD101	PROPOSED DEMOLITION PLAN
11	CG201	PROPOSED GRADING AND DRAINAGE PLAN & PROFILE
12	CG501	DRAINAGE DETAILS NORTH WINGWALL (1 OF 2)
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17	CE101	EROSION CONTROL PLAN
SOUTH CULVERT CIVIL PLAN AND DETAILS		
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19	CS102	ROADWAY GEOMETRY PLAN AND PROFILE
20	CS202	TYPICAL PAVEMENT SECTION
21	CS203	PAVING DETAILS DOWNSTREAM ANCHOR TERMINAL
22	CS204	PAVING DETAILS TRAFFIC RAIL (1 OF 2)
23	CS205	PAVING DETAILS TRAFFIC RAIL (2 OF 2)
24	CS206	TRAFFIC CONTROL PLAN
25	CG202	GRADING AND DRAINAGE PLAN
26	CG302	CROSS SECTIONS (SHEET 1 OF 2)
27	CG303	CROSS SECTIONS (SHEET 2 OF 2)
28	CG506	DRAINAGE DETAILS BOX CULVERTS
29	CG507	DRAINAGE DETAILS BOX CULVERTS
30	CG508	DRAINAGE DETAILS WINGWALLS
31	CG509	DRAINAGE DETAILS WINGWALLS
32	CG510	DRAINAGE DETAILS TYPE E INLET
33	CG511	DRAINAGE DETAILS BACKSLOPE SWALE
34	CG512	DRAINAGE DETAILS BACKSLOPE INTERCEPTOR
35	CE102	EROSION CONTROL PLAN
36	CE202	EROSION CONTROL DETAILS

GENERAL NOTES

1. THE EXISTING CONDITIONS ILLUSTRATED WITHIN THESE PROJECT PLANS ARE DEVELOPED FROM SURVEY INFORMATION AND HAS PROVIDED RECORD DRAWINGS. THE DESIGNER DOES NOT WARRANT THESE EXISTING CONDITIONS INFORMATION AS ALL-INCLUSIVE OR EXACT BUT RATHER AS THE BEST AVAILABLE KNOWLEDGE TRANSFER AT THE TIME OF THE SURVEY COMPLETION BY LANDTECH, 03-05-2023.
2. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK. SHOULD THE CONTRACTOR DISCOVER ANY CONDITIONS NOT REFLECTED WITHIN THE PROJECT DOCUMENTS, THEY SHALL NOTIFY THE HAS REPRESENTATIVE IMMEDIATELY.
3. THE LOCATION FOR THE CONTRACTOR'S STAGING AREA AND HAUL ROUTE IS INDICATED ON SHEET G-004. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL UTILITY CONNECTIONS AND SERVICE TO AND WITHIN THE STAGING AREA AS MAY BE NECESSARY. THE CONTRACTOR SHALL PROVIDE SECURITY, FENCING OR BARRICADES AROUND THE STAGING AREA(S) AS NEEDED. THE CONTRACTOR SHALL RESTORE THE STAGING AREA UPON PROJECT COMPLETION, INCLUDING REPAIR OF EXISTING FACILITIES, REMOVAL OF INSTALLED UTILITIES, REGRADING, TOP SOILING AND RESEEDING, COMPLETE AND TO THE SATISFACTION OF THE ENGINEER AND AIRPORT MANAGER. THE WORK ASSOCIATED WITH ESTABLISHING, MAINTAINING, DEMOBILIZING AND RESTORING THE CONTRACTOR'S STAGING AREA IS INCIDENTAL AND NOT MEASURED FOR SEPARATE PAYMENT.
4. ACCESS TO THE PROJECT SITE TO/FROM THE STAGING AREA SHALL BE VIA THE ROUTE SHOWN ON SHEET G-004.
5. THE CONTRACTOR SHALL SECURE MATERIALS STOCKPILED WITHIN THE CONSTRUCTION AREA TO PREVENT ITS MOVEMENT OR EROSION RESULTING FROM WIND CONDITION AND/OR RAINFALL. THE CONTRACTOR IS RESPONSIBLE FOR THE IMMEDIATE CLEANUP OF ANY DEBRIS ON PAVEMENTS WITHIN OR ADJACENT TO THE PROJECT WORK AREA. THE CONTRACTOR SHALL SWEEP AND/OR VACUUM ALL PAVEMENT AREAS AFFECTED BY THE WORK ON A DAILY BASIS. IN ADDITION, THE CONTRACTOR SHALL SWEEP/CLEAN PAVED ROADWAYS ALONG THE PROJECT HAUL ROUTES AND IMMEDIATELY CLEAN UP MUD, DEBRIS OR CONSTRUCTION MATERIALS FALLING ON ANY PAVEMENTS OUTSIDE OF THE LIMITS OF CONSTRUCTION OR RESULTING FROM HIS HAULING ACTIVITIES.
6. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS THAT ARE PERTINENT TO THIS WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN, MAINTAIN AND PAY ALL COSTS ASSOCIATED WITH ANY PERMITS AND LICENSES REQUIRED TO ACCOMPLISH THE WORK. THESE COSTS ARE INCIDENTAL TO THE WORK AND WILL NOT BE PAID FOR SEPARATELY.
7. CONTRACTOR IS RESPONSIBLE FOR SELECTING, DESIGNING, CONSTRUCTING, MAINTAINING, AND MONITORING A GROUNDWATER CONTROL SYSTEM AND ADAPT OPERATIONS TO ENSURE THE STABILITY OF THE EXCAVATIONS AND THE QUALITY OF THE SUBGRADE PREP WORK.
8. MATERIAL PRODUCED AS A RESULT OF THE CONTRACTOR'S OPERATIONS THAT ARE NOT OTHERWISE USEABLE BY THE AIRPORT SHALL BE DISPOSED OF OFF AIRPORT PROPERTY IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. THERE WILL BE NO SEPARATE PAY ITEM FOR WASTE MATERIAL DISPOSAL.
9. MECHANICAL SWEEPER AND/OR VACUUM TRUCK SHALL BE ON-SITE AT ALL TIMES TO CLEAN ANY DEBRIS OFF THE ROADWAY PAVEMENTS FOR THE DURATION OF ALL CONSTRUCTION ACTIVITIES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ACTIVITIES WITH THE APPROPRIATE ENTITY, INCLUDING BUT NOT LIMITED TO HAS, AND CITY OF HOUSTON.
11. CONTRACTOR SHALL REFER TO CONSTRUCTION SAFETY AND PHASING PLAN FOR EMPLOYEE PARKING, TEMPORARY SAFETY ITEMS, AND OTHER INFORMATION NECESSARY TO COMPLETE THE PROJECT.
12. DEMOBILIZATION SHALL BE COMPLETED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AND THE ENGINEER, AS APPROPRIATE, AND SHALL BE COMPLETED IN A MANNER THAT WILL MINIMIZE INCONVENIENCE AIRPORT OPERATIONS. ANY DAMAGE TO THE AIRPORT FACILITIES DURING DEMOBILIZATION SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
13. ALL APPLICABLE PERMITS FOR CONSTRUCTION AND EQUIPMENT ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. COPIES OF ALL PERMITS SHALL BE PROVIDED AS SUBMITTALS IN ACCORDANCE WITH SECTION 01330 - SUBMITTAL PROCEDURES AND ARE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.
14. THE PROJECT PAY ITEMS PROVIDED SHALL BE INCLUSIVE OF ALL WORK TO BE PERFORMED AS SHOWN IN THE PLANS OR DESCRIBED IN THE SPECIFICATIONS. ANY WORK THAT IS NOT PAID FOR DIRECTLY BY A SPECIFIC BID ITEM SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF PROJECT PAY ITEMS OF WHICH IT IS A COMPONENT.

STANDARD NOTES FOR CONSTRUCTION DRAWINGS (HCFCD):

1. OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY.
2. NOTIFY THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S PROPERTY MANAGEMENT DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. SUBMIT THE HCFCD 48 HOUR PRE-CONSTRUCTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORP'S ENGINEERS INDIVIDUAL SECTION 404 PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: PROPERTY MANAGEMENT DEPT. BY HAND DELIVERY, OR FAX TO 713-684-4129 (FAX NUMBER).
3. ENGINEER SHALL SUBMIT CERTIFICATION LETTER AND RECORD DRAWINGS TO THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S PROPERTY MANAGEMENT DEPARTMENT REQUESTING INSPECTION OF ITEMS CONSTRUCTED IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FLAGGED.
4. PROTECT, MAINTAIN, AND RESTORE EXISTING BACKSLOPE DRAINAGE SYSTEMS.
5. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
6. ESTABLISH TURF GRASS ON ALL DISTURBED AREAS WITHIN THE CHANNEL OR DETENTION RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM AND WHERE STRUCTURAL EROSION MEASURES ARE USED. MINIMUM ACCEPTANCE CRITERIA ARE 75% COVERAGE OF LIVE BERMUDA GRASS AND NO EROSION OR RILLS DEEPER THAN 4". ANY DISTURBED AREAS OUTSIDE THE SPECIFIED PROJECT LIMITS SHALL BE IMPROVED AND MAINTAINED AT THE CONTRACTOR'S EXPENSE.
7. BACKFILL IN ACCORDANCE WITH THE HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATION, SECTION 02315 - EXCAVATING AND BACKFILLING, OR EQUIVALENT.
8. EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATION AS SHOWN ON PLANS AND DOWNSTREAM, AS NECESSARY, TO ENSURE NO WATER REMAINS IN THE FACILITY (STORM SEWER, LATERAL CHANNEL, OR DRY BOTTOM DETENTION BASIN) DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL, SO THE FACILITY WILL FUNCTION AS INTENDED. FOR WET BOTTOM DETENTION BASINS, ENSURE NO WATER IS ABOVE THE DESIGN LEVEL IN THE WET BOTTOM DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL.
9. MAINTAIN FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORE CHANNEL TO ORIGINAL CONDITION.
10. REMOVE ALL EXCAVATED MATERIAL FROM THE HARRIS COUNTY FLOOD CONTROL DISTRICT OR DRAINAGE RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN A DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT FROM THE APPROPRIATE JURISDICTIONAL AUTHORITY.

AIRPORT SAFETY REQUIREMENTS

1. THE CONTRACTOR SHALL ACQUAINT HIS SUPERVISORS AND EMPLOYEES OF THE AIRPORT ACTIVITY AND OPERATIONS THAT ARE INHERENT TO THIS AIRPORT AND SHALL CONDUCT THE CONSTRUCTION ACTIVITIES TO CONFORM TO ALL ROUTINE AND EMERGENCY AIR TRAFFIC REQUIREMENTS AND GUIDELINES ON SAFETY AS SPECIFIED HEREIN.
2. ALL CONTRACTOR VEHICLES AND TRAFFIC SHALL REMAIN WITHIN THE DESIGNATED CONSTRUCTION LIMITS OR HAUL ROUTES. NO CONTRACTOR VEHICLES WILL BE ALLOWED ON ACTIVE AIRFIELD PAVEMENTS, UNLESS OTHERWISE APPROVED BY AIRPORT OPERATIONS.
3. ALL CONTRACTOR VEHICLES AND EQUIPMENT THAT AREA AUTHORIZED TO OPERATE ON THE AIRPORT IN THE ACTIVE AOA SHALL MEET THE FOLLOWING REQUIREMENTS:
 - 3.a. DISPLAY A COMPANY LOGO/PLACARD IDENTIFYING THE VEHICLE WITH BLOCK-TYPE CHARACTERS OF CONTRASTING COLOR THAT ARE EASILY LEGIBLE AT 50 FEET;
 - 3.b. DISPLAY A FLASHING AMBER (YELLOW) DOME-TYPE LIGHT ON TOP OF THE VEHICLE AND OF SUCH INTENSITY TO CONFORM TO LOCAL CODES FOR MAINTENANCE AND EMERGENCY VEHICLES. A 3 FT. X 3FT. OR LARGER ORANGE AND WHITE CHECKERBOARD FLAG, EACH CHECKERBOARD SQUARE BEING 1 FT. SQUARE, ABOVE THE VEHICLE MAY BE USED TO SUPPLEMENT THE FLASHING LIGHT OR FOR TRANSIENT VEHICLES DELIVERING MATERIALS DURING DAYTIME OPERATIONS ONLY;
 - 3.c. BE ESCORTED UNDER THE CONTROL OF ONE CONTRACTOR ESCORT MONITORING GROUND CONTROL RADIO FREQUENCY.
4. ANY VEHICLE OPERATING IN THE AOA DURING THE HOURS OF DARKNESS SHALL BE EQUIPPED WITH A FLASHING AMBER (YELLOW) DOME-TYPE LIGHT. VEHICLE AND EQUIPMENT IDENTIFICATION SHALL BE CONSIDERED PART OF THE EQUIPMENT PROVIDED BY THE CONTRACTOR AND SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.
5. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL NOT EXCEED 15 MPH WITHIN THE AOA AND HAVE A MAXIMUM OPERATING HEIGHT OF 25 FT.
6. STOCKPILE EROSION AND DUST CONTROL - SPECIAL ATTENTION TO DUST CONTROL WILL BE REQUIRED WHEN EARTHWORK OR HAULING OPERATIONS ARE IN PROGRESS OR WHEN WIND AND WEATHER CONDITIONS CAUSE EXCESSIVE BLOWING OF DUST. IN THIS REGARD, THE CONTRACTOR SHALL APPLY WATER OR APPROVED CHEMICAL DUST CONTROLS TO THE AFFECTED SITES AS DIRECTED. STOCKPILED MATERIAL AND OPEN EXCAVATIONS SHALL BE TREATED IN SUCH A MANNER AS TO PREVENT MOVEMENT RESULTING FROM WIND CONDITIONS.
7. PRIOR TO OPENING FOR PUBLIC TRANSIT USE, THE OWNER'S AUTHORIZED REPRESENTATIVE WILL ARRANGE FOR INSPECTION BY HAS OPERATIONS OF ANY PAVEMENT THAT HAS BEEN CLOSED FOR WORK, OR THAT HAS BEEN USED FOR A CROSSING POINT OR HAUL ROUTE BY THE CONTRACTOR. THIS AREA MUST COMPLY WITH THE SAFETY REQUIREMENTS, AND APPROVED BY THE DESIGNATED OPERATION'S INSPECTOR, BEFORE PERMISSION FOR THE CONTRACTOR'S WORK CREWS TO DEPART WILL BE GRANTED.
8. THE CONTRACTOR SHALL SUBMIT A DESTRUCTIVE/INCLEMENT WEATHER PLAN TO SET FORTH GENERAL GUIDANCE AND INFORMATION FOR THE CONTRACTOR TO COORDINATE PREPAREDNESS PLANS WHEN DESTRUCTIVE WEATHER THREATENS ELLINGTON FIELD AIRPORT.
9. MATERIALS STORED OR STOCKPILED ON THE SITE SHALL BE SO PLACED, AND THE WORK SHALL AT ALL TIMES, BE SO CONDUCTED AS TO CAUSE NO GREATER OBSTRUCTION TO THE TRAFFIC THAN IS CONSIDERED NECESSARY BY THE OWNER'S REPRESENTATIVE.
10. THE CONTRACTOR SHALL CONFINE THEIR PERSONNEL, EQUIPMENT, OPERATIONS AND TRAVEL, TO THE AREA WITHIN THE DEFINED WORK LIMITS SHOWN ON THE PLANS.
11. THE CONTRACTOR SHALL INFORM ALL CONSTRUCTION PERSONNEL AS TO THE PROPER ROUTES, SPEEDS, AND PROCEDURES, FOR TRANSPORTING EQUIPMENT AND MATERIALS TO THE CONSTRUCTION SITE. DELIVERIES SHALL BE AS SHOWN IN THE PLANS.
12. MEASURES SHALL BE ADOPTED TO PREVENT POTENTIAL POLLUTANTS FROM ENTERING ANY DRAINAGE SYSTEM OR WATERWAY. MATERIALS AND DEBRIS SHALL NOT BE STORED IN THE WORK AREA IN A MANNER THAT WOULD ALLOW THEM TO ENTER THE DRAINAGE SYSTEM AS A RESULT OF SPILLAGE, NATURAL RUNOFF OR FLOODING. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY NOTIFY THE SPONSOR SHOULD THERE BE A SPILLAGE OF MATERIAL WHICH MIGHT CONTAMINATE THE DRAINAGE SYSTEM. IT SHALL ALSO BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND CLEAR UP SUCH SPILLAGE IN A MANNER ACCEPTABLE TO THE SPONSOR. MATERIAL SHALL BE SECURED SO THAT IT WILL NOT BE BLOWN BY THE WIND ONTO THE ADJACENT ROADWAYS.
13. THE CONTRACTOR SHALL SUBMIT A SAFETY AND SECURITY PLAN, SAFETY PLAN COMPLIANCE DOCUMENT AND CONSTRUCTION SAFETY AND PHASING PLAN TO THE HAS PROJECT MANAGER FOR REVIEW AND APPROVAL BY THE AIRPORT PRIOR TO CONSTRUCTION COMMENCING.

LEGEND

---24"SD---SD---	EXISTING STORM DRAIN	---	---	EXISTING ELECTRICAL DUCTBANK
---	EXISTING WATERLINE	---	---	EXISTING FIBER OPTIC / ELECTRICAL LINE
---	EXISTING SANITARY SEWER	---	FO/E---	EXISTING ELECTRICAL LINE
---	EXISTING TAXIWAY SAFETY AREA	---	DEB---	EXISTING FENCE
---	EXISTING TAXIWAY OBJECT FREE AREA	---	X---	---
---	EXISTING BUILDING RESTRICTION LINE	GPS07	MON	SURVEY MONUMENT
---	EXISTING FAA DUCTBANK	ACP 100	---	ATKINS CONTROL POINT
---	EXISTING ABANDONED FAA DUCTBANK	---	---	EXISTING STORM DRAIN INLET
---	EXISTING UNDERGROUND ELECTRICAL	---	---	EXISTING BLANK BASE CAN
---	EXISTING ELECTRICAL POWER LINE	---	---	EXISTING TAXIWAY EDGE LIGHT
---	---	---	---	EXISTING SIGN

AIRPORT SECURITY REQUIREMENTS:

1. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE AIRPORT SECURITY PLAN AND WITH THE SECURITY REQUIREMENTS SPECIFIED HEREIN AND AS REQUIRED BY AIRPORT OPERATIONS. THE CONTRACTOR SHALL DESIGNATE TO THE OWNER AND AIRPORT OPERATIONS, IN WRITING, THE NAME OF HIS "CONTRACTOR SECURITY AND SAFETY OFFICER (CSSO)". THE CSSO SHALL REPRESENT THE CONTRACTOR ON THE SECURITY REQUIREMENTS FOR THE CONTRACT.
2. THE CSSO SHALL BE RESPONSIBLE FOR BRIEFING ALL CONTRACTOR PERSONNEL ON SECURITY REQUIREMENTS. ALL NEW CONTRACTOR EMPLOYEES SHALL BE BRIEFED ON SECURITY REQUIREMENTS PRIOR TO WORKING IN THE CONSTRUCTION AREA. THE AIRPORT SHALL BRIEF AND/OR TRAIN CONSTRUCTION RELATED VEHICLE EQUIPMENT DRIVERS ON OPERATIONS WITHIN AN AIRPORT/AIRCRAFT ENVIRONMENT. THE OWNER SHOULD PROVIDE PRINTED MATERIALS TO EACH VEHICLE OPERATOR THAT DEPICTS HAUL ROUTES, PROHIBITED MOVEMENT AREAS, AND DESCRIBES THE CONSEQUENCES FOR NON-COMPLIANCE WITH ESTABLISHED PROCEDURES. THE AIRPORT HAS IMPLEMENTED A ZERO TOLERANCE APPROACH TO DRIVING VIOLATIONS.
3. THE CONTRACTOR SHALL BE REQUIRED TO ATTEND A SPECIAL SECURITY MEETING WITH AIRPORT SECURITY PERSONNEL PRIOR TO CONSTRUCTION OPERATIONS OR THE USE OF ANY ACCESS GATES. THIS MEETING MUST BE ATTENDED BY THE CONTRACTOR'S SENIOR FIELD STAFF, INCLUDING BUT NOT LIMITED TO, SUPERINTENDENTS AND TEAM LEADERS.
4. ALL CONTRACTOR TRAFFIC AUTHORIZED TO ENTER THE AOA SHALL BE EXPERIENCED IN THE ROUTE OR GUIDED BY AN AIRPORT APPROVED AND BADGED ESCORT VEHICLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL TO AND FROM THE VARIOUS CONSTRUCTION AREAS ON THE SITE, AND FOR THE OPERATION AND SECURITY OF THE ACCESS GATE TO THE SITE. THE CONTRACTOR SHALL NOT PERMIT ANY UNAUTHORIZED CONSTRUCTION PERSONNEL OR TRAFFIC ON THE SITE AND SHALL PROHIBIT "PIGGYBACKING" OF MULTIPLE VEHICLES BEHIND AN AUTHORIZED VEHICLE. ACCESS GATES SHALL BE LOCKED AND SECURED AT ALL TIMES WHEN NOT ATTENDED BY THE CONTRACTOR. ANY DIRECTIONAL SIGNAGE FROM THE ACCESS GATE ALONG THE DELIVERY ROUTE TO PROJECT SITE(S) SHALL BE AS DIRECTED BY AIRPORT OPERATIONS.
5. THE CONTRACTOR SHALL FURNISH TO THE GATE GUARD A LIST OF AUTHORIZED DELIVERY VEHICLES TO ENTER THE GATE AND RECORD THE VEHICLE LICENSE PLATE, TIME IN, AND TIME OUT FOR EACH VEHICLE USING THE GATE. THE GATE GUARD WILL ISSUE A NUMBERED PERMIT WITH A PROJECT SPECIFIC COLOR TO EACH DELIVERY VEHICLE FOR PLACEMENT IN THE FRONT WINDOW. THIS PERMIT WILL BE ISSUED UPON THE FIRST ENTRY TO THE SITE OF THE DAY, AND COLLECTED UPON THE FINAL EXIT FROM THE SITE AT THE END OF THE DAY.
6. ALL MATERIAL DELIVERIES WILL USE THE STREET NAME ASSIGNED TO THE ACCESS POINT AT THE CONTRACTOR'S STAGING AREA AS SHOWN IN THE PLANS. THE NAME "ELLINGTON AIRPORT" SHALL NOT BE USED IN THE DELIVERY ADDRESS AT ANY TIME. THIS WILL PRECLUDE DELIVER TRUCKS FROM ENTERING INTO THE TERMINAL COMPLEX, OR TAKING SHORT CUTS THROUGH THE PERIMETER GATES AND INADVERTENTLY ENTERING INTO THE AOA.
7. ALL CONTRACTOR EMPLOYEES, SUBCONTRACTORS, AGENTS, VENDORS, INVITEES, ETC., REQUIRING ACCESS TO THE CONSTRUCTION SITE SHALL, IN ACCORDANCE WITH THE AIRPORT OPERATIONS SECURITY PROGRAM, BE REQUIRED TO DISPLAY AIRPORT ISSUED IDENTIFICATION OR BE UNDER AIRPORT APPROVED AND BADGED ESCORT PERSONNEL.
8. ALL PERSONNEL OPERATING A VEHICLE WITHIN HE AOA SHALL OBTAIN ALL NECESSARY TRAINING AS REQUIRED BY AIRPORT OPERATIONS.
9. ANYONE FOUND IN VIOLATION OF AIRPORT RULES, REGULATIONS, AND/OR SAFETY PLAN MUST BE PROMPTLY AND PERMANENTLY REMOVED FROM THE JOB SITE AND MAY BE SUBJECT TO ARREST FOR ALL PUNISHABLE STATE AND FEDERAL OFFENSES.
10. THE CONTRACTOR WILL BE RESPONSIBLE FOR FURNISHING AND MAINTAINING THE NECESSARY BARRICADES AND HAZARD LIGHTING AS REQUIRED BY THE SPECIFICATIONS.

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PLOT DATE: 2023-08-15



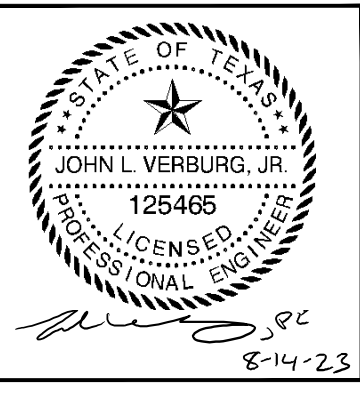
ATKINS
Member of the SNC-Lavalin Group
LOCAL OFFICE:
920 MEMORIAL CITY WAY
STE. 400
HOUSTON, TX 77024
TEL: (713) 576-8500
ATKINS NORTH
AMERICA PE FIRM REG.
#F-000474
WWW.ATKINSGLOBAL.COM

REVISIONS

NO.	DESCRIPTION	DATE	BY

ELLINGTON AIRPORT (EFD)
CULVERT RECONSTRUCTION
GENERAL & SAFETY NOTES

PROJECT MGR: JV
DESIGNER: JDP
DRAWN BY: JDP
CHECK BY: AC
SCALE:
DATE: 08/14/2023



APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO.
954

SHEET NO.

G003

HAS FILE: C:\PW\WORK\ATKINS\ATKINS\G0UC4236\DOT06118\E231715C-G-004.DWG
 PLOT DATE: 2023-08-15

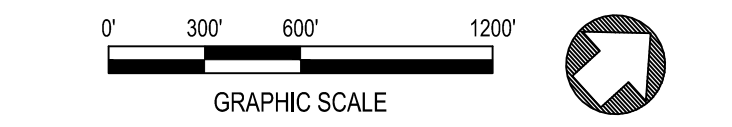


LEGEND

- HAUL ROUTE
- ▲ W1-1R SIGN
- CONTRACTOR STAGING AND STORAGE AREAS
- PROPOSED PROJECT SITE
- BORROWING LOCATION SEE G010

NOTES

1. ALL AOA PAVEMENT SURFACES SHALL BE OPEN FOR AIRPORT OPERATIONS AT ALL TIMES UNLESS OTHERWISE DESIGNATED AND APPROVED BY THE RPR FOR SPECIFIC CONSTRUCTION WORK PERIODS. THE PERIMETER ROAD SHALL REMAIN OPERATIONAL AT ALL TIMES. THE AOA CONSISTS OF THE AREA INSIDE THE PERIMETER SECURITY FENCE.
2. PRIOR TO THE START OF EACH WORK DAY, THE CONTRACTOR SHALL COORDINATE EACH WORK PERIOD'S ACTIVITIES WITH AIRPORT OPERATIONS WHICH SHALL INCLUDE A CLOSURE AND BARRICADE PLAN FOR REVIEW AND APPROVAL. NO WORK WILL BE ALLOWED WITHIN THE AOA UNLESS IT HAS BEEN COORDINATED WITH AIRPORT OPERATIONS.
3. CONTRACTOR SHALL COORDINATE STAGING AREA SITE AND ACCESS WITH THE RPR.
4. MAIN ACCESS TO THE PROJECT SITE SHALL BE THROUGH GATE W-21. CONTRACTOR TO SUPPLY GATE GUARD.
5. PRIOR TO LEAVING THE WORK SITE EACH DAY, CONTRACTOR SHALL COORDINATE WITH OPERATIONS TO VERIFY BARRICADES ARE SET UP PROPERLY.
6. THE CONTRACTOR SHALL INSTALL AND CONSTRUCT THE TEMPORARY SERVICE ROAD. THE ROAD SHALL BE CONSTRUCTED USING CRUSH CONCRETE, C-SAND, OR ANOTHER APPROVED EQUAL MATERIAL. THE CONTRACTOR SHALL SUBMIT THE TEMPORARY ROAD DESIGN TO ENGINEER FOR REVIEW.
7. FLAGGER REQUIRED TO OPERATE THE GATE WITH ACCESS TO AIR-SIDE OPERATIONS. FLAGGER MUST BE FLUENT IN ENGLISH WITH NO PREVIOUS CRIMINAL RECORD. FLAGGER IS REQUIRED TO DOCUMENT ALL VEHICLES IN/OUT OF THE AOA, AND IS REQUIRED AT ANY TIME THERE IS MOVEMENT THROUGH THE GATE. THE GATE SHALL REMAIN CLOSED AND LOCKED AT ALL TIMES EXCEPT WHEN FLAGGER HAS CLEARED A VEHICLE TO PROCEED THROUGH.
8. BUILD TEMPORARY ACCESS ROAD AT MINIMUM 10' FROM EDGE OF SPOILS. CONTRACTOR TO CONFIRM LOCATION.
9. TEMPORARY STAGING AREAS AT PROJECT SITE MAY BE ALLOWED. HOWEVER, ALL EXCAVATED AND DEMO MATERIALS WILL BE REMOVED AND DISPOSED OF OFF-SITE. ANY STAGING AND/OR LAYDOWN AREAS TO BE COORDINATED WITH EFD OPERATIONS.



ATKINS
 Member of the SNC-Lavalin Group
 LOCAL OFFICE:
 920 MEMORIAL CITY WAY
 STE. 400
 HOUSTON, TX 77024
 TEL: (713) 576-8500
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 WWW.ATKINSGLOBAL.COM

REVISIONS

NO.	DESCRIPTION	DATE	BY

**ELLINGTON AIRPORT (EFD)
 CULVERT RECONSTRUCTION
 SITE LAYOUT, ACCESS PLAN AND
 CONSTRUCTION CONTROL PLAN**

PROJECT MGR: JV
 DESIGNER: JDP
 DRAWN BY: JDP
 CHECK BY: AC
 SCALE:
 DATE: 08/14/2023



APPROVED BY:

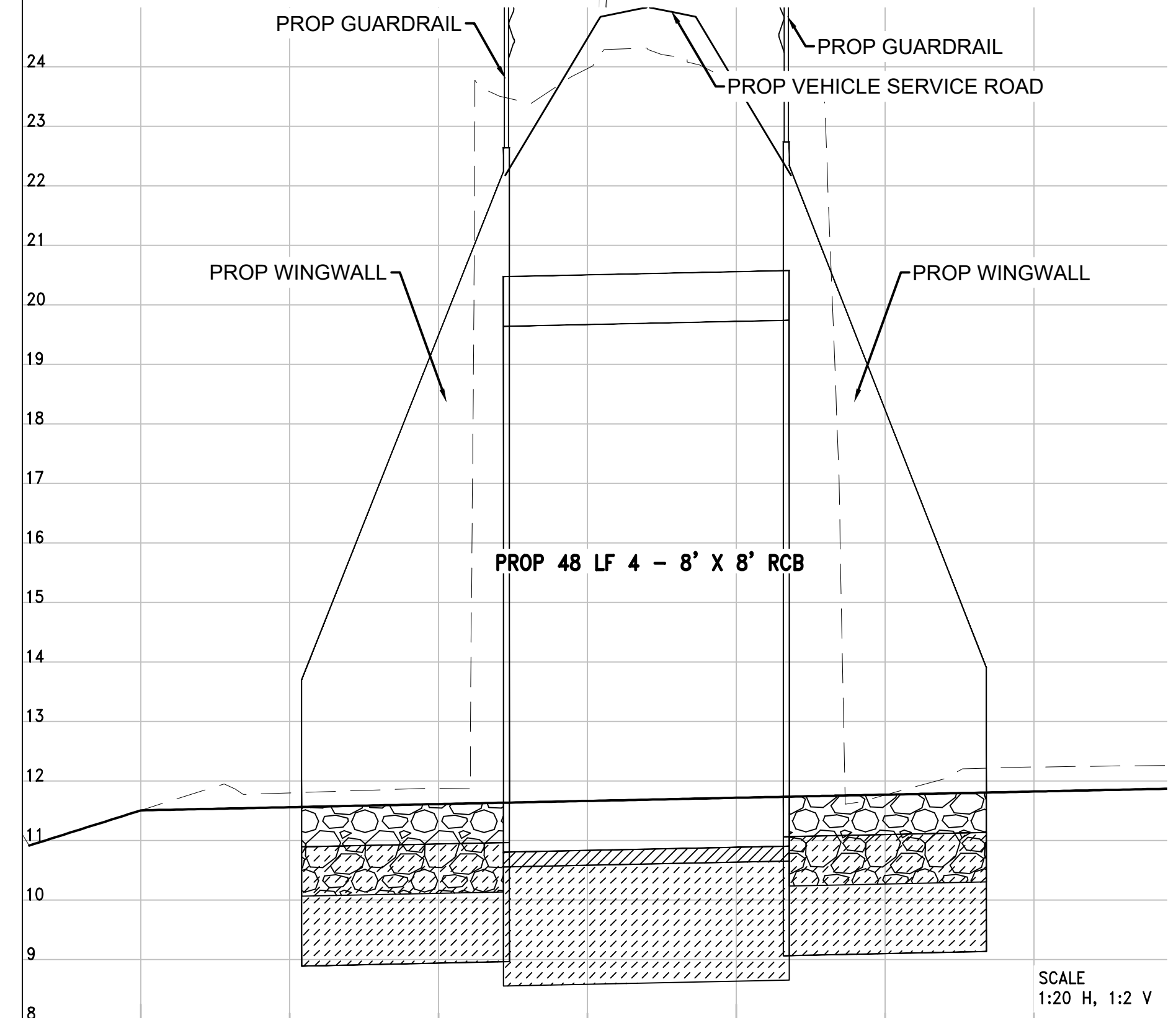
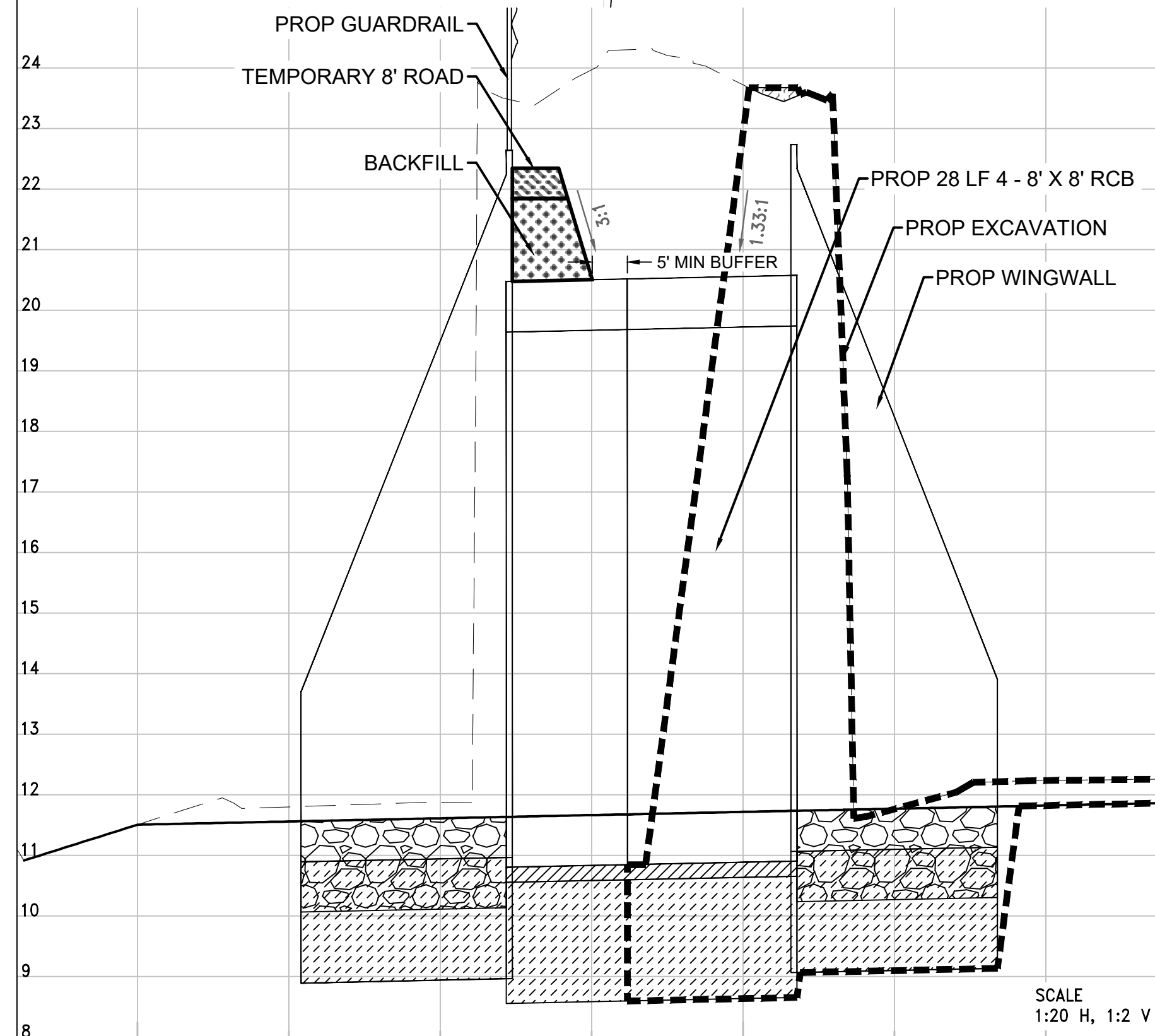
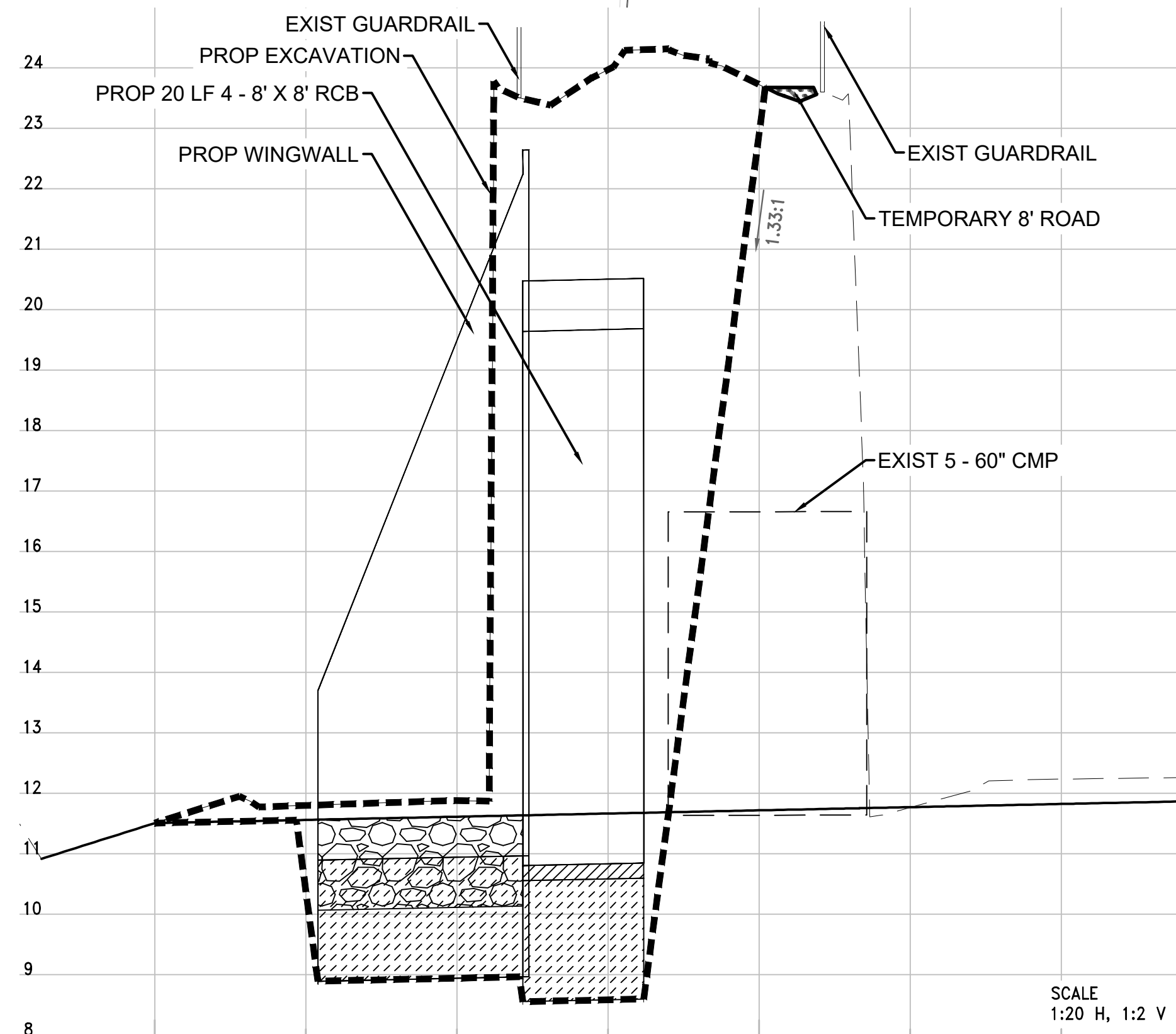
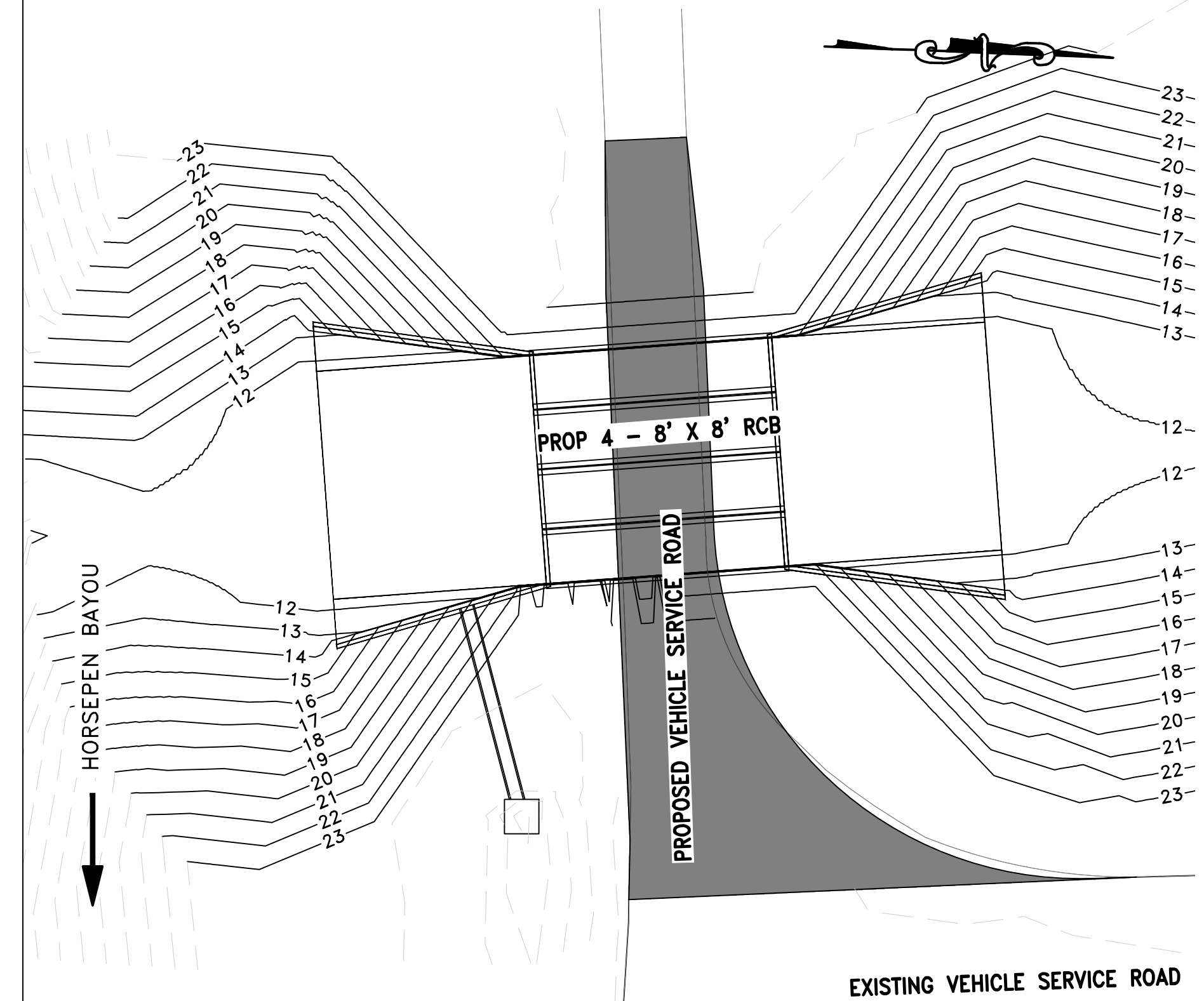
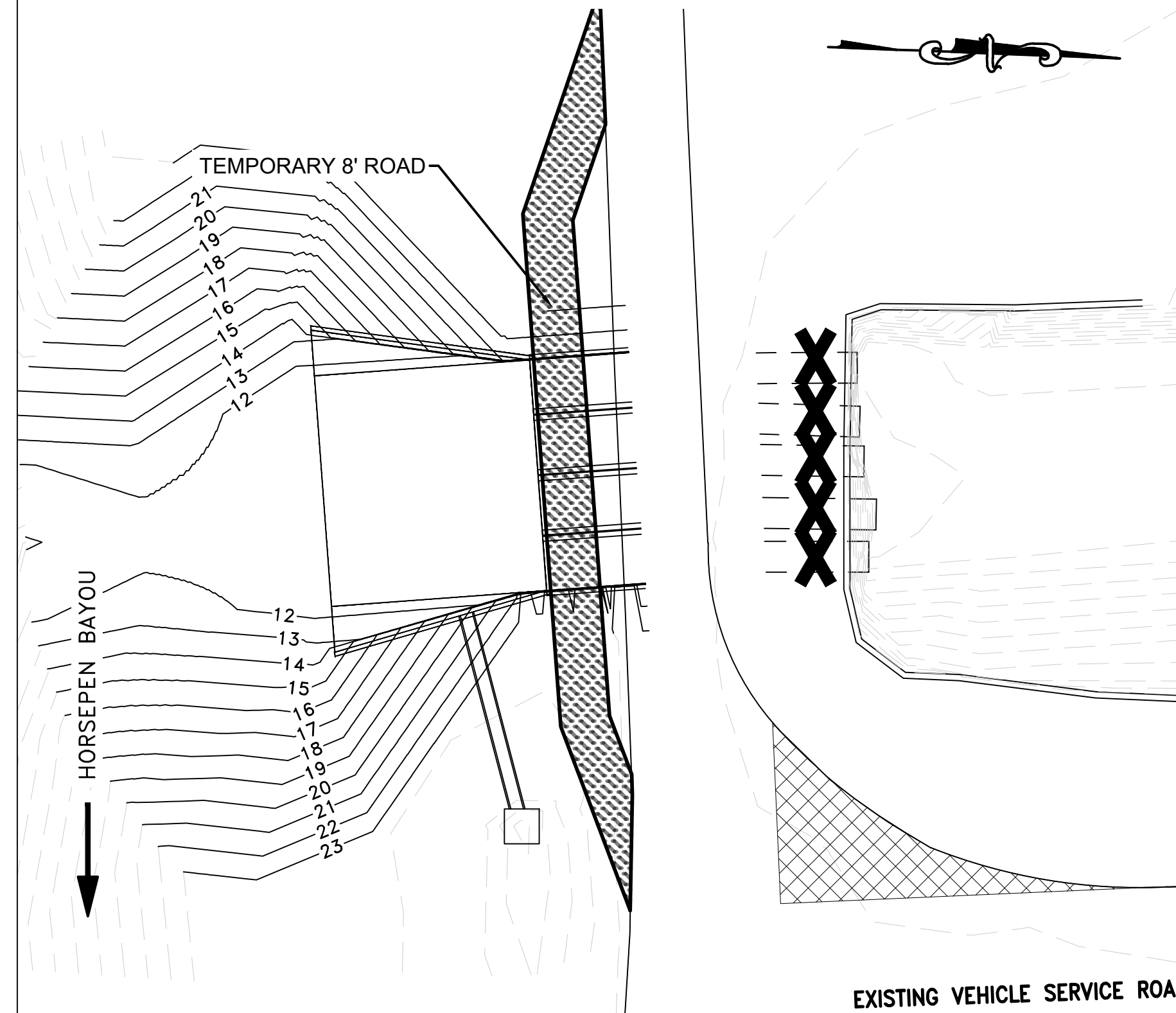
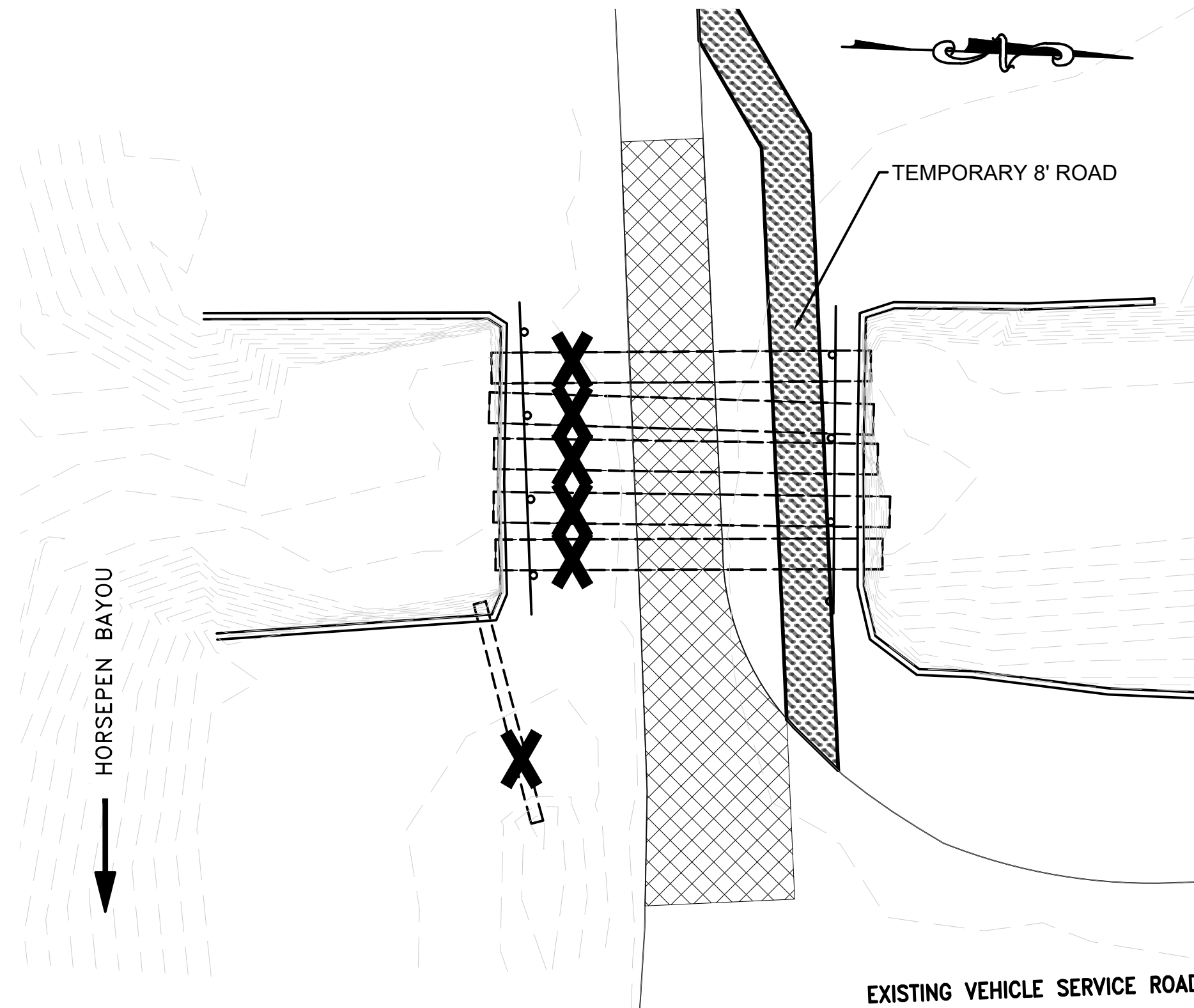
 DIRECTOR
 HOUSTON AIRPORT SYSTEM

PROJECT NO. 100082467
 A.I.P. NO. _____
 C.I.P. NO. _____
 H.A.S. NO. 954
 SHEET NO. _____

CONSTRUCTION PHASE 1

CONSTRUCTION PHASE 2

COMPLETE



SCALE 1:20 H, 1:2 V

SCALE 1:20 H, 1:2 V

SCALE 1:20 H, 1:2 V

LEGEND

- REMOVE EXIST STRUCTURE
- DEMOLISH EXIST PVMT
- PROP EXCAVATION
- TEMP ROADWAY
- PROP PVMT
- PROP BACKFILL
- PROP RIPRAP
- PROP CRUSHED CONCRETE BASE COURSE

NOTES

- CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING, CONSTRUCTING, AND MAINTAINING SAFE EXCAVATIONS. SEE GEOTECHNICAL REPORT, SECTION 5.1.4 FOR EXCAVATION STABILITY RECOMMENDATIONS.
- CONSTRUCTION PHASE 1**
 - DEMOLISH EXIST GUARDRAILS
 - CONSTRUCT TEMP 8' ROADWAY (NORTH SIDE). PROVIDE TRAFFIC CONTROL TO REDIRECT TRAFFIC TO TEMPORARY ROAD.
 - EXCAVATE, DEMOLISH EXIST CMPS, AND RECONSTRUCT 16 LF NEW 4 - 8' X 8' RCB AND WINGWALL (SOUTH SIDE).

CONSTRUCTION PHASE 2

- CONSTRUCT TEMP 8' ROADWAY (SOUTH SIDE) ON TOP OF NEWLY CONSTRUCTED 4 - 8' X 8' RCBS. PROVIDE TRAFFIC CONTROL TO REDIRECT TRAFFIC TO TEMPORARY ROAD.
- DEMOLISH TEMP 8' ROADWAY (NORTH SIDE)
- EXCAVATE, DEMOLISH EXIST CMPS, AND RECONSTRUCT 24 LF NEW 4 - 8' X 8' RCB AND WINGWALL (NORTH SIDE).

CONSTRUCTION PHASE 3

- DEMOLISH TEMP 8' ROADWAY (SOUTH SIDE)
- RECONSTRUCT NEW VEHICLE SERVICE ROAD
- INSTALL NEW GUARDRAILS
- ESTABLISH TURF

HOUSTON AIRPORT SYSTEM
 GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING
 10351 STELLA LINK RD
 HOUSTON, TEXAS 77025
 512-767-1009
 TBPE FIRM No. 20690

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD) SOUTH CULVERT RECONSTRUCTION AND SOUTH CONSTRUCTION SAFETY AND PHASING PLAN

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	
DATE:	9/1/2023



APPROVED BY: _____
 DIRECTOR
 HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

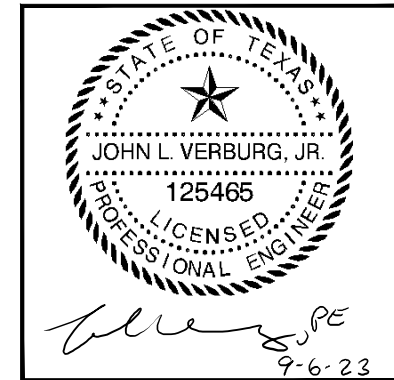
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REVISIONS

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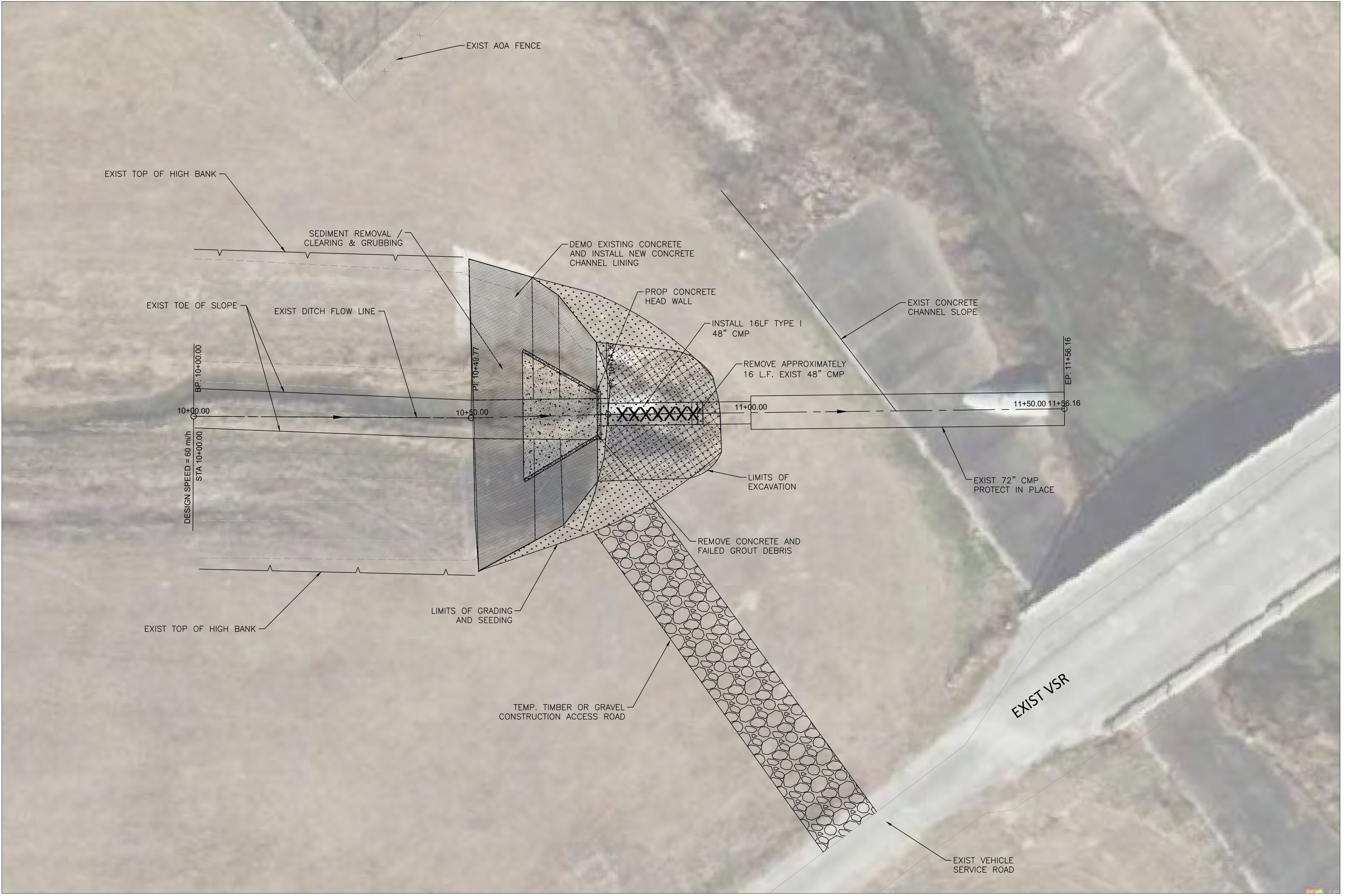
ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION AND NORTH CONSTRUCTION SAFETY AND PHASING PLAN

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/28/2023



APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

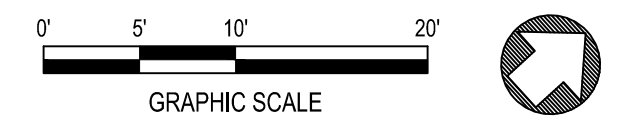


LEGEND

---	EXISTING DITCH FLOW LINE
X X X	PIPE REMOVAL
XXXX	EXCAVATION
▨	CONCRETE CHANNEL LINING
••••	PROPOSED SEEDING
▩	TEMP. CONST. ACCESS ROAD

NOTES

- PHASE 4 (30 CALENDAR DAYS)
- REMOVE EXISTING HEADWALL, CONCRETE CHANNEL LINING, AND SECTION(S) OF EXISTING PIPE
- INSTALL PROPOSED PIPE, NEW HEADWALL, AND CONCRETE CHANNEL LINING.
- CONTROL OF GROUND AND SURFACE WATER MUST BE MAINTAINED AT ALL TIMES AS SPECIFIED IN SPECIFICATION 01578.



ATKINS
Member of the SNC-Lavalin Group
LOCAL OFFICE:
920 MEMORIAL CITY WAY
STE. 400
HOUSTON, TX 77024
TEL: (713) 576-8500
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REVISIONS

NO.	DESCRIPTION	DATE	BY

ELLINGTON AIRPORT (EFD)
**CULVERT RECONSTRUCTION
SURVEY CONTROL PLAN**

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023

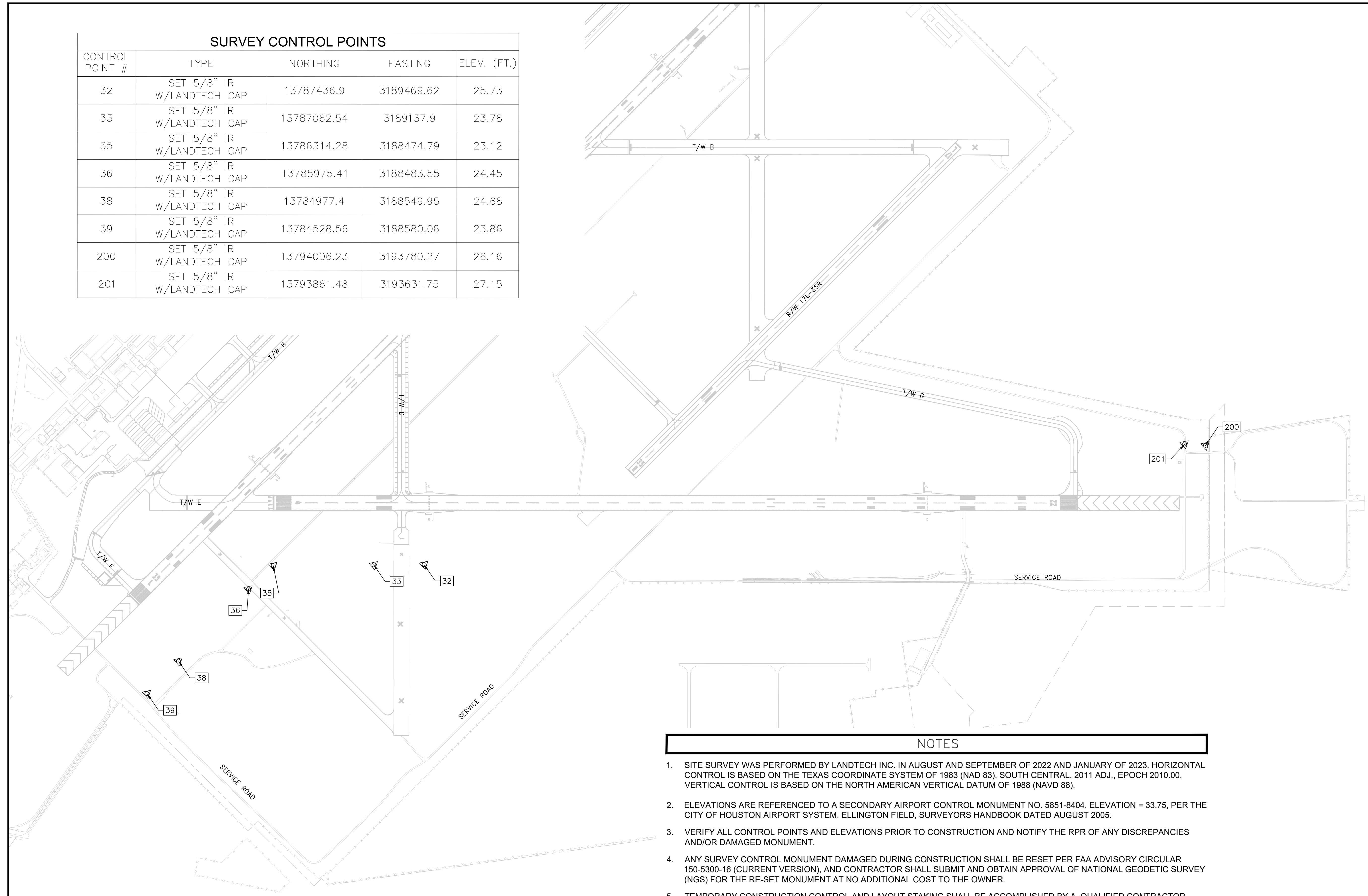


APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

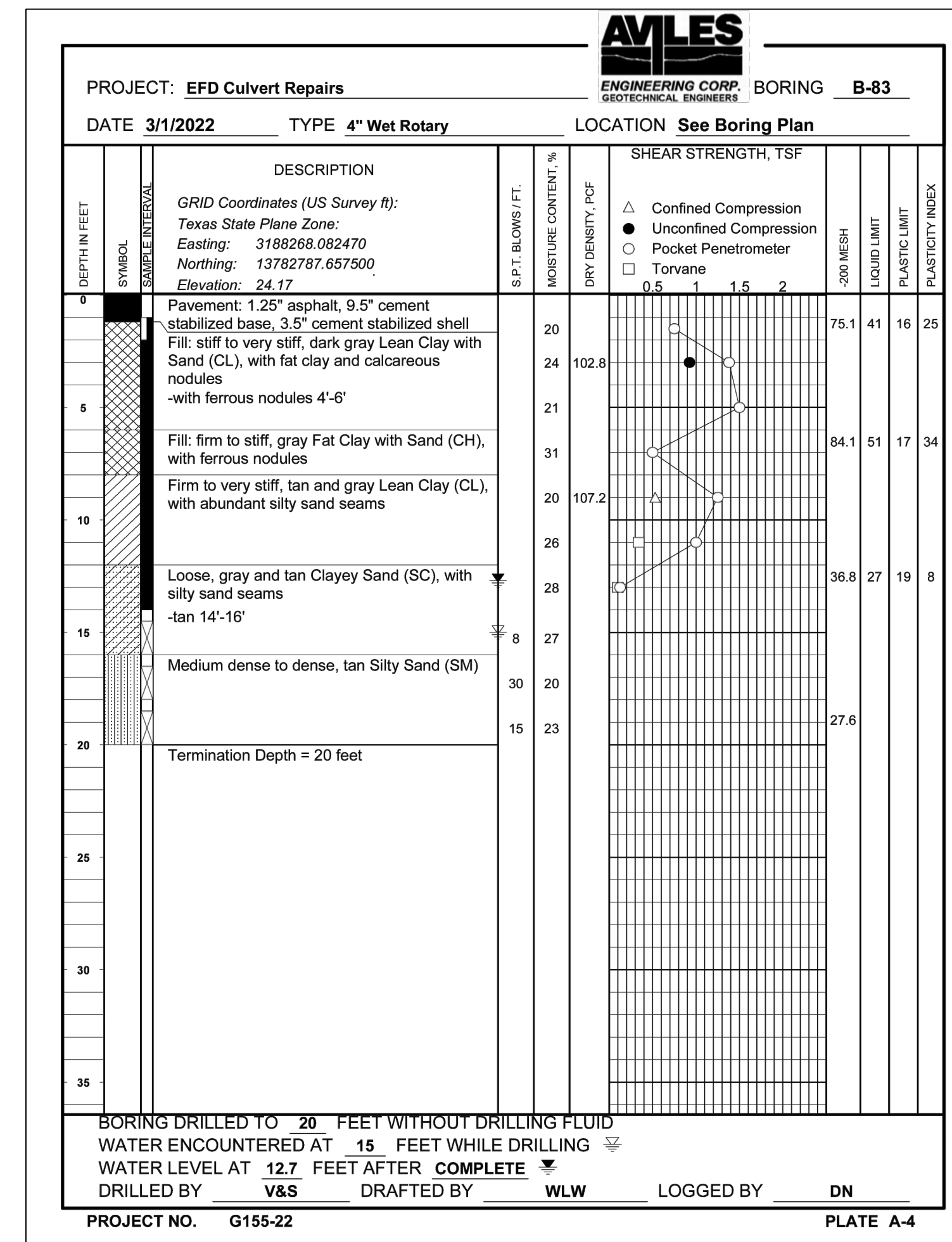
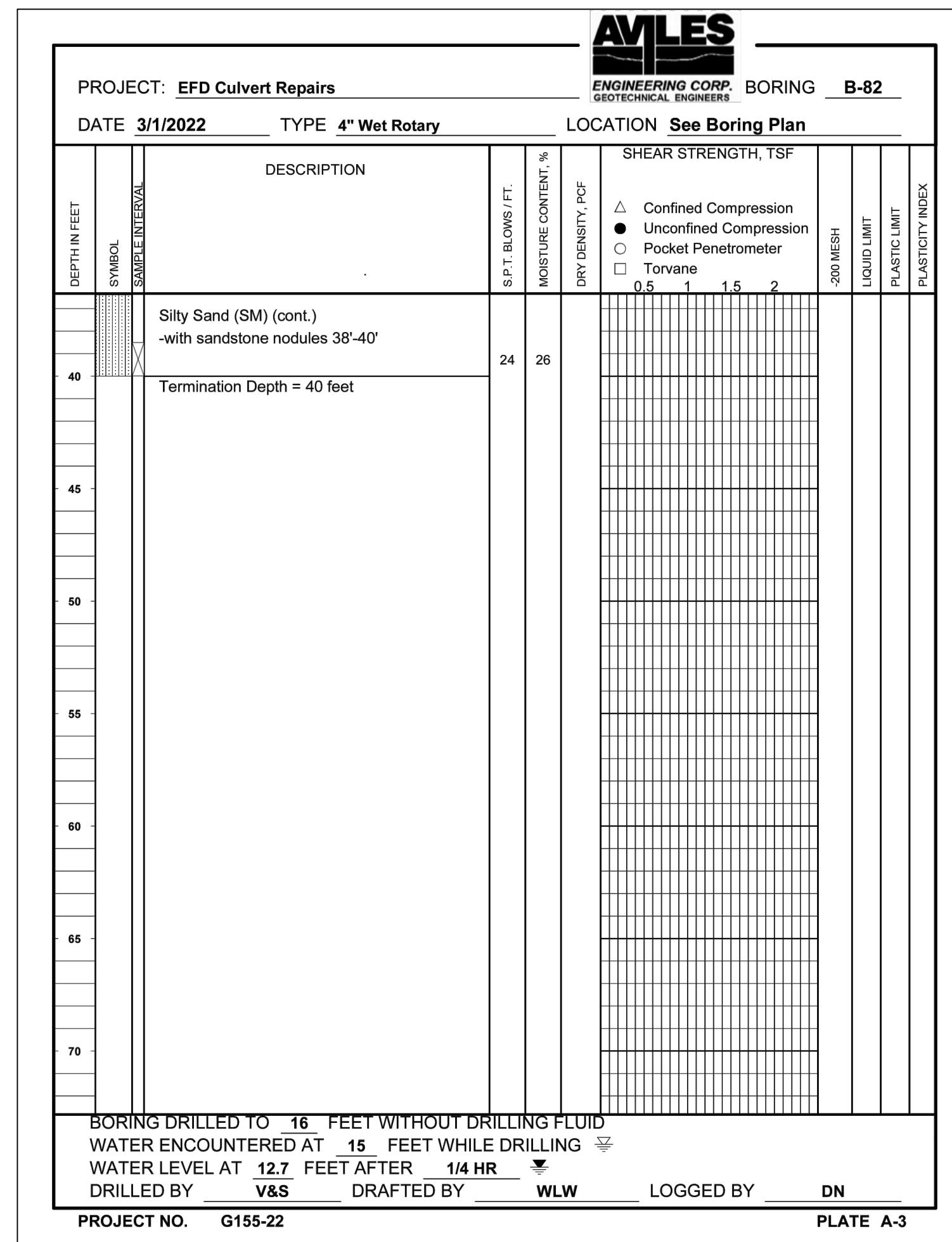
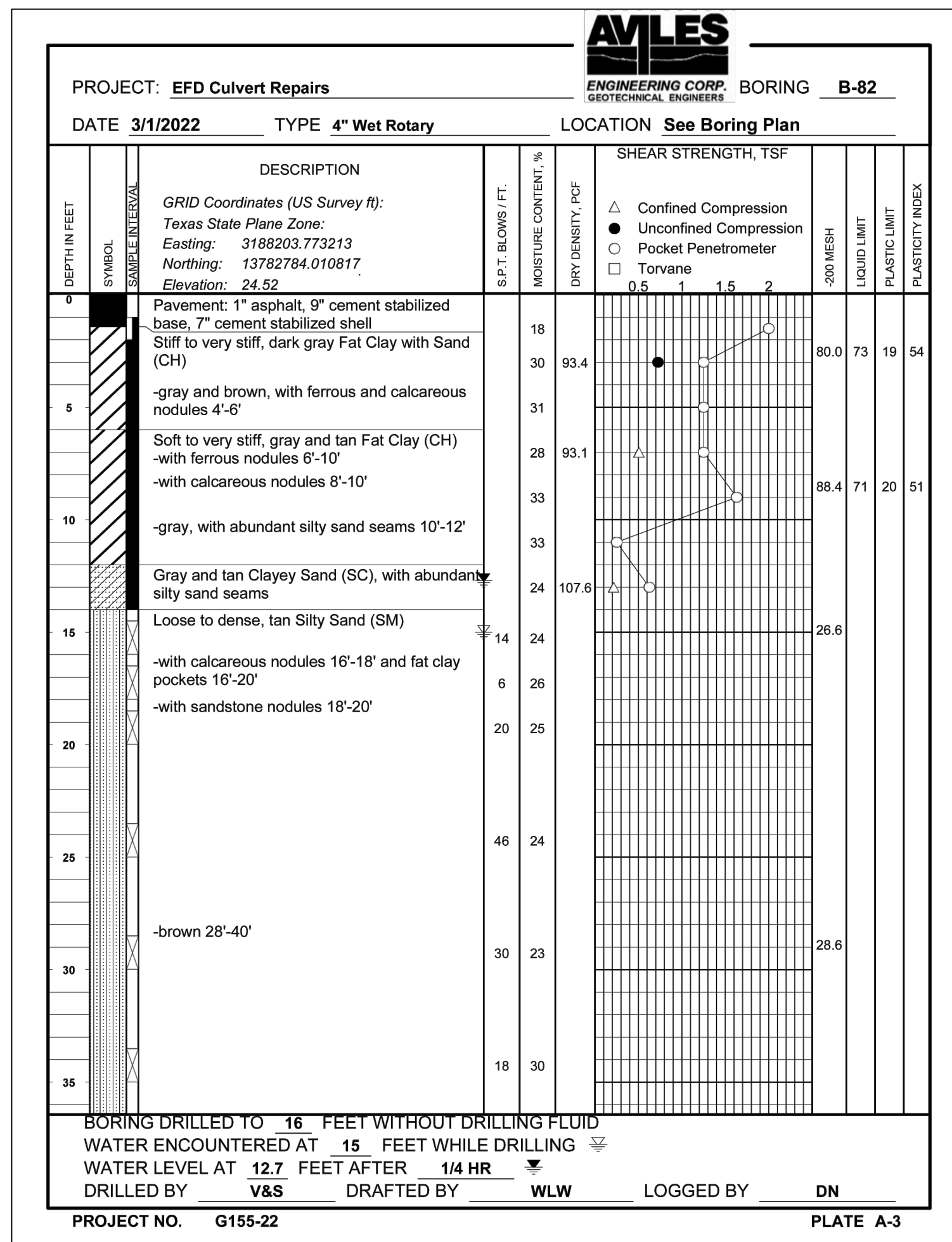
SURVEY CONTROL POINTS				
CONTROL POINT #	TYPE	NORTHING	EASTING	ELEV. (FT.)
32	SET 5/8" IR W/LANDTECH CAP	13787436.9	3189469.62	25.73
33	SET 5/8" IR W/LANDTECH CAP	13787062.54	3189137.9	23.78
35	SET 5/8" IR W/LANDTECH CAP	13786314.28	3188474.79	23.12
36	SET 5/8" IR W/LANDTECH CAP	13785975.41	3188483.55	24.45
38	SET 5/8" IR W/LANDTECH CAP	13784977.4	3188549.95	24.68
39	SET 5/8" IR W/LANDTECH CAP	13784528.56	3188580.06	23.86
200	SET 5/8" IR W/LANDTECH CAP	13794006.23	3193780.27	26.16
201	SET 5/8" IR W/LANDTECH CAP	13793861.48	3193631.75	27.15



NOTES

- SITE SURVEY WAS PERFORMED BY LANDTECH INC. IN AUGUST AND SEPTEMBER OF 2022 AND JANUARY OF 2023. HORIZONTAL CONTROL IS BASED ON THE TEXAS COORDINATE SYSTEM OF 1983 (NAD 83), SOUTH CENTRAL, 2011 ADJ., EPOCH 2010.00. VERTICAL CONTROL IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
- ELEVATIONS ARE REFERENCED TO A SECONDARY AIRPORT CONTROL MONUMENT NO. 5851-8404, ELEVATION = 33.75, PER THE CITY OF HOUSTON AIRPORT SYSTEM, ELLINGTON FIELD, SURVEYORS HANDBOOK DATED AUGUST 2005.
- VERIFY ALL CONTROL POINTS AND ELEVATIONS PRIOR TO CONSTRUCTION AND NOTIFY THE RPR OF ANY DISCREPANCIES AND/OR DAMAGED MONUMENT.
- ANY SURVEY CONTROL MONUMENT DAMAGED DURING CONSTRUCTION SHALL BE RESET PER FAA ADVISORY CIRCULAR 150-5300-16 (CURRENT VERSION), AND CONTRACTOR SHALL SUBMIT AND OBTAIN APPROVAL OF NATIONAL GEODETIC SURVEY (NGS) FOR THE RE-SET MONUMENT AT NO ADDITIONAL COST TO THE OWNER.
- TEMPORARY CONSTRUCTION CONTROL AND LAYOUT STAKING SHALL BE ACCOMPLISHED BY A QUALIFIED CONTRACTOR HIRED SURVEYOR.

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PLOT DATE: 2023-08-15



KEY TO SYMBOLS

Symbol Description	Symbol Description
Strata symbols	☒ Standard penetration test
■ Paving	
▨ High plasticity clay	
▧ Clayey sand	
▩ Silty sand	
▪ Fill	
▫ Low plasticity clay	
Misc. Symbols	
⊕ Water table depth during drilling	
⊖ Subsequent water table depth	
○ Pocket Penetrometer	
● Unconfined Compression	
△ Confined Compression	
□ Torvane	
Soil Samplers	
▮ Auger	
■ Undisturbed thin wall Shelby tube	

PLATE A-5

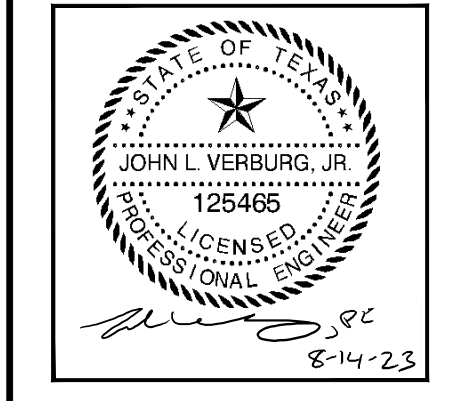
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 Member of the SNC-Lavalin Group
 LOCAL OFFICE:
 920 MEMORIAL CITY WAY
 STE. 400
 HOUSTON, TX 77024
 TEL: (713) 576-8500
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REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
CULVERT RECONSTRUCTION BORING LOG DETAILS

PROJECT MGR: JV
 DESIGNER: JDP
 DRAWN BY: JDP
 CHECK BY: AC
 SCALE:
 DATE: 08/14/2023



APPROVED BY:
 DIRECTOR
 HOUSTON AIRPORT SYSTEM
 PROJECT NO. 100082467
 A.I.P. NO.
 C.I.P. NO.
 H.A.S. NO. 954
 SHEET NO.

HAS FILE: C:\PW\WORK\ATKINS\ATKINS\GOUUC4236\0106118\E231715C-G-010.DWG
 PLOT DATE: 2023-08-15

REVISIONS

NO.	DESCRIPTION	DATE	BY

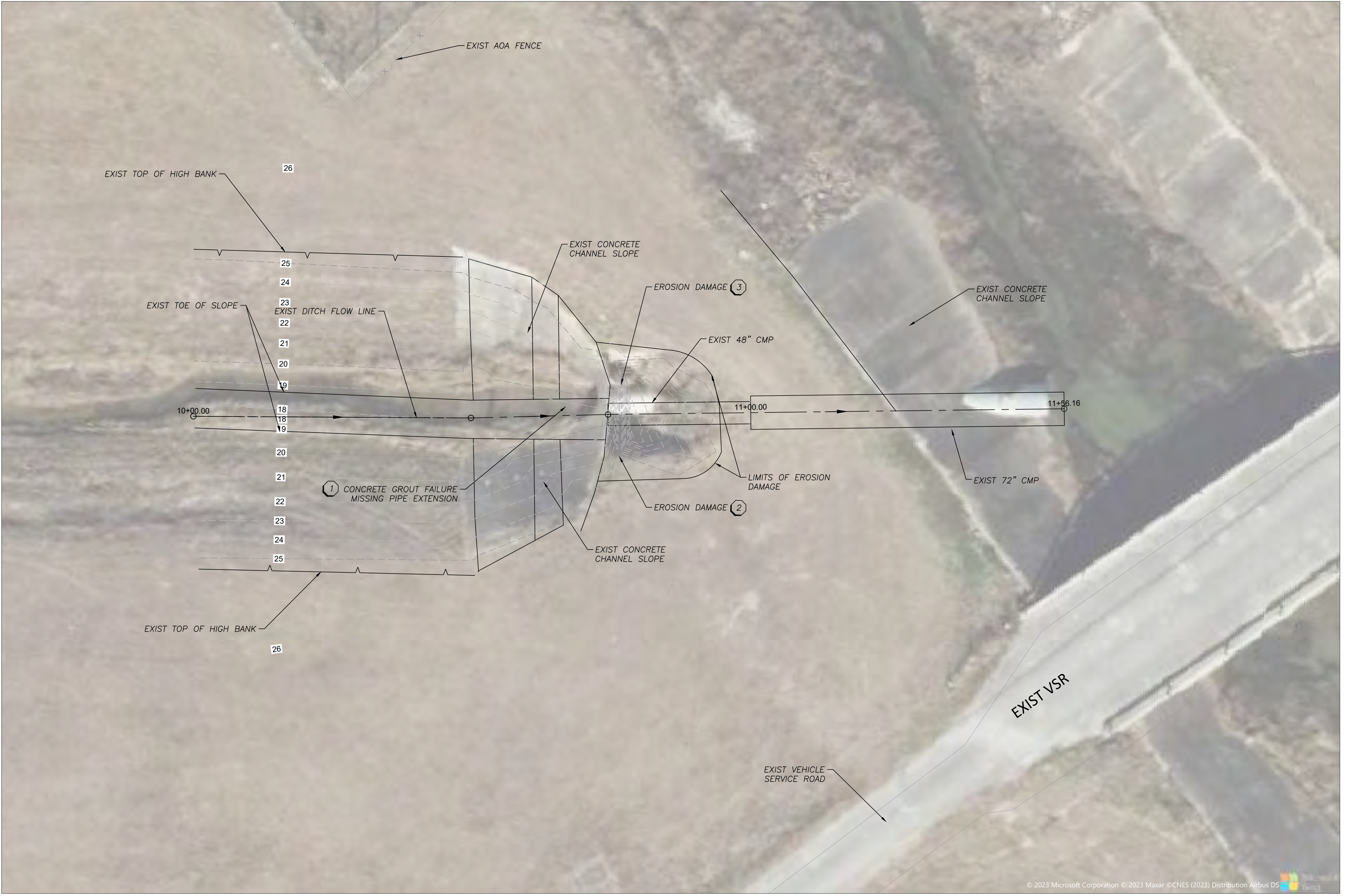
ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION
EXISTING CONDITIONS PLAN

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023



APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	



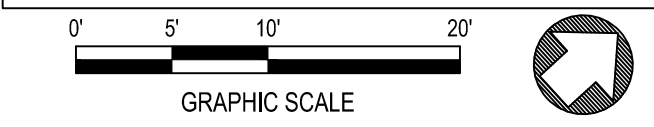
① CONCRETE GROUT FAILURE



② EROSION DAMAGE

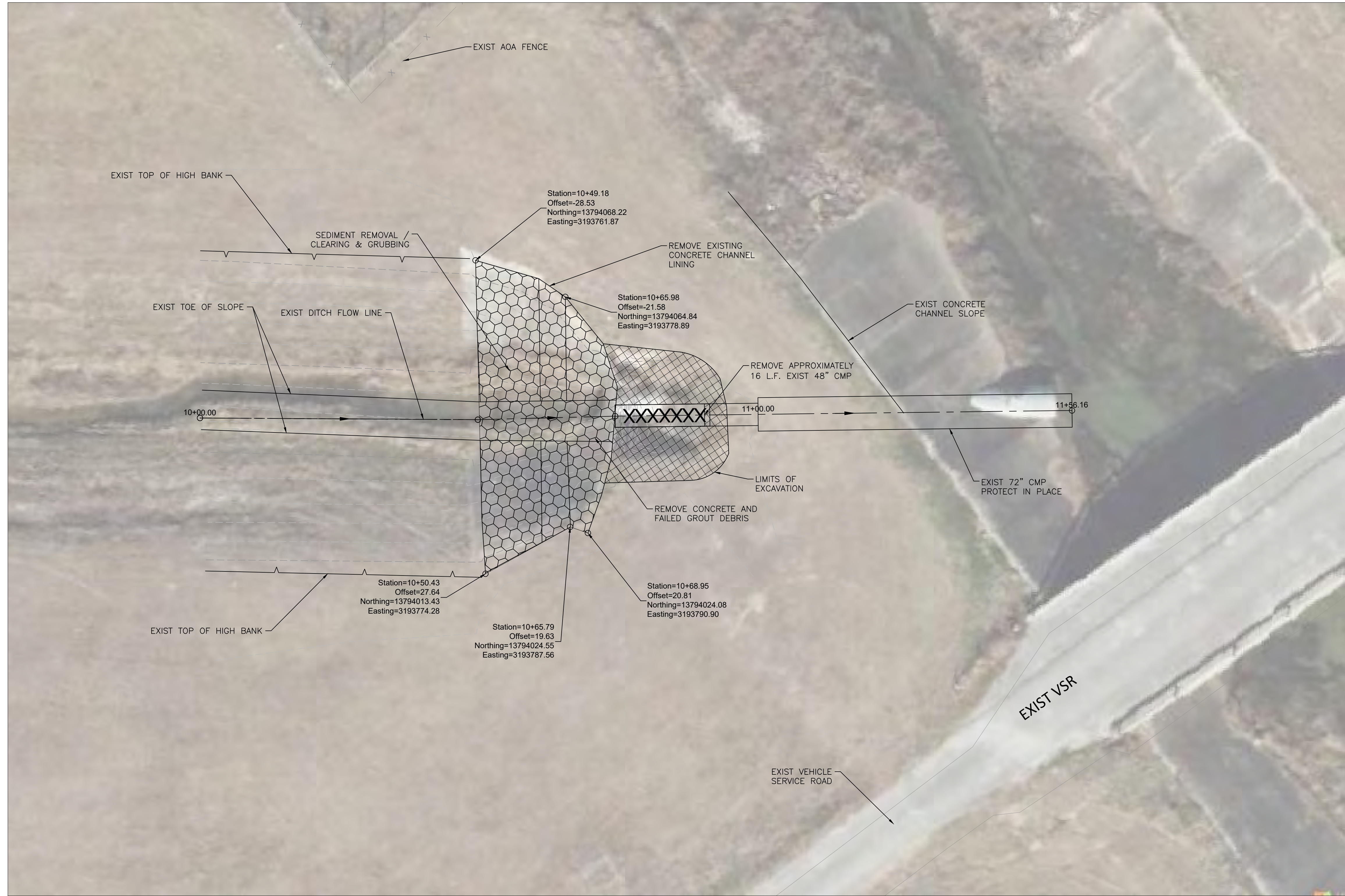


③ EROSION DAMAGE



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PLOT DATE: 2023-08-15

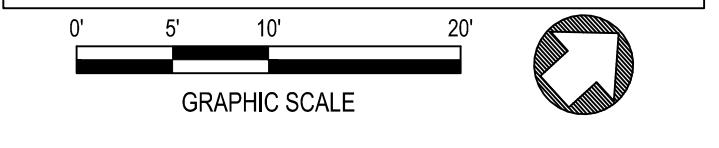
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 PLOT DATE: 2023-08-15



LEGEND	
----	SAWCUT
- - - -	EXISTING DITCH FLOW LINE
XXX	PIPE REMOVAL
	CONCRETE REMOVAL
	EXCAVATION

NOTES

- REFER TO GENERAL NOTES SHEET G003 FOR ADDITIONAL REQUIREMENTS.



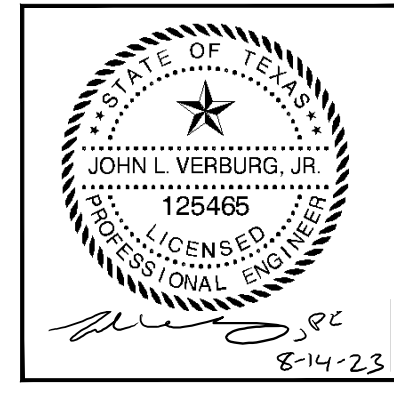
ATKINS
 Member of the SNC-Lavalin Group
 LOCAL OFFICE:
 920 MEMORIAL CITY WAY
 STE. 400
 HOUSTON, TX 77024
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REVISIONS

NO.	DESCRIPTION	DATE BY

**ELLINGTON AIRPORT (EFD)
 NORTH CULVERT RECONSTRUCTION
 PROPOSED DEMOLITION PLAN**

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023



APPROVED BY: _____

DIRECTOR
 HOUSTON AIRPORT SYSTEM

PROJECT NO.
 100082467

A.I.P. NO. _____

C.I.P. NO. _____

H.A.S. NO.
 954

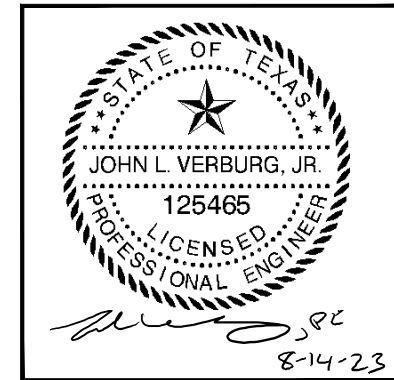
SHEET NO.

REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION
PROPOSED GRADING AND DRAINAGE
PLAN & PROFILE

PROJECT MGR: JV
 DESIGNER: JDP
 DRAWN BY: JDP
 CHECK BY: AC
 SCALE:
 DATE: 08/14/2023

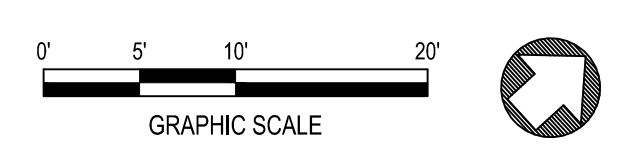
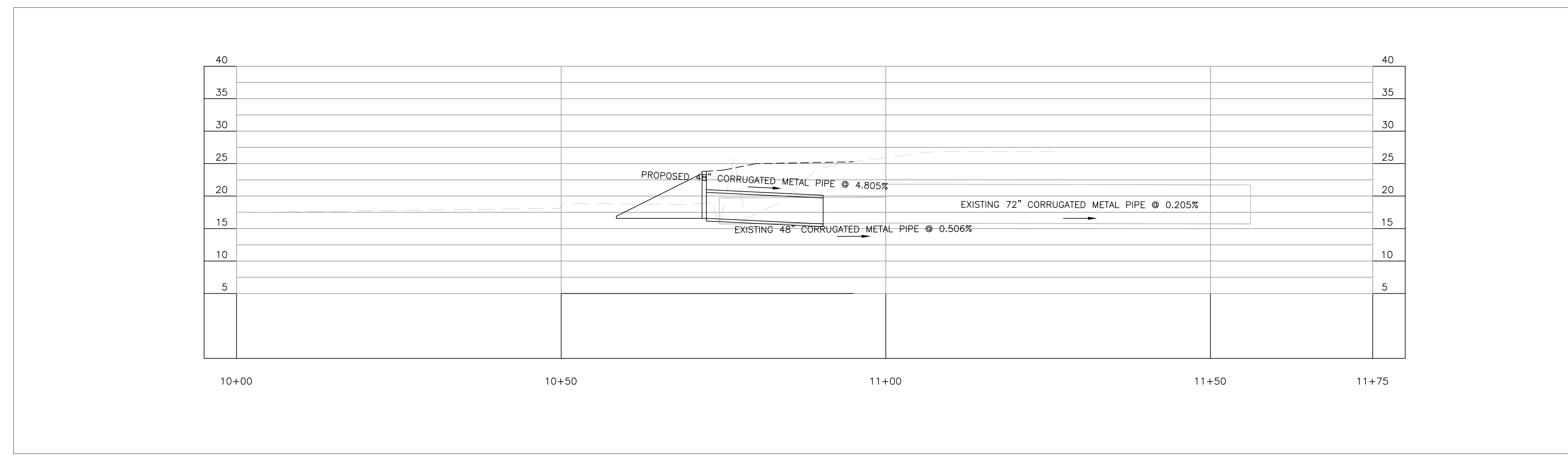
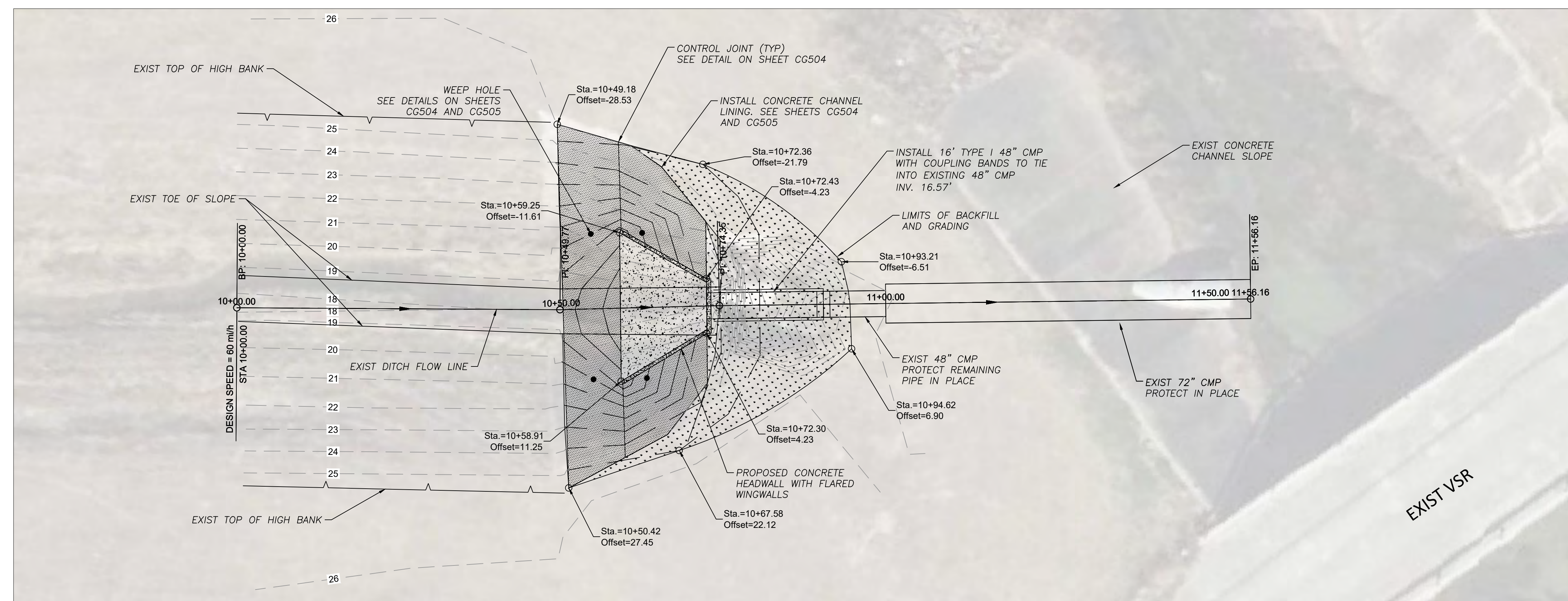


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PROJECT NO. 100082467
 A.I.P. NO.
 C.I.P. NO.
 H.A.S. NO. 954
 SHEET NO.

LEGEND

- EXISTING GRADE CONTOURS
- - - PROPOSED GRADE CONTOURS
- [Dotted Pattern] HYDRO MULCH GRASS SEED
- [Hatched Pattern] CONCRETE CHANNEL LINING

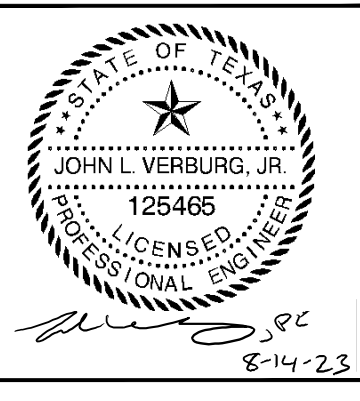


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 PLOT DATE: 2023-08-15

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
NORTH WINGWALL (1 OF 2)

PROJECT MGR:	JV
DESIGNER:	JDP
DRAWN BY:	JDP
CHECK BY:	AC
SCALE:	
DATE:	08/14/2023

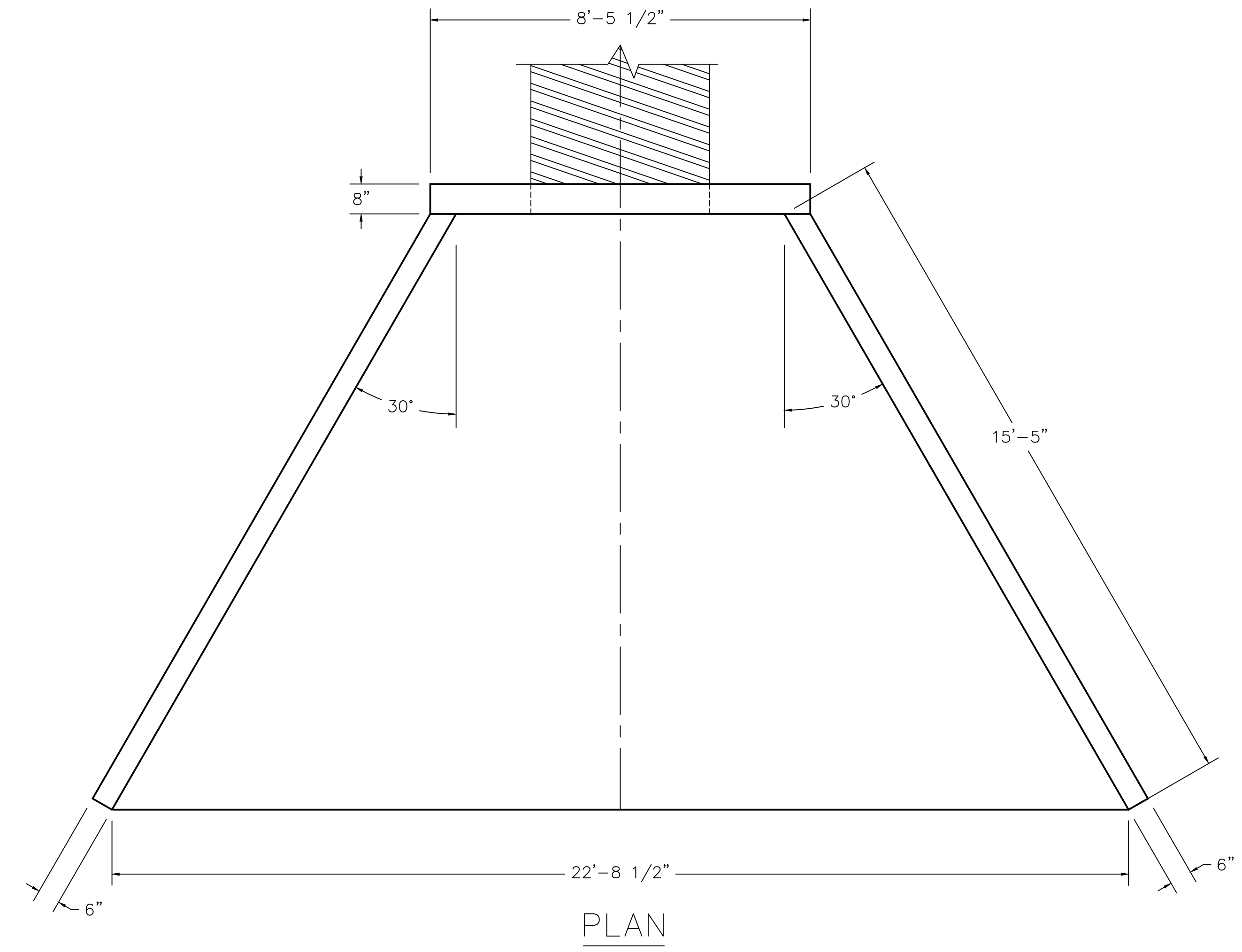


APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

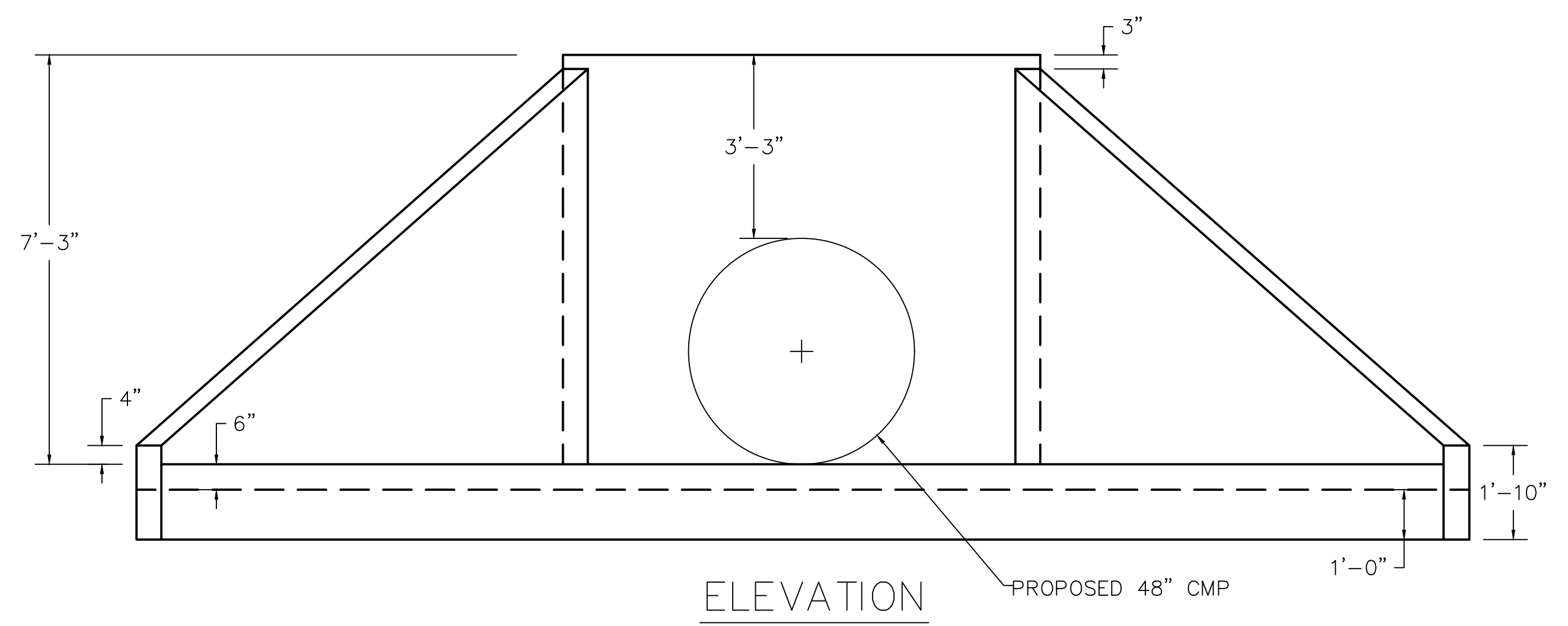
PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

NOTE:

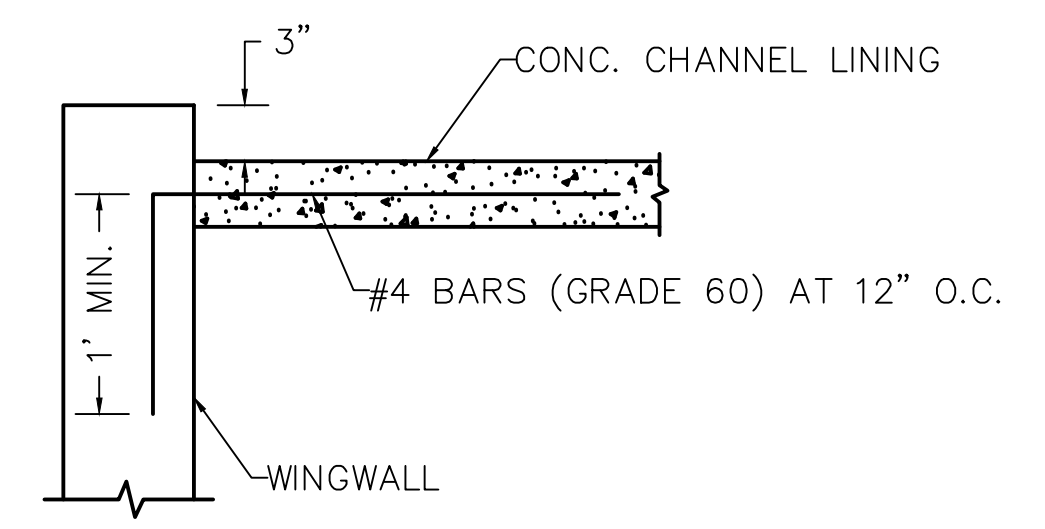
1. SEE SHEET CG502 FOR ADDITIONAL DETAILS.
2. DIMENSIONING AND REINFORCEMENT REQUIREMENTS BASED ON TXDOT STANDARD DETAIL FOR CONCRETE HEADWALLS WITH FLARED WINGWALLS WITH 72" PIPE TO PROVIDE ADEQUATE HEADWALL HEIGHT.



PLAN



ELEVATION



CHANNEL LINING CONNECTION DETAIL

REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**NORTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
NORTH WINGWALL (2 OF 2)**

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	Values for One Pipe				Values to be Added for Each Add'l Pipe				
		W	X	Y	L	Reinf (Lbs)	Conc (CY)			
2:1	12"	4'-7 1/2"	2'-6"	2'-10"	3'-3 1/4"	88	0.6	1'-9"	20	0.2
	15"	5'-5 3/4"	2'-9 1/2"	3'-4"	3'-10 1/4"	103	0.7	2'-2"	24	0.3
	18"	6'-4 1/4"	3'-1"	3'-10"	4'-5"	124	0.9	2'-8"	32	0.3
	21"	7'-2 3/4"	3'-4 1/2"	4'-4"	5'-0"	143	1.1	3'-1"	43	0.4
	24"	8'-2 1/2"	3'-9 1/2"	4'-10"	5'-7"	164	1.3	3'-7"	50	0.5
	27"	9'-1"	4'-1"	5'-4"	6'-2"	179	1.5	3'-11"	56	0.6
	30"	9'-11 1/2"	4'-4 1/2"	5'-10"	6'-8 3/4"	203	1.7	4'-4"	65	0.8
	33"	10'-10"	4'-8"	6'-4"	7'-3 3/4"	224	2.0	4'-8"	71	0.9
	36"	11'-8 1/4"	4'-11 1/2"	6'-10"	7'-10 3/4"	249	2.2	5'-1"	81	1.0
	42"	13'-5 1/4"	5'-6 1/2"	7'-10"	9'-0 1/2"	298	2.8	5'-10"	97	1.3
	48"	15'-9"	6'-1 1/2"	9'-4"	10'-9 1/4"	360	3.8	6'-7"	117	1.7
	54"	17'-5 3/4"	6'-8 1/2"	10'-4"	11'-11 1/4"	427	4.5	7'-6"	151	2.1
60"	19'-2 3/4"	7'-3 1/2"	11'-4"	13'-1"	481	5.3	8'-3"	174	2.5	
66"	20'-11 1/2"	7'-10 1/2"	12'-4"	14'-3"	544	6.2	8'-9"	194	2.9	
72"	22'-8 1/2"	8'-5 1/2"	13'-4"	15'-4 3/4"	601	7.1	9'-4"	213	3.3	
3:1	12"	6'-3"	2'-6"	4'-3"	4'-11"	118	0.8	1'-9"	22	0.2
	15"	7'-5"	2'-9 1/2"	5'-0"	5'-9 1/4"	137	1.1	2'-2"	28	0.3
	18"	8'-6 3/4"	3'-1"	5'-9"	6'-7 3/4"	170	1.3	2'-8"	37	0.5
	21"	9'-8 3/4"	3'-4 1/2"	6'-6"	7'-6"	195	1.6	3'-1"	48	0.6
	24"	11'-0"	3'-9 1/2"	7'-3"	8'-4 1/2"	227	2.0	3'-7"	58	0.7
	27"	12'-2"	4'-1"	8'-0"	9'-2 3/4"	251	2.3	3'-11"	67	0.8
	30"	13'-4"	4'-4 1/2"	8'-9"	10'-1 1/4"	293	2.7	4'-4"	77	1.0
	33"	14'-5 3/4"	4'-8"	9'-6"	10'-11 3/4"	318	3.1	4'-8"	84	1.2
	36"	15'-7 3/4"	4'-11 1/2"	10'-3"	11'-10"	351	3.5	5'-1"	96	1.4
	42"	17'-11 1/2"	5'-6 1/2"	11'-9"	13'-6 3/4"	432	4.5	5'-10"	119	1.7
	48"	21'-1 3/4"	6'-1 1/2"	14'-0"	16'-2"	537	6.1	6'-7"	146	2.3
	54"	23'-5 1/2"	6'-8 1/2"	15'-6"	17'-10 3/4"	630	7.3	7'-6"	186	2.9
60"	25'-9 1/4"	7'-3 1/2"	17'-0"	19'-7 1/2"	719	8.7	8'-3"	219	3.4	
66"	28'-1"	7'-10 1/2"	18'-6"	21'-4 1/4"	811	10.1	8'-9"	242	3.9	
72"	30'-4 3/4"	8'-5 1/2"	20'-0"	23'-1 1/4"	924	11.7	9'-4"	272	4.4	
4:1	12"	7'-10 3/4"	2'-6"	5'-8"	6'-6 1/2"	148	1.1	1'-9"	24	0.3
	15"	9'-4"	2'-9 1/2"	6'-8"	7'-8 1/2"	181	1.5	2'-2"	32	0.4
	18"	10'-9 1/2"	3'-1"	7'-8"	8'-10 1/4"	221	1.9	2'-8"	42	0.5
	21"	12'-2 3/4"	3'-4 1/2"	8'-8"	10'-0"	260	2.3	3'-1"	57	0.7
	24"	13'-9 1/2"	3'-9 1/2"	9'-8"	11'-2"	301	2.8	3'-7"	67	0.9
	27"	15'-3"	4'-1"	10'-8"	12'-3 3/4"	334	3.3	3'-11"	77	1.0
	30"	16'-8 1/4"	4'-4 1/2"	11'-8"	13'-5 3/4"	385	3.8	4'-4"	89	1.3
	33"	18'-1 3/4"	4'-8"	12'-8"	14'-7 1/2"	425	4.5	4'-8"	101	1.4
	36"	19'-7"	4'-11 1/2"	13'-8"	15'-9 1/4"	472	5.1	5'-1"	115	1.7
	42"	22'-5 3/4"	5'-6 1/2"	15'-8"	18'-1"	583	6.5	5'-10"	141	2.1
	48"	26'-6 1/4"	6'-1 1/2"	18'-8"	21'-6 3/4"	730	8.9	6'-7"	175	2.8
	54"	29'-5"	6'-8 1/2"	20'-8"	23'-10 1/4"	875	10.7	7'-6"	226	3.6
60"	32'-3 3/4"	7'-3 1/2"	22'-8"	26'-2"	996	12.7	8'-3"	264	4.3	
66"	35'-2 1/2"	7'-10 1/2"	24'-8"	28'-5 3/4"	1,140	14.9	8'-9"	300	4.9	
72"	38'-1 1/4"	8'-5 1/2"	26'-8"	30'-9 1/2"	1,297	17.3	9'-4"	334	5.6	
6:1	12"	11'-2"	2'-6"	8'-6"	9'-9 3/4"	224	1.9	1'-9"	28	0.4
	15"	13'-2 1/4"	2'-9 1/2"	10'-0"	11'-6 1/2"	268	2.5	2'-2"	37	0.5
	18"	15'-2 1/2"	3'-1"	11'-6"	13'-3 1/4"	330	3.2	2'-8"	50	0.7
	21"	17'-2 3/4"	3'-4 1/2"	13'-0"	15'-0 1/4"	387	3.9	3'-1"	69	0.9
	24"	19'-4 1/2"	3'-9 1/2"	14'-6"	16'-9"	453	4.8	3'-7"	80	1.2
	27"	21'-4 3/4"	4'-1"	16'-0"	18'-5 3/4"	512	5.7	3'-11"	96	1.4
	30"	23'-5 1/4"	4'-4 1/2"	17'-6"	20'-2 1/2"	593	6.7	4'-4"	110	1.7
	33"	25'-5 1/2"	4'-8"	19'-0"	21'-11 1/4"	675	7.8	4'-8"	127	2.0
	36"	27'-5 3/4"	4'-11 1/2"	20'-6"	23'-8"	735	9.0	5'-1"	144	2.3
	42"	31'-6 1/4"	5'-6 1/2"	23'-6"	27'-1 1/2"	922	11.5	5'-10"	179	3.0
	48"	37'-3 1/2"	6'-1 1/2"	28'-0"	32'-4"	1,191	15.9	6'-7"	231	4.0
	54"	41'-4 1/4"	6'-8 1/2"	31'-0"	35'-9 1/2"	1,424	19.2	7'-6"	300	5.0
60"	45'-4 3/4"	7'-3 1/2"	34'-0"	39'-3"	1,631	22.9	8'-3"	353	6.0	

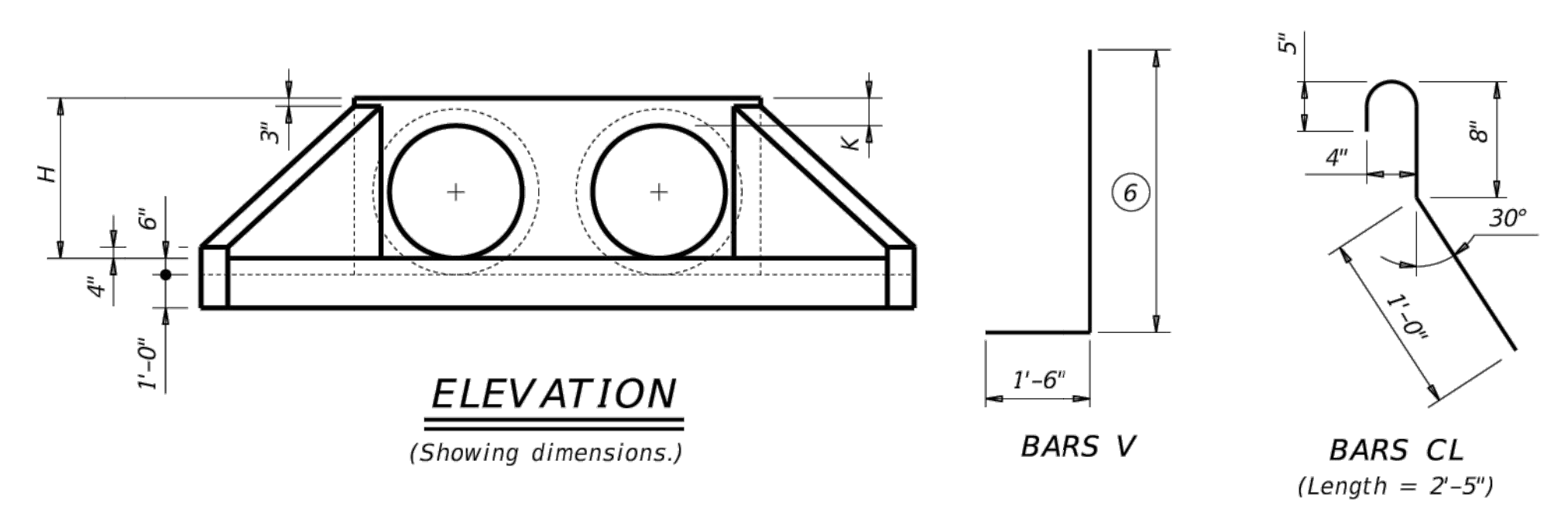
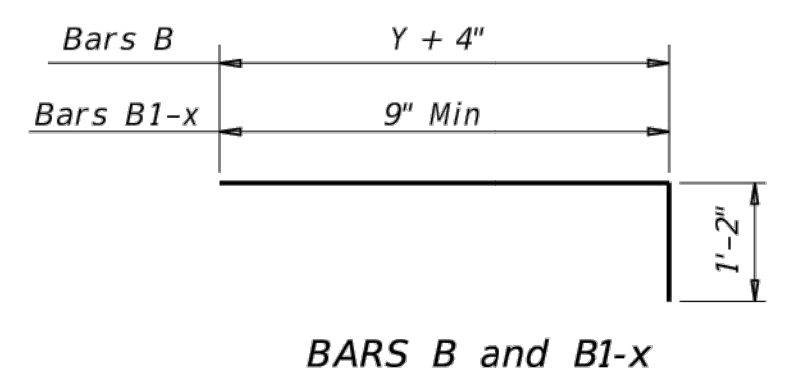
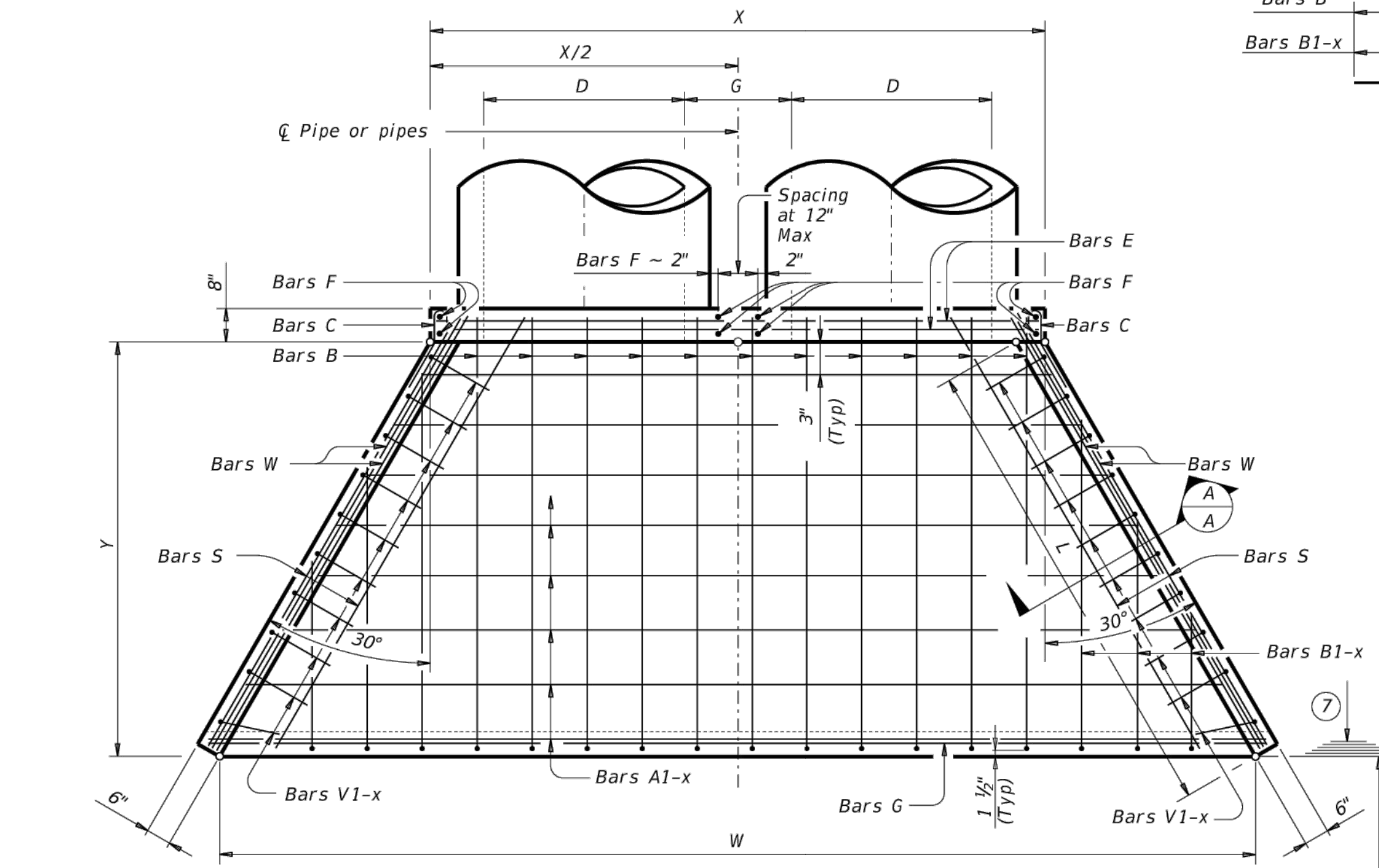


TABLE OF REINFORCING STEEL (5)

Bar	Size	Spa	No.
A	#4	1'-0"	~
B	#3	1'-6"	~
C	#4	1'-0"	~
D	#3	1'-0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1'-0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (4)	H
12"	0'-9"	1'-0"	2'-0"
15"	0'-11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-4"	1'-0"	2'-9"
24"	1'-7"	1'-0"	3'-0"
27"	1'-8"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"
33"	1'-11"	1'-0"	3'-9"
36"	2'-1"	1'-0"	4'-0"
42"	2'-4"	1'-0"	4'-6"
48"	2'-7"	1'-3"	5'-3"
54"	3'-0"	1'-3"	5'-9"
60"	3'-3"	1'-3"	6'-3"
66"	3'-3"	1'-3"	6'-9"
72"	3'-4"	1'-3"	7'-3"

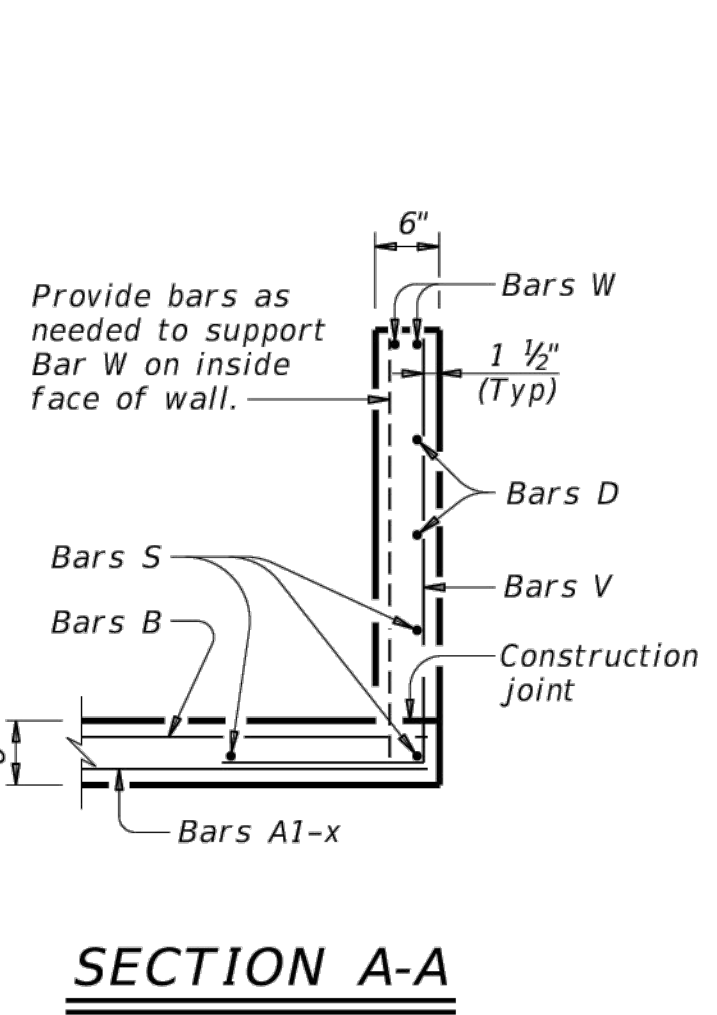
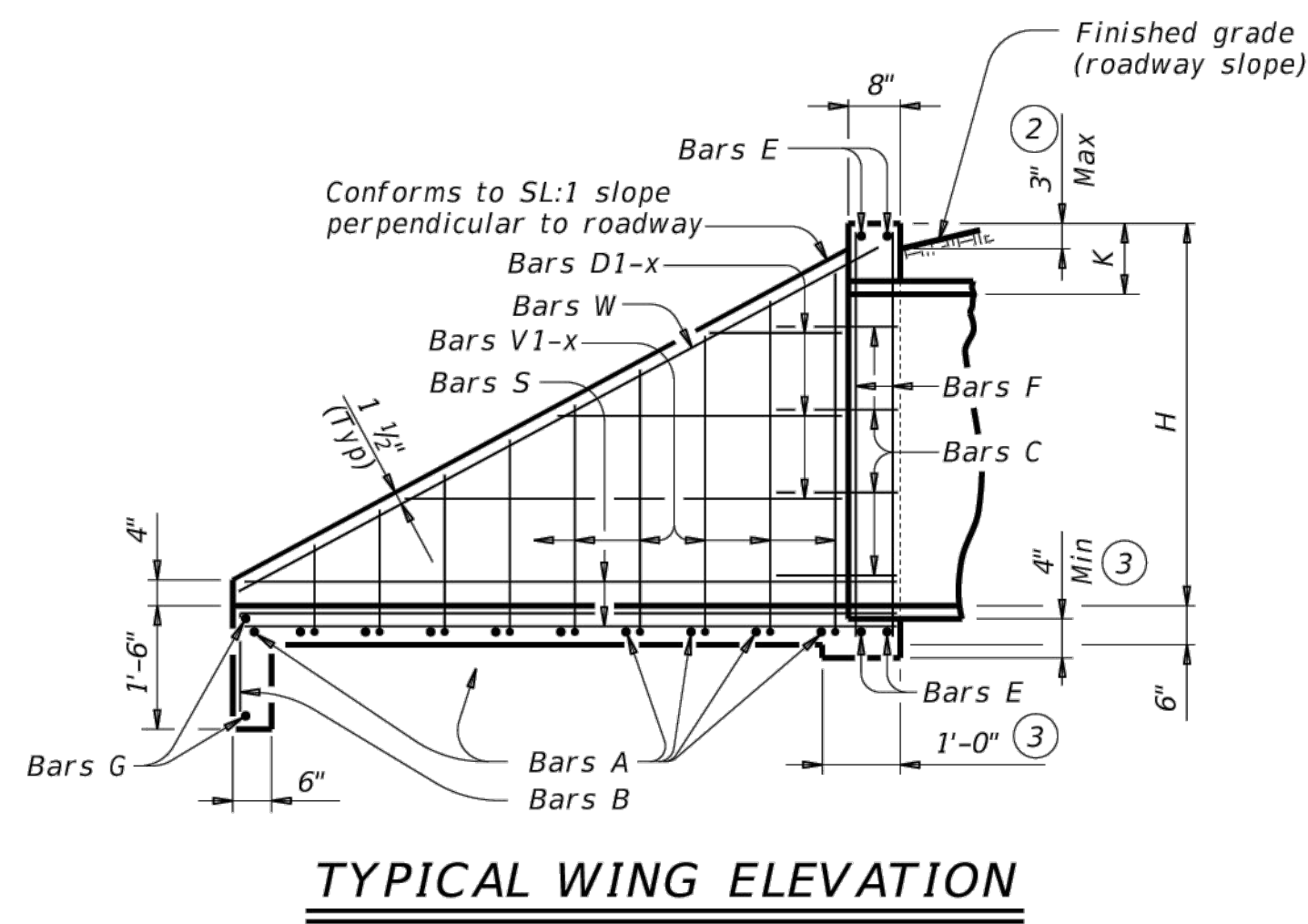


- Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
- For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.
- Dimensions shown are usual and maximum.
- Quantities shown are for one structure end only (one headwall).
- Min Length = $6' + 3' \times \left(\frac{12 \times H - 7}{12 \times L} \right)$
Max Length = $12 \times H - 3' \times \left(\frac{12 \times H - 7}{12 \times L} \right) - 1'$
- Lengths of wings based on SL:1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



Texas Department of Transportation Bridge Division Standard

CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: chfw00se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	

PROJECT MGR: JV
DESIGNER: JDP
DRAWN BY: JDP
CHECK BY: AC
SCALE:
DATE: 08/14/2023



APPROVED BY:
DIRECTOR HOUSTON AIRPORT SYSTEM
PROJECT NO. 100082467
A.I.P. NO.
C.I.P. NO.
H.A.S. NO. 954
SHEET NO.

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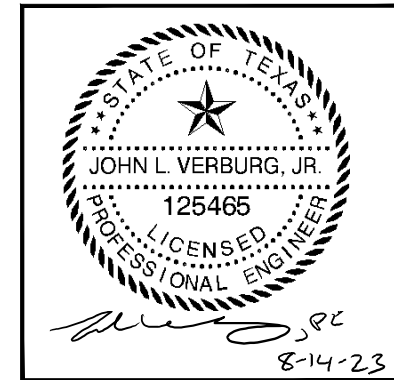
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REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
BEDDING AND BACKFILL

PROJECT MGR: JV
DESIGNER: JDP
DRAWN BY: JDP
CHECK BY: AC
SCALE:
DATE: 08/14/2023

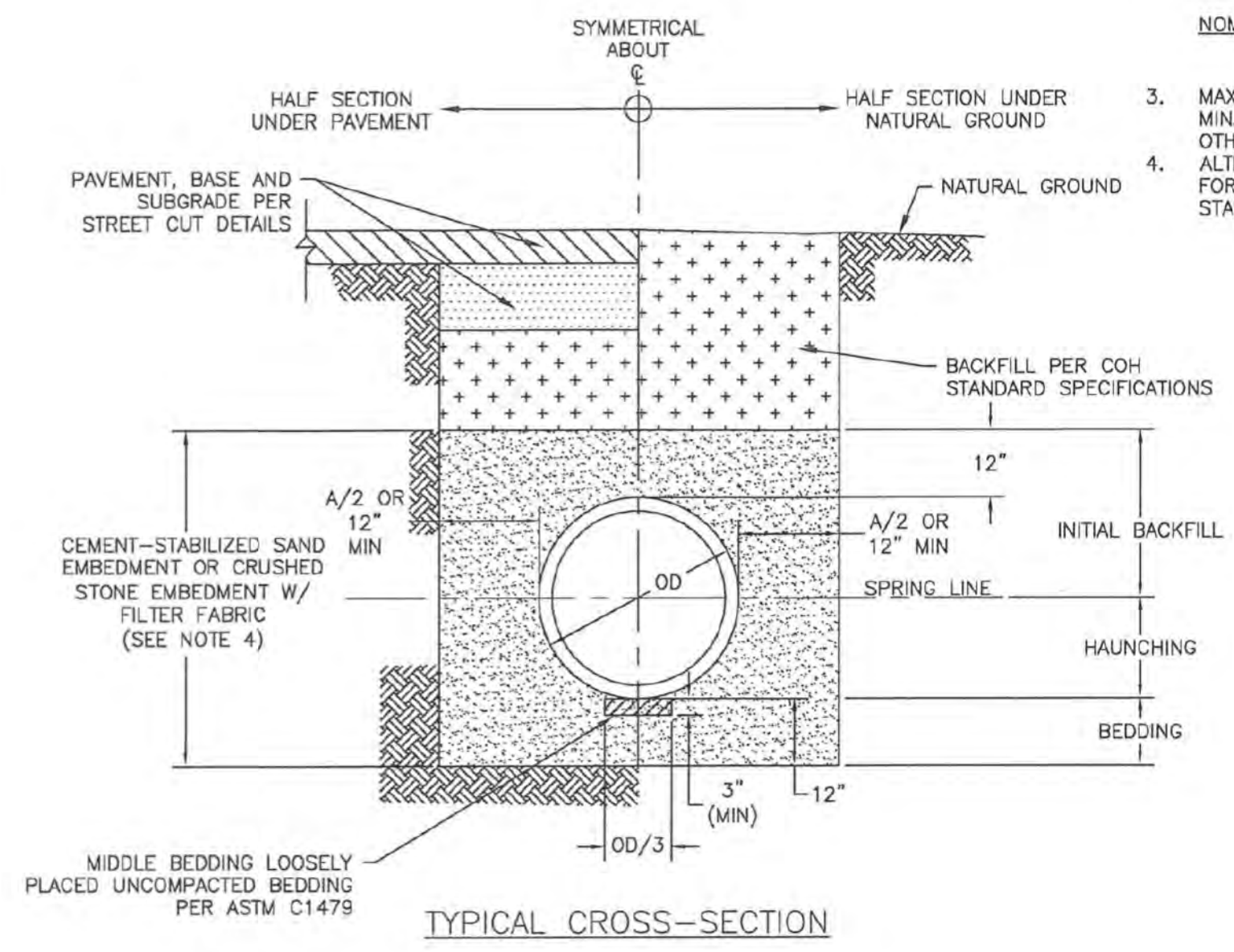


APPROVED BY:
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467
A.I.P. NO.
C.I.P. NO.
H.A.S. NO.
954
SHEET NO.

02317-03

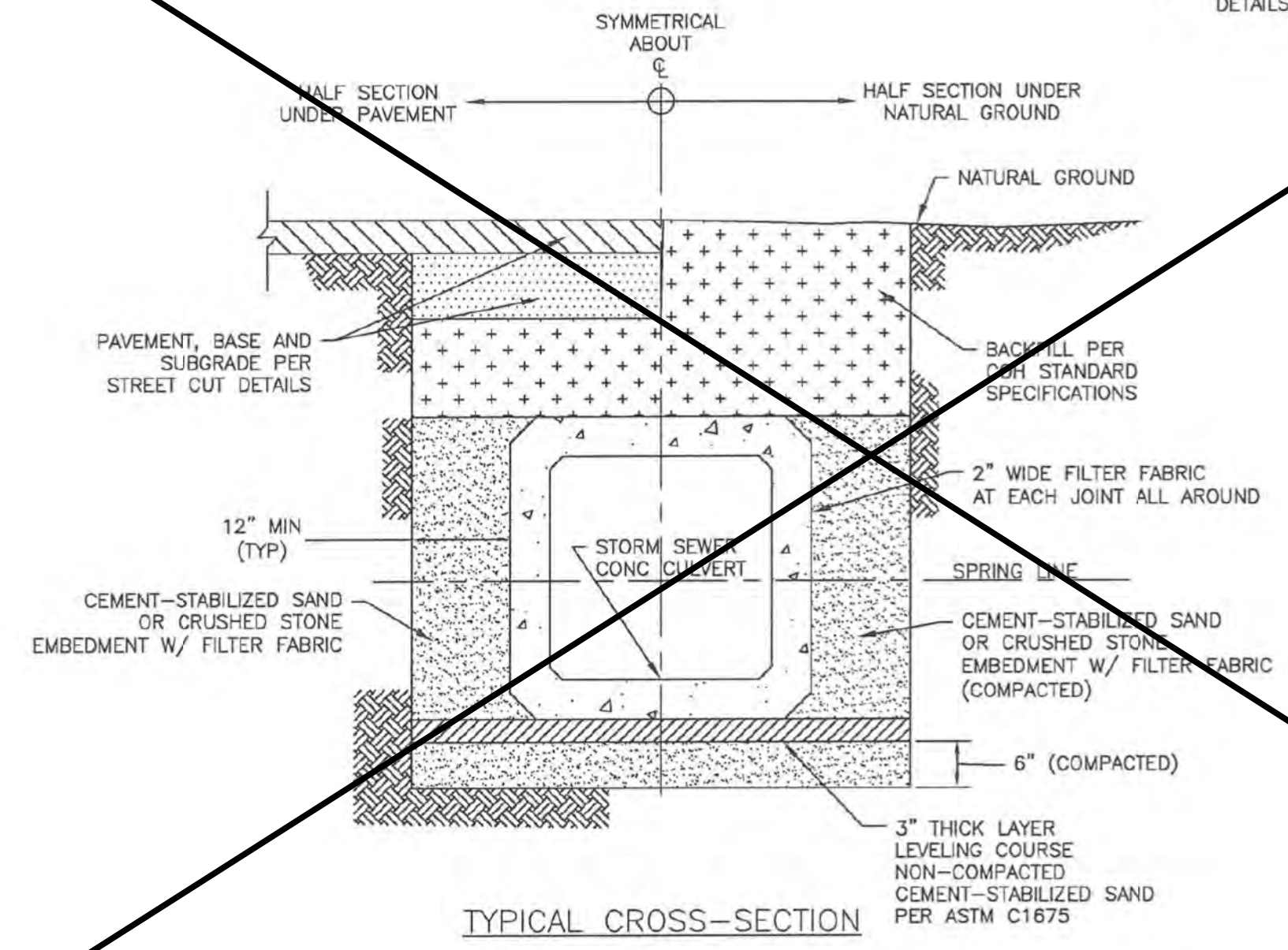
- NOTES:**
- THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
 - MIN. TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:
- | NOMINAL PIPE SIZE | "A" |
|-------------------|-----|
| 18" TO 30" | 24" |
| OVER 30" | 36" |
- MAX. TRENCH WIDTH SHALL BE NOT GREATER THAN MIN. TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
 - ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS.



TYPICAL CROSS-SECTION
SANITARY OR STORM SEWER BEDDING AND BACKFILL
FOR DRY STABLE TRENCH
NTS

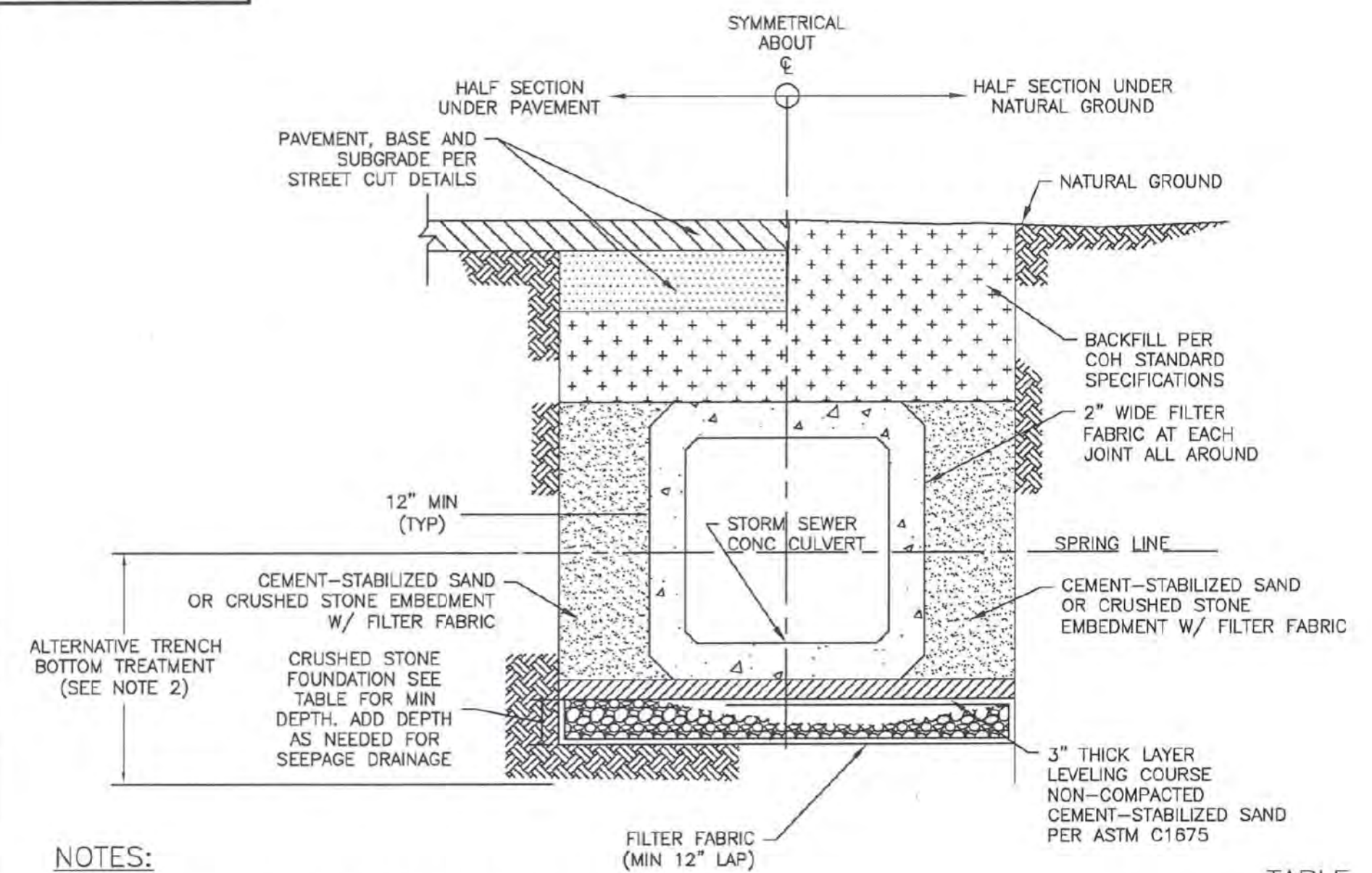
02317-05

- NOTES:**
- WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
 - SUBGRADE AND PAVEMENT FOR STREET CUT DETAILS - 02951.



TYPICAL CROSS-SECTION
PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-06



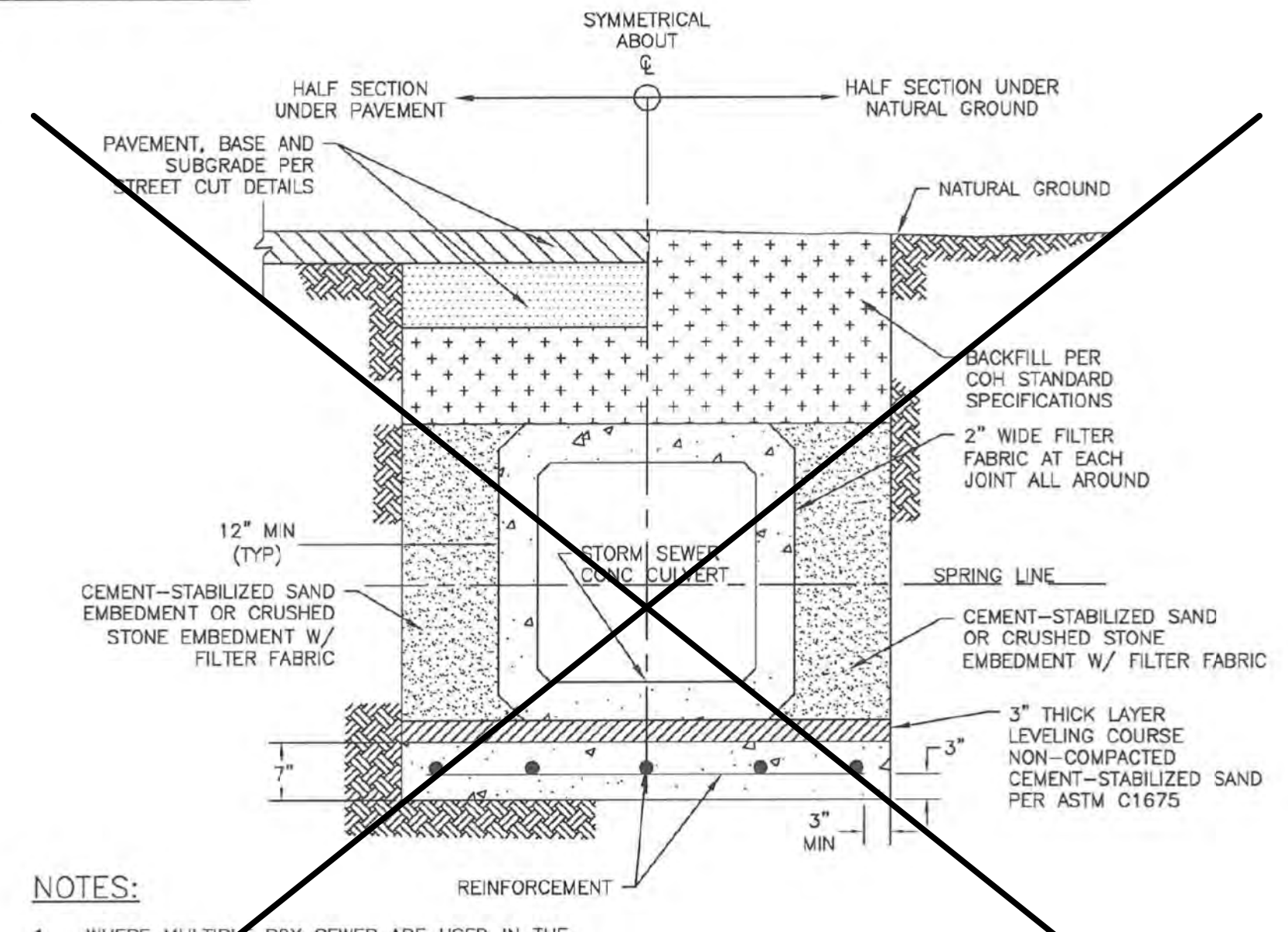
- NOTES:**
- WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
 - ALTERNATIVE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY OF ENGINEERS AND AS PAID FOR IN THE PROPOSAL.

TABLE

CULVERT SIZE (FT)	FOUNDATION DEPTH(INCHES)
3' X 2' TO 6' X 6'	12
6' X 6' AND LARGER	18

TYPICAL CROSS-SECTION
PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL FOR WET STABLE TRENCH
NTS

02317-07



- NOTES:**
- WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
 - REINFORCED CONCRETE SLAB PIPE BEDDING TO BE PLACED IN DRY TRENCH ONLY.
 - CONCRETE IN SLAB TO REACH MIN COMPRESSIVE STRENGTH OF 1000 PSI BASED ON MAX DESIGN BEFORE PIPE IS LAID.
 - PRECAST SEAL SLAB MAYBE USED AS APPROVED BY CITY ENGINEER.

TYPICAL CROSS-SECTION
PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL WITH SEAL SLAB
NTS

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PLOT DATE: 2023-08-15

REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
NORTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
CONCRETE CHANNEL LINING (1 OF 2)

PROJECT MGR: JV
DESIGNER: JDP
DRAWN BY: JDP
CHECK BY: AC
SCALE:
DATE: 08/14/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

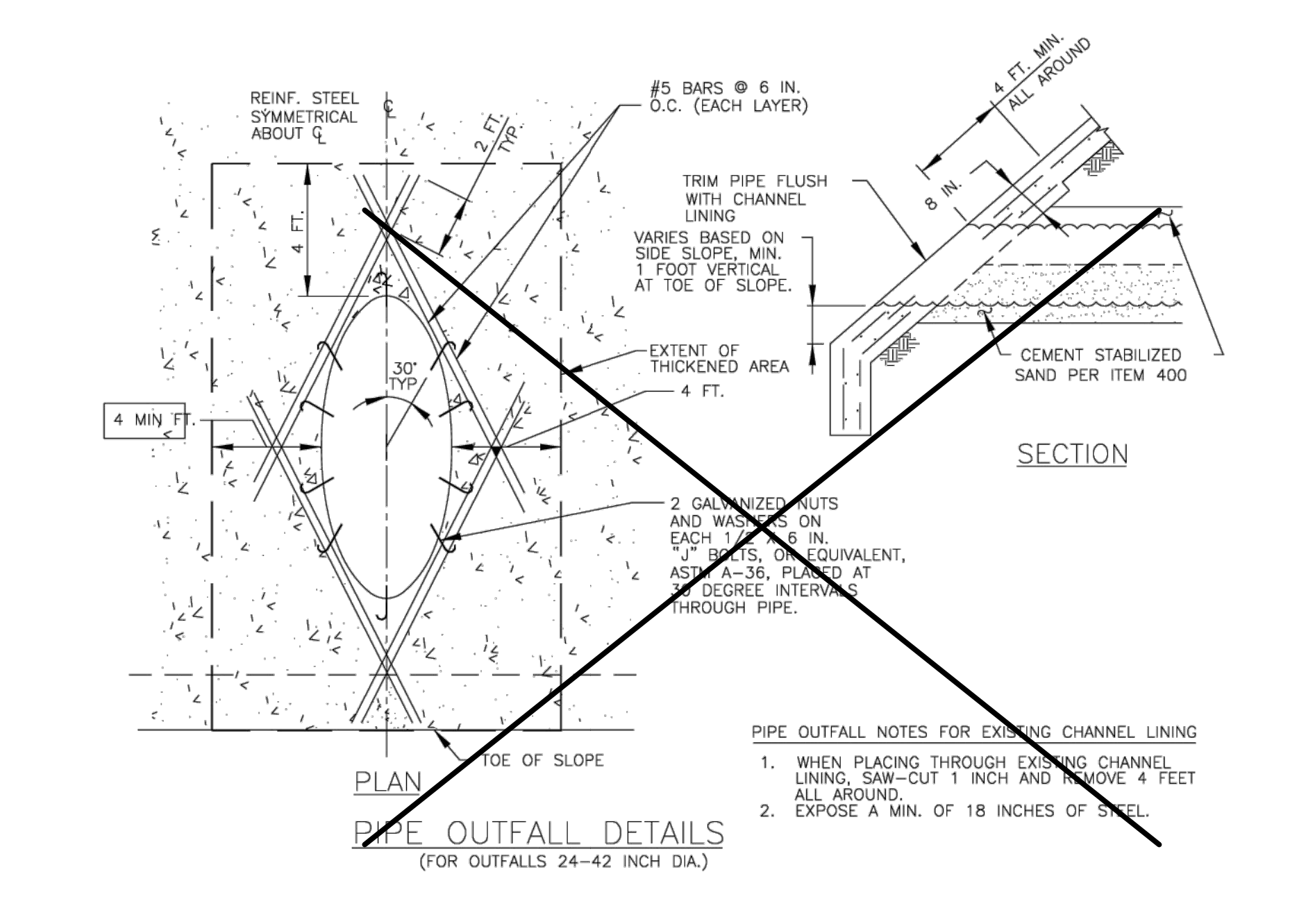
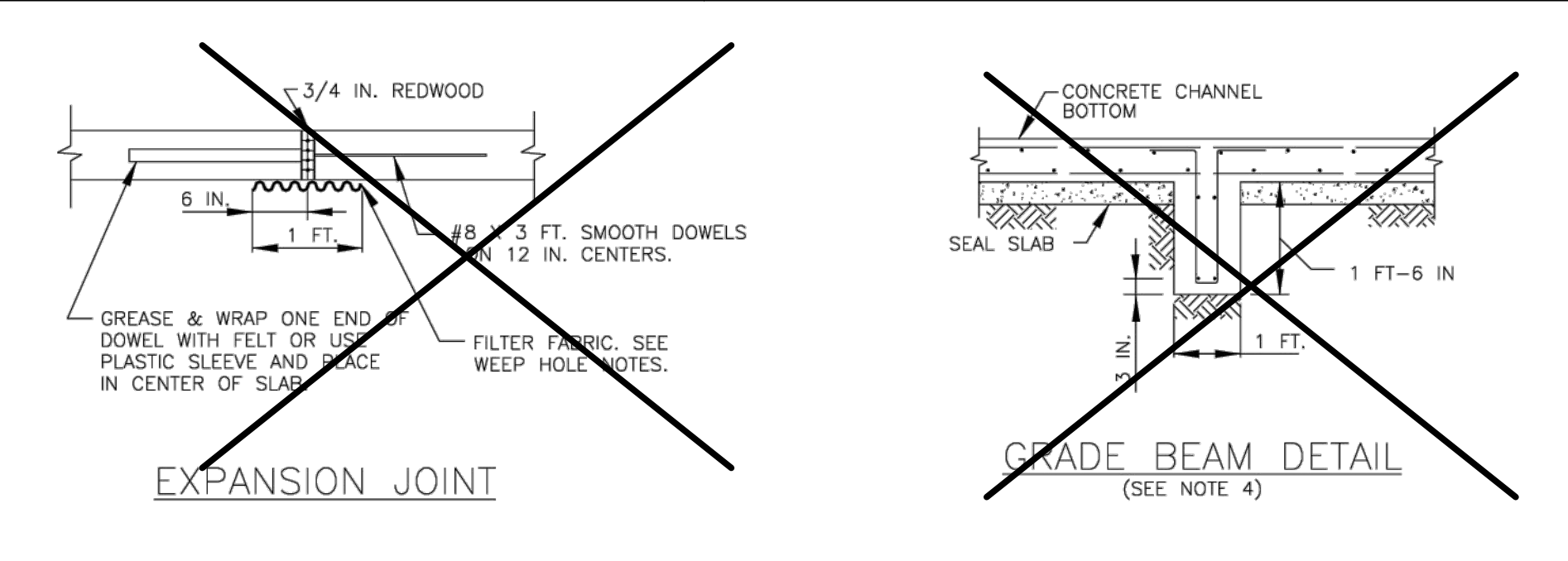
PROJECT NO.
100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO. 954

SHEET NO.



- (A)** THESE ARE GENERAL DETAILS AND NOTES. IF THERE ARE ANY DISCREPANCIES BETWEEN THIS STANDARD AND THE DETAILED SEALED DRAINAGE PLANS, THE SEALED PLANS WILL OVERRIDE.
- (B)** DESIGNER TO CONSULT WITH DISTRICT ENVIRONMENTAL SECTION TO DETERMINE IF OUTFALL IS OR IS NOT JURISDICTIONAL. IF JURISDICTIONAL, REQUEST ORDINARY HIGH WATER ELEVATION AND CORP OF ENGINEER'S PERMIT FROM ENVIRONMENTAL SECTION FOR ANY WORK BELOW ORDINARY HIGH WATER ELEVATION.

- GENERAL NOTES:**
- TO BE PAID AS ITEM 420-2065 CL A CONC (STEPS.)
 - SEE SIDE SLOPE DETAILS ELSEWHERE ON PLANS.
 - RISE DIMENSION VARIES AS A FUNCTION OF SIDE SLOPE.
 - INSTALL STRUCTURAL CONCRETE GRADE BEAMS TRANSVERSELY AT 20 FOOT MAXIMUM CENTERS ON CONCRETE LINED CHANNELS WITH BOTTOM WIDTHS EQUAL TO OR GREATER THAN 20 FEET, GRADE BEAM TO BE PAID AS ITEM 420-2242 CL A CONC. (CHANNEL LINING.)
 - JOINTS:**
 - PLACE CONSTRUCTION JOINTS IN CONCRETE LOW-FLOW AND TRAPEZOIDAL BOTTOM SECTIONS AT 20 FEET MINIMUM, 60 FEET MAXIMUM, SPACING CONTINUOUSLY THROUGH CHANNEL LINING.
 - PLACE EXPANSION JOINTS IN CONCRETE LOW-FLOW AND TRAPEZOIDAL BOTTOM SECTIONS AT 60 FEET MAXIMUM SPACING CONTINUOUSLY THROUGH CHANNEL LINING.
 - PLACE CONTROL JOINT ON SLOPES AT 20 FOOT SPACING.
 - DELETE 2 FOOT FLAT EDGE WHEN LINING IS BELOW TOP OF BANK. SEE MID-SLOPE LINING DETAIL.
 - UPSTREAM AND DOWNSTREAM TOE WALL 3 FOOT MINIMUM DEPTH AT BOTTOM OF SLOPE AND 8 INCHES THICK.
 - #4 AT 12 IN. O.C. BOTH DIRECTIONS MIN. OR EQUIVALENT WELDED WIRE FABRIC.

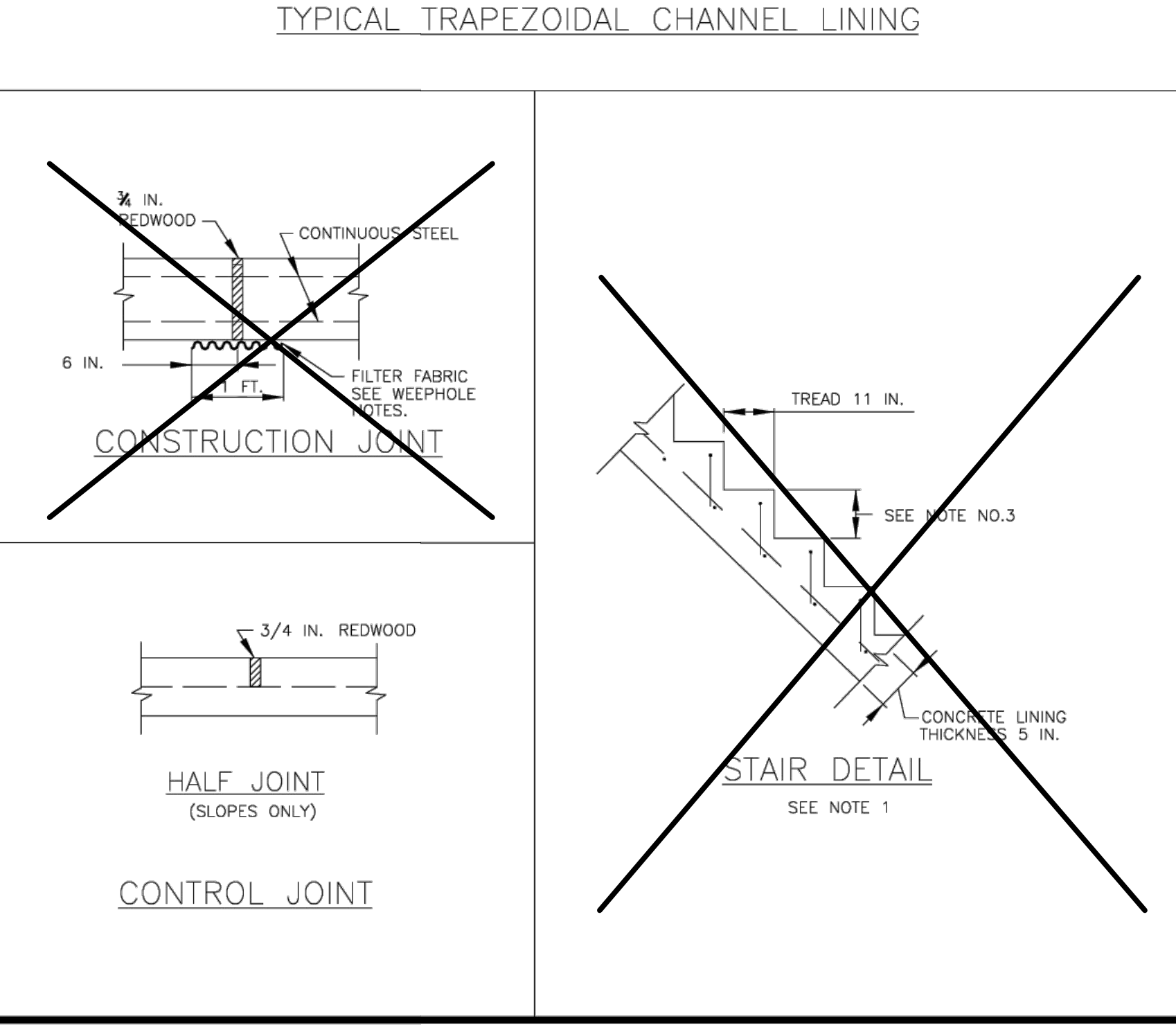
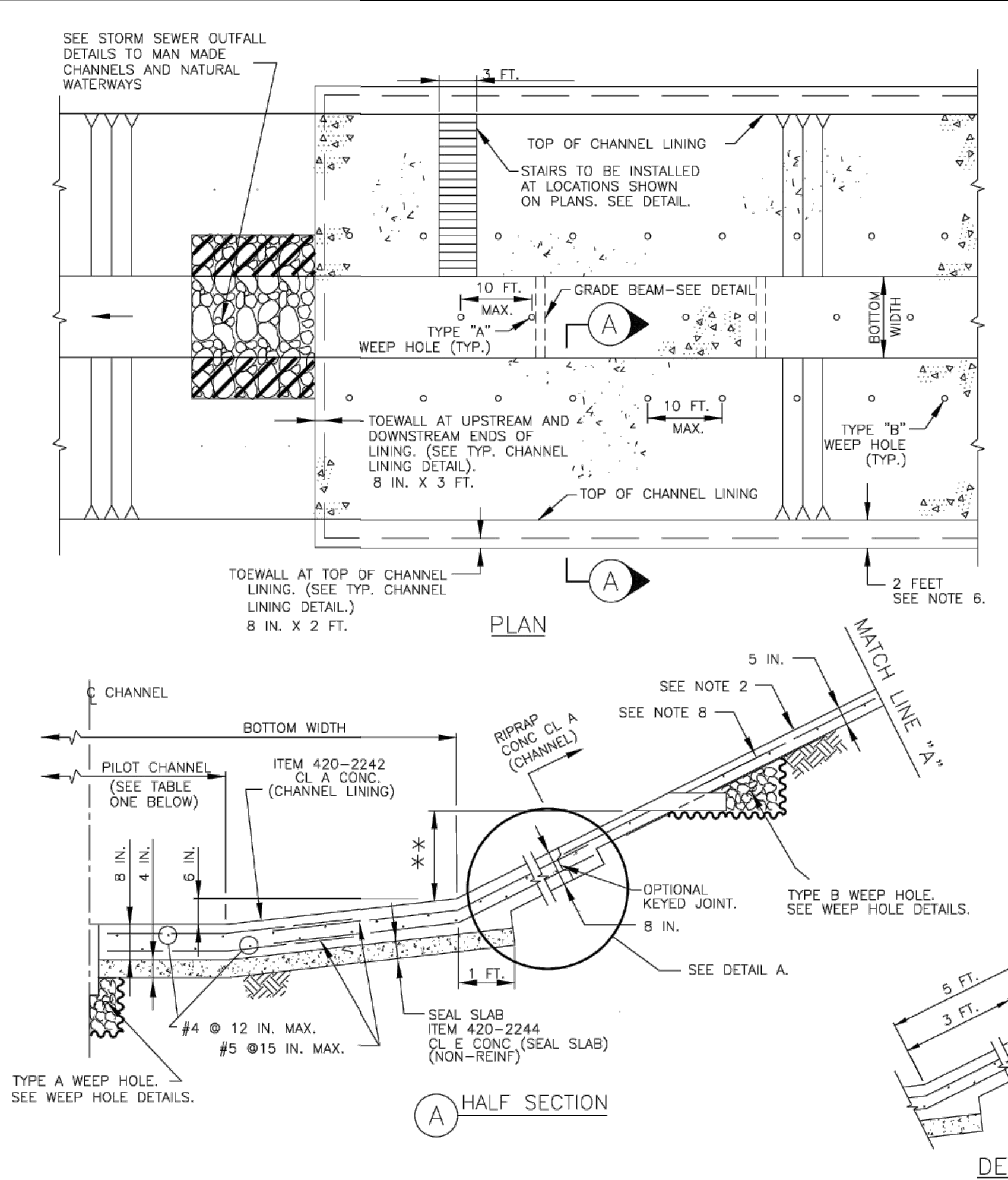
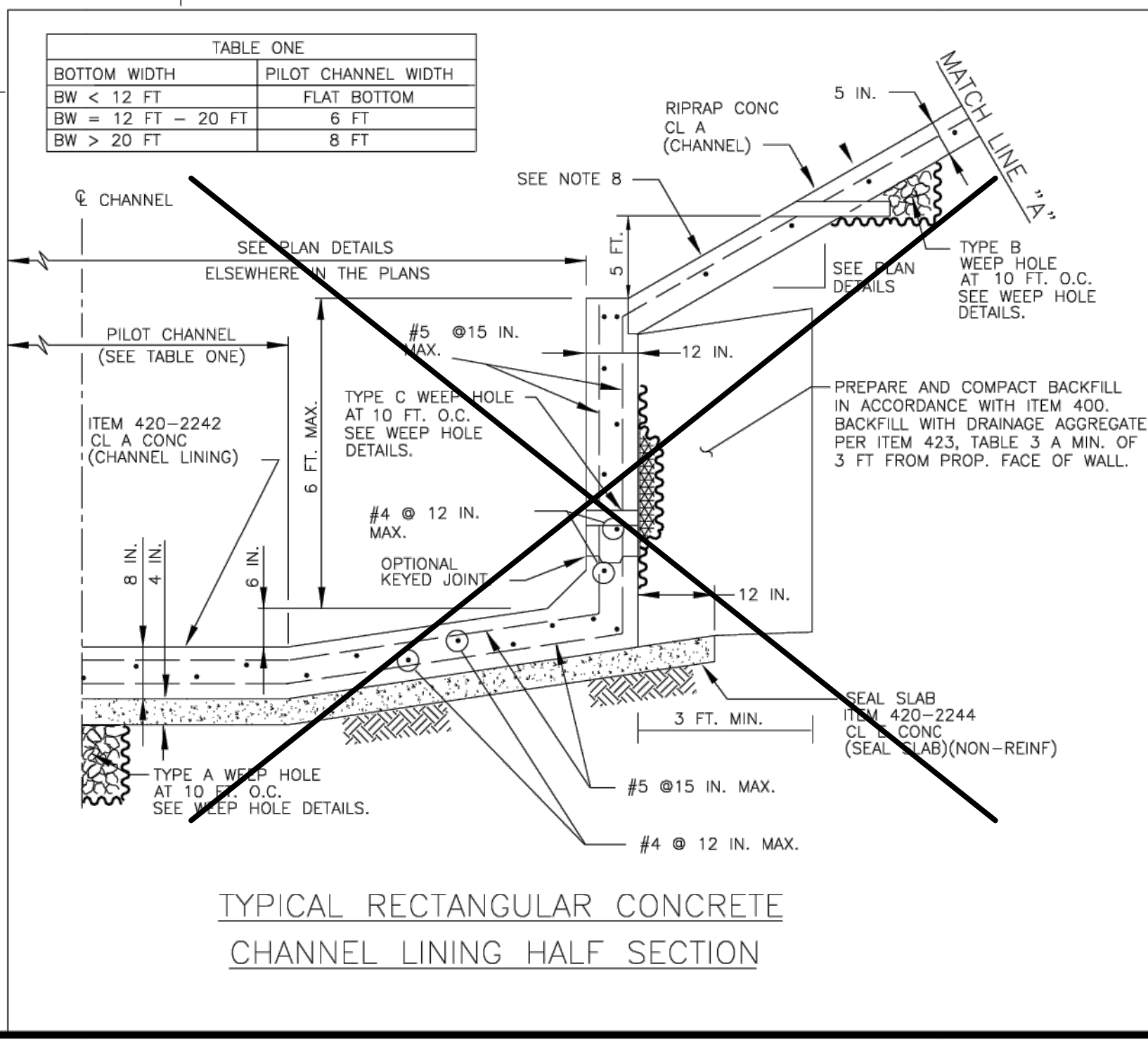
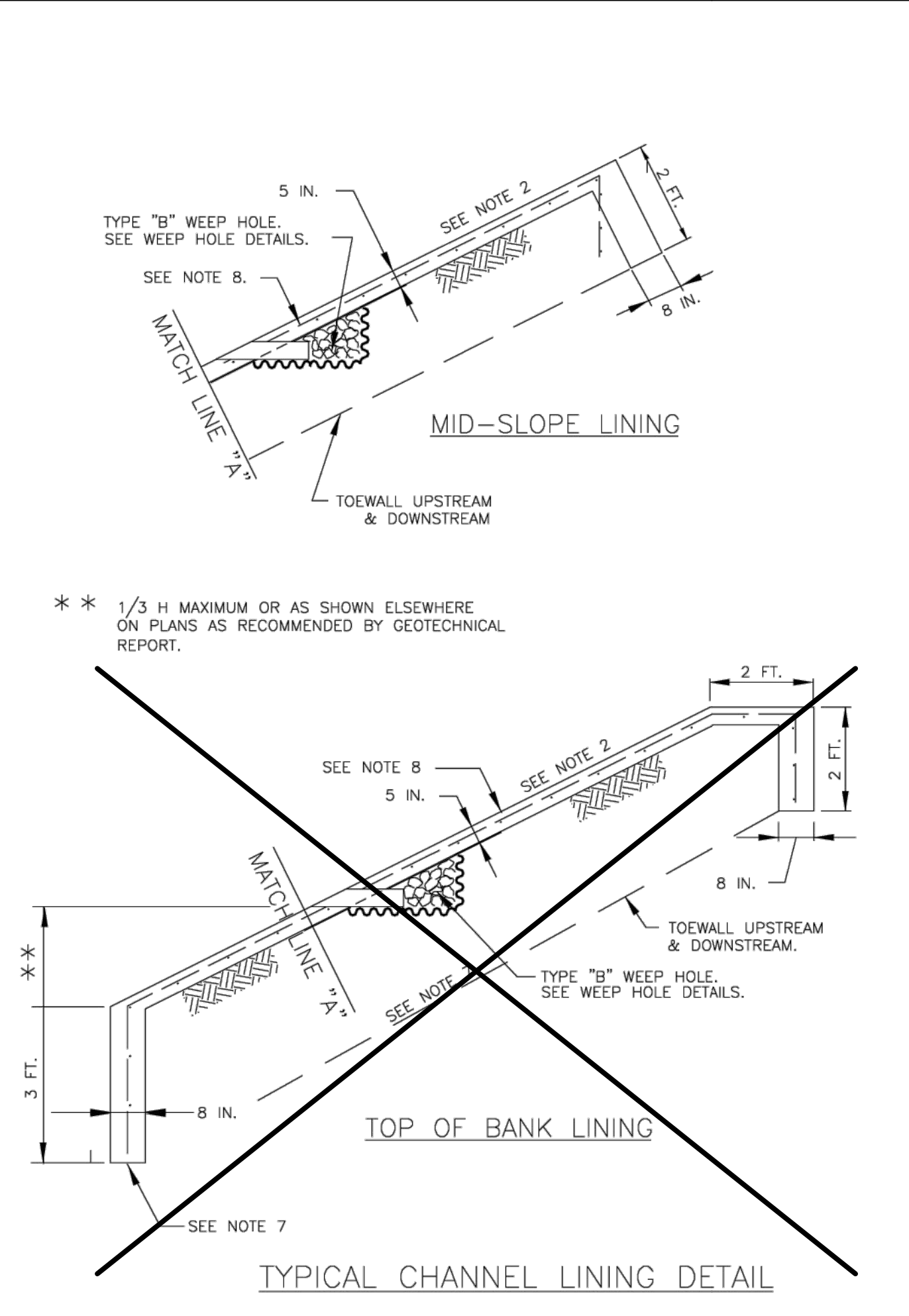
Texas Department of Transportation
Houston District

HCFCD
CONCRETE CHANNEL LINING
DETAILS

HCFCD-CCLD (1)

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© TxDOT DEC, 2012	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 11/2013 FIX MISPELLINGS	HOU	6		
	COUNTY	CONTROL	SECT	JOB
				HIGHWAY

STDG580



HAS FILE: C:\PW\WORK\ATKINS\TX01\WSATKINS_GOU4236\DOT06118\E231715C-CG-501.DWG
 PLOT DATE: 2023-08-15

ATKINS
Member of the SNC-Lavalin Group
LOCAL OFFICE:
920 MEMORIAL CITY WAY
STE. 400
HOUSTON, TX 77024
TEL: (713) 576-8500
ATKINS NORTH
AMERICA PE FIRM REG.
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WWW.ATKINSGLOBAL.COM

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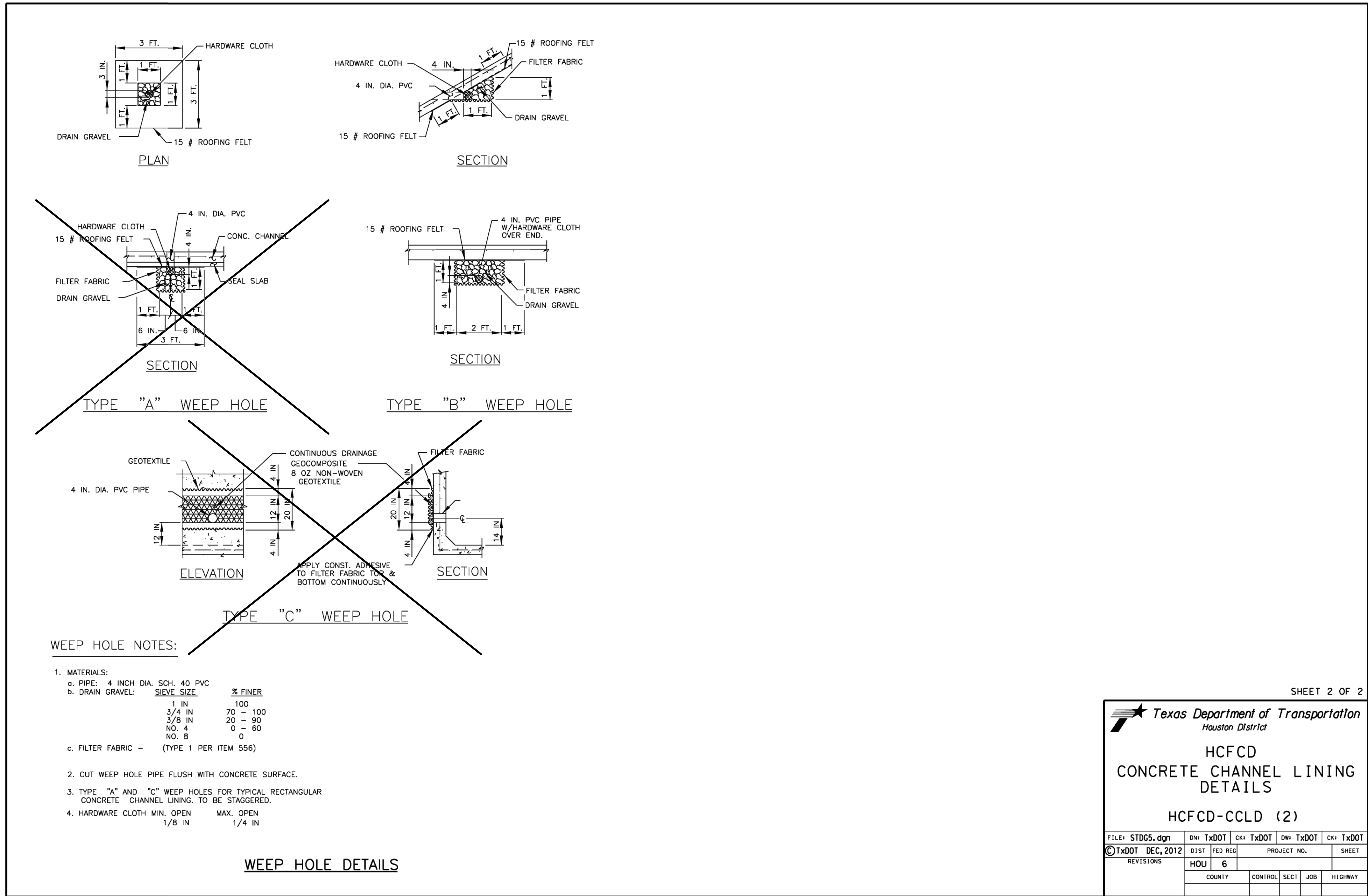
ELLINGTON AIRPORT (EFD)
**NORTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
CONCRETE CHANNEL LINING (2 OF 2)**

PROJECT MGR: JV
DESIGNER: JDP
DRAWN BY: JDP
CHECK BY: AC
SCALE:
DATE: 08/14/2023



APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO. 100082467
A.I.P. NO. _____
C.I.P. NO. _____
H.A.S. NO. 954
SHEET NO. _____



WEEP HOLE NOTES:

- MATERIALS:
 - PIPE: 4 INCH DIA. SCH. 40 PVC
 - DRAIN GRAVEL:

SIEVE SIZE	% FINER
1 IN	100
3/4 IN	70 - 100
3/8 IN	20 - 90
NO. 4	0 - 60
NO. 8	0
 - FILTER FABRIC - (TYPE 1 PER ITEM 556)
- CUT WEEP HOLE PIPE FLUSH WITH CONCRETE SURFACE.
- TYPE "A" AND "C" WEEP HOLES FOR TYPICAL RECTANGULAR CONCRETE CHANNEL LINING TO BE STAGGERED.
- HARDWARE CLOTH MIN. OPEN 1/8 IN MAX. OPEN 1/4 IN

WEEP HOLE DETAILS

SHEET 2 OF 2

Texas Department of Transportation
Houston District

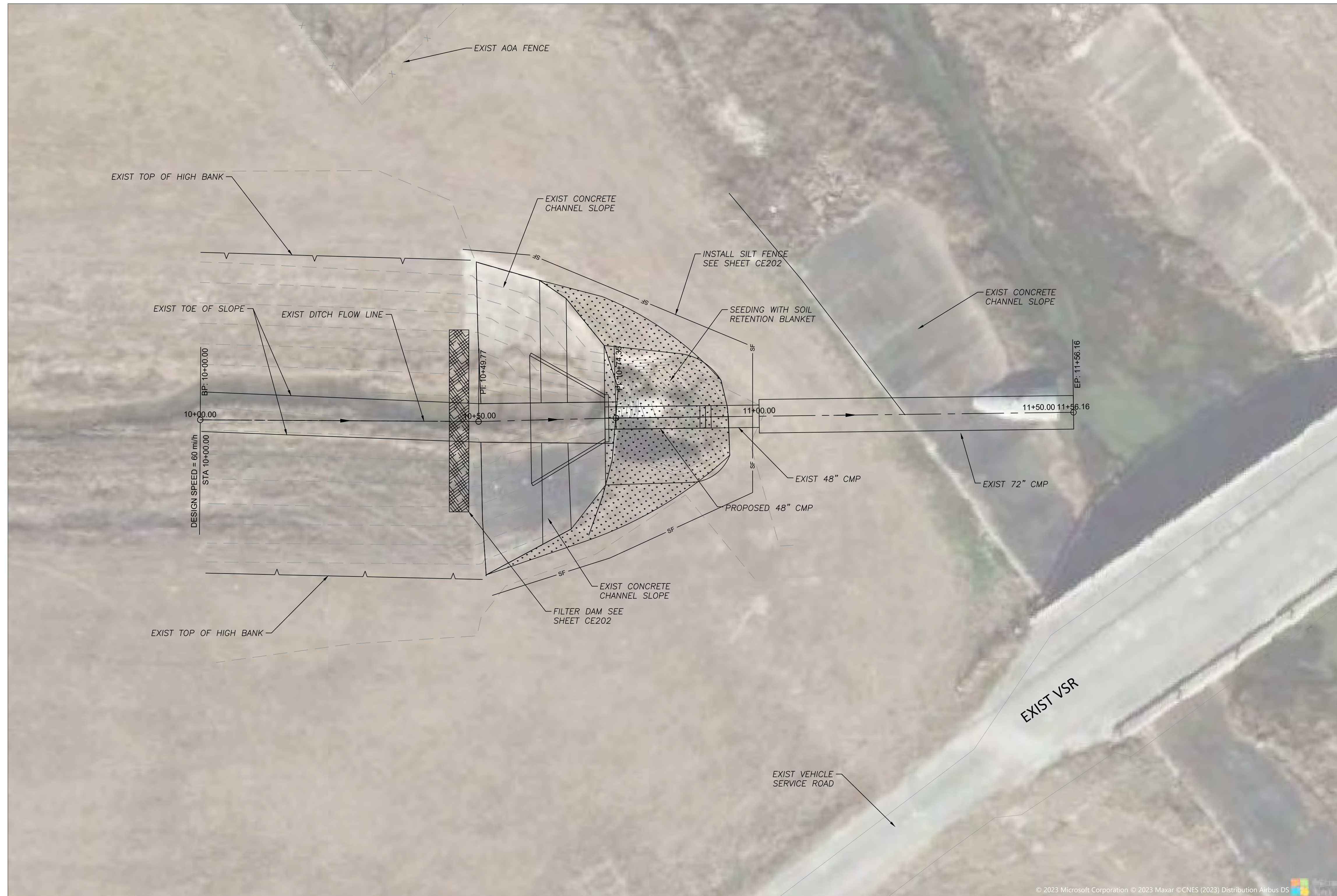
HCFCD
CONCRETE CHANNEL LINING
DETAILS

HCFCD-CCLD (2)

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©TxDOT DEC, 2012	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		
	COUNTY	CONTROL	SECT	JOB
				HIGHWAY

STDG5Bb

HAS FILE: C:\PW\WORK\ATKINS\ATKIN\TX01\WSATKINS_GOU4236\0106118\E231715C-CE-101.DWG
 PLOT DATE: 2023-08-15



LEGEND		
— SF —	SILT FENCE	
	SEEDING WITH SOIL RETENTION BLANKET	
	FILTER DAM	

NOTES		
1. SEE EROSION CONTROL DETAILS ON SHEET CE202		

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PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

0' 5' 10' 20'
 GRAPHIC SCALE

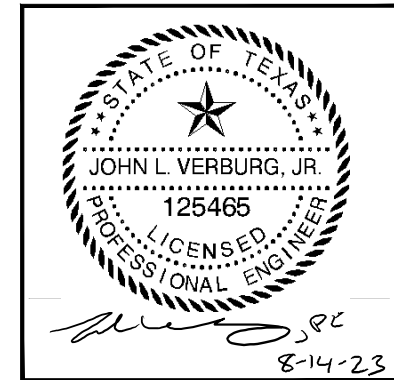
HOUSTON AIRPORT SYSTEM
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ATKINS
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LOCAL OFFICE:
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 HOUSTON, TX 77024
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ELLINGTON AIRPORT (EFD)
**NORTH CULVERT RECONSTRUCTION
 EROSION CONTROL PLAN**

PROJECT MGR: JV
 DESIGNER: JDP
 DRAWN BY: JDP
 CHECK BY: AC
 SCALE:
 DATE: 08/14/2023



APPROVED BY:

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PROJECT NO.
 100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO.
 954

SHEET NO.

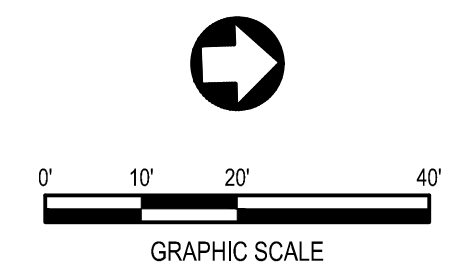
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HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING

10351 STELLA LINK RD
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512-767-1009
TBPE FIRM No. 20690



REVISIONS		
NO.	DESCRIPTION	DATE

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
DEMOLITION PLAN**

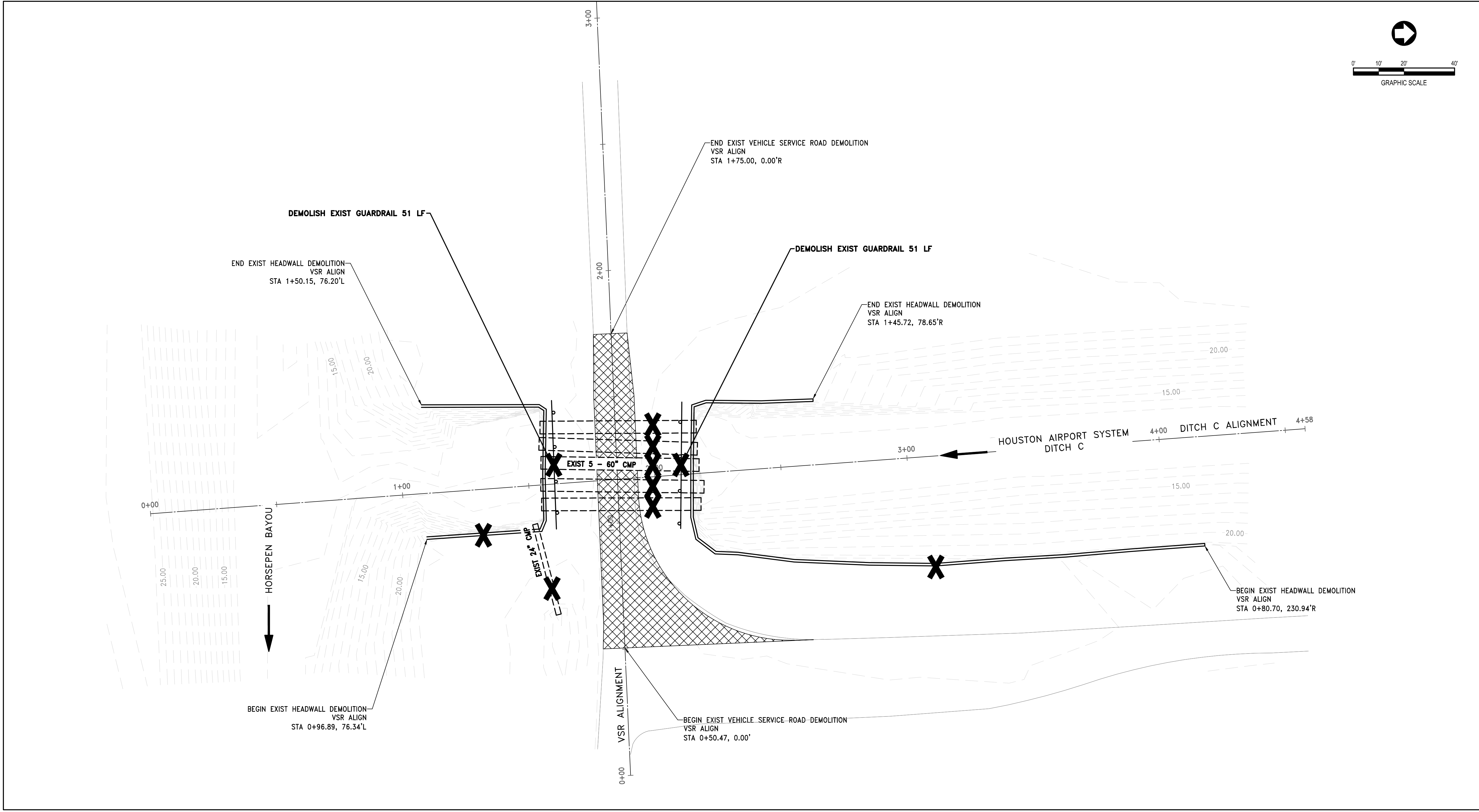
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DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	1:20
DATE:	8/28/2023



APPROVED BY: _____
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

CD102



LEGEND

- FLOW DIRECTION
- PROP DEMOLITION
- REMOVE EXIST STRUCTURE

NOTES

1. VEHICLE SERVICE ROAD TO REMAIN OPERATIONAL AT ALL TIMES
2. SEE PROP VEHICLE SERVICE ROAD AND GRADING AND DRAINAGE PLAN ON SHEETS CS102 AND CG202

HAS FILED: \EDGE ENGINEERING\PROJECTS - 100082467 - 981 - 01\TINS_LFD_CULVERTS\6-CAD SHEETS\HAS_001_SHEET DEMO.DWG



HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

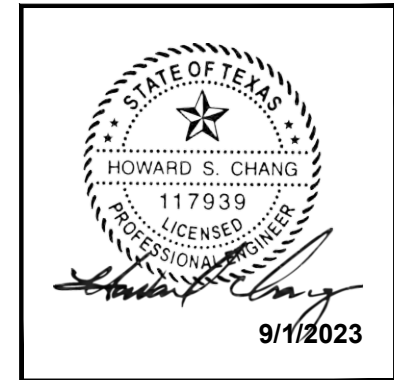
REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)

SOUTH CULVERT RECONSTRUCTION ROADWAY GEOMETRY PLAN AND PROFILE

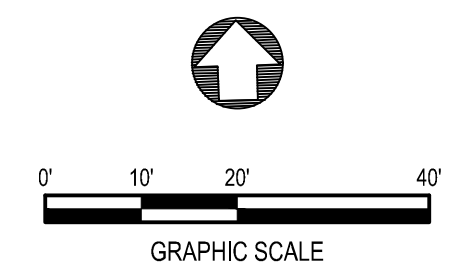
PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	1:20
DATE:	9/1/2023



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DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

CS102

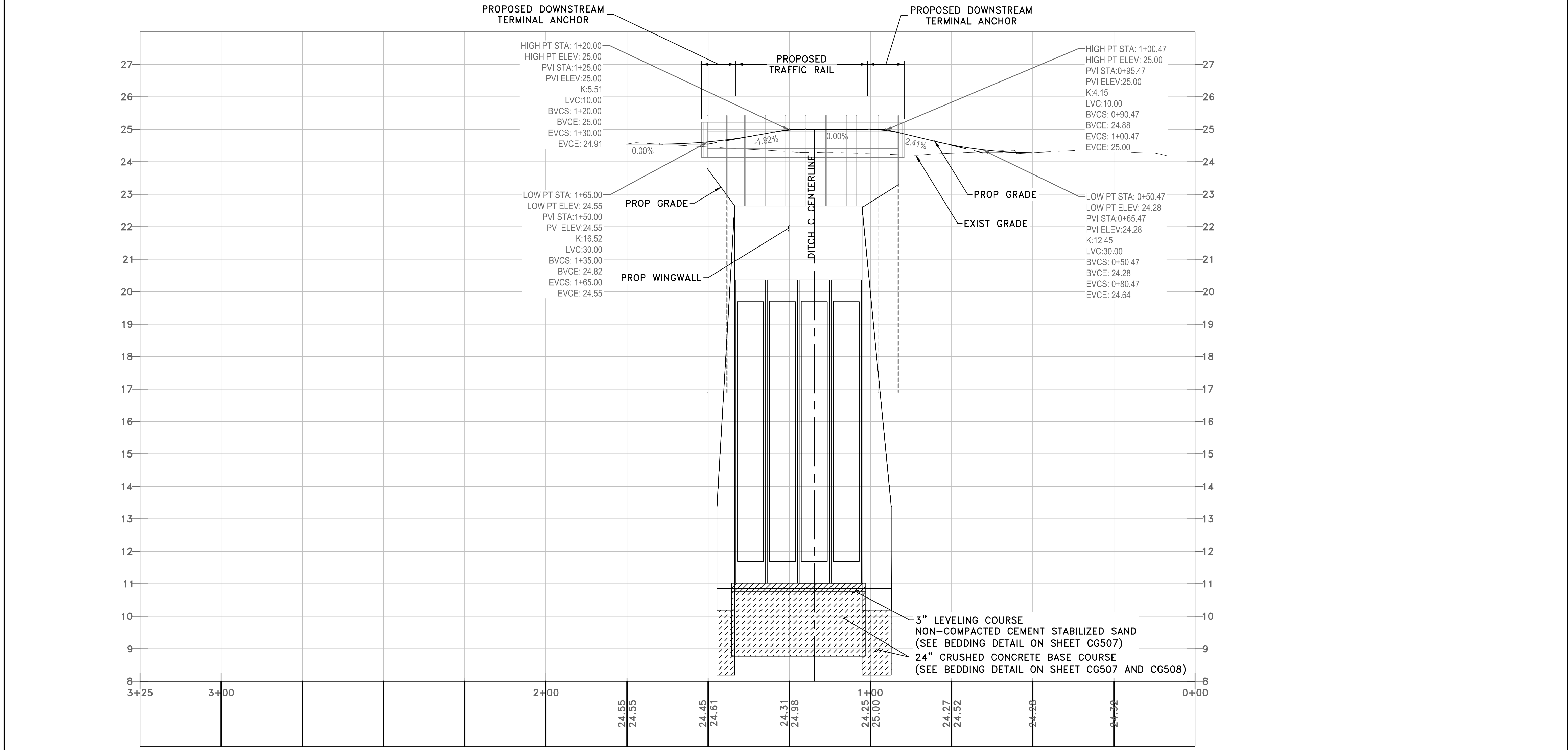
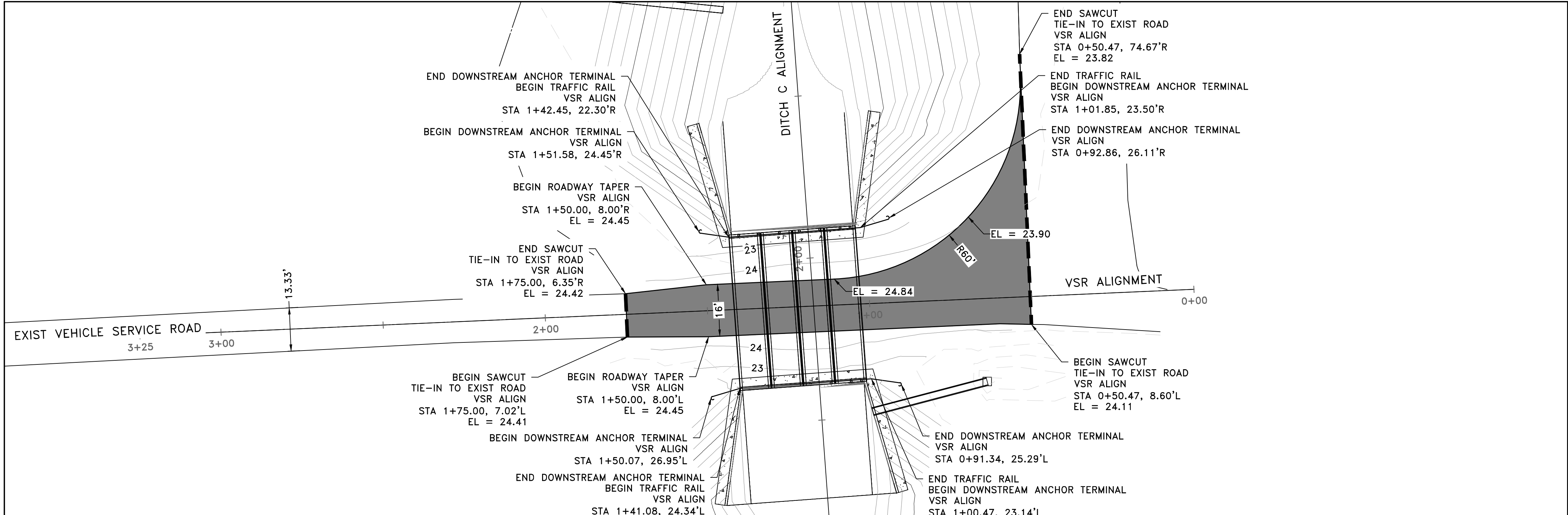


LEGEND

- PROP ASPHALT PVMT
- PROP DOWNSTREAM ANCHOR TERMINAL
- PROP METAL BEAM GUARD FENCE

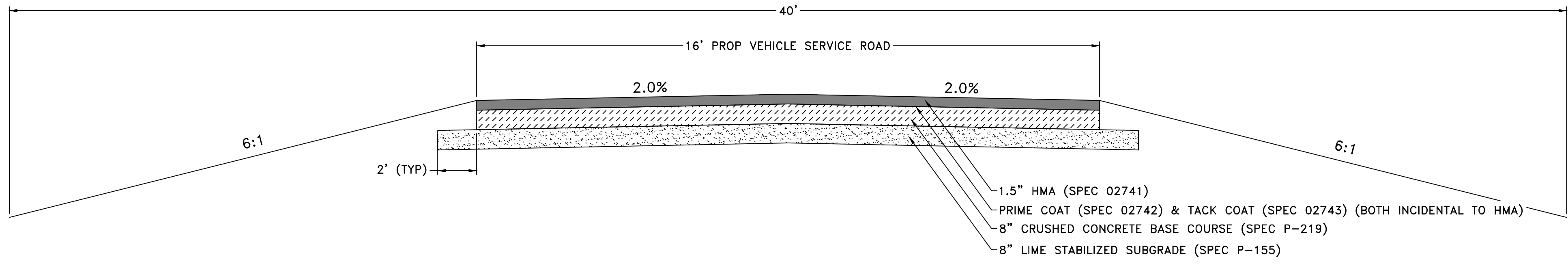
NOTES

- SEE DOWNSTREAM TERMINAL ANCHOR DETAIL ON SHEET CS203
- SEE TRAFFIC RAIL DETAIL ON SHEETS CS204 TO CS205



HAS FILED: \EDGE ENGINEERING\PROJECTS - POORWAYS\HAS-991-01\THINS_LEFT_CULVERTS\6-CAD\SHEETS\HAS_001_SHEET PAVING.DWG

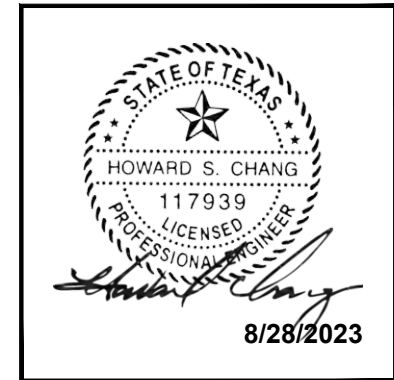
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 P000\HAS-981-00\TINS_LFD_CULVERTS\6-CAD\SHEETS\HAS_001_SHEET PAVING.DWG



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NO.	DESCRIPTION	DATE	BY

ELLINGTON AIRPORT (EFD)
SOUTH CULVERT RECONSTRUCTION
TYPICAL PAVEMENT SECTION

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	----
DATE:	8/28/2023

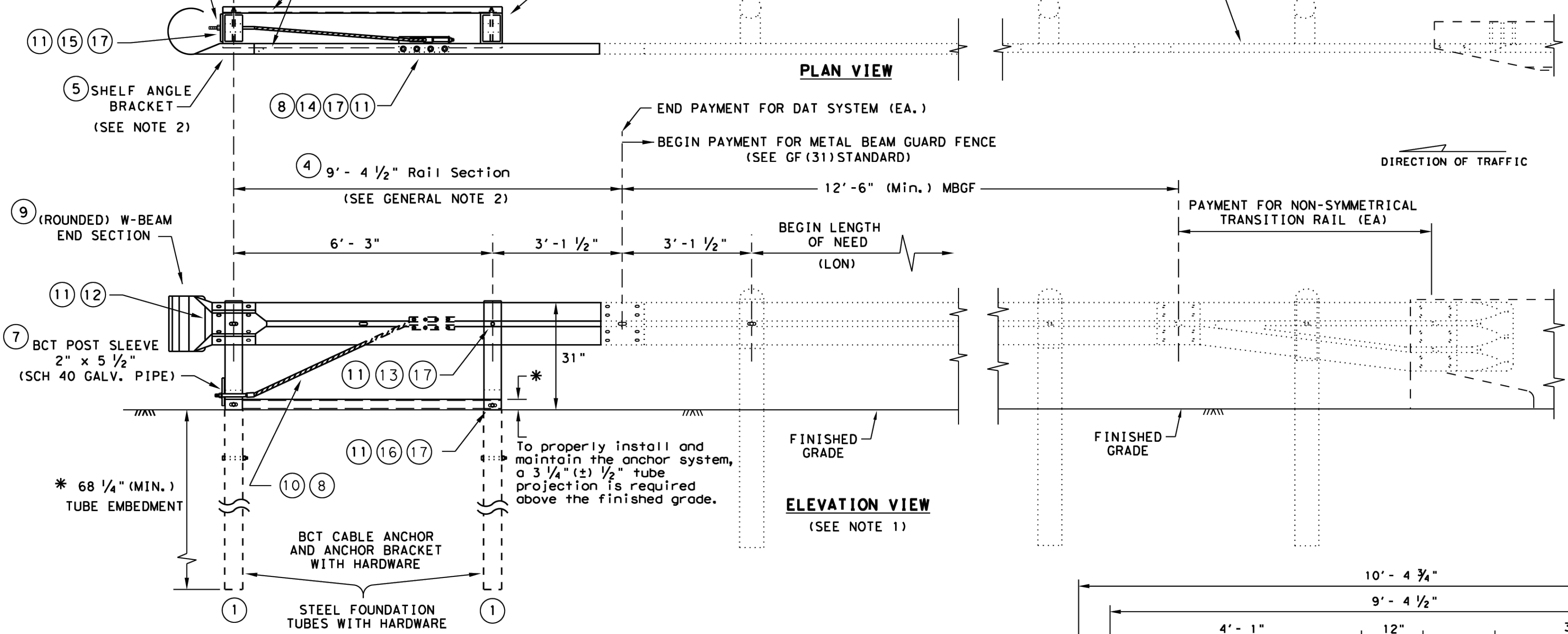


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 DIRECTOR
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PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

BREAKAWAY CABLE TERMINAL (BCT)
CABLE ANCHOR ASSEMBLY WITH
CABLE BRACKET, BEARING PLATE
AND STANDARD HARDWARE.



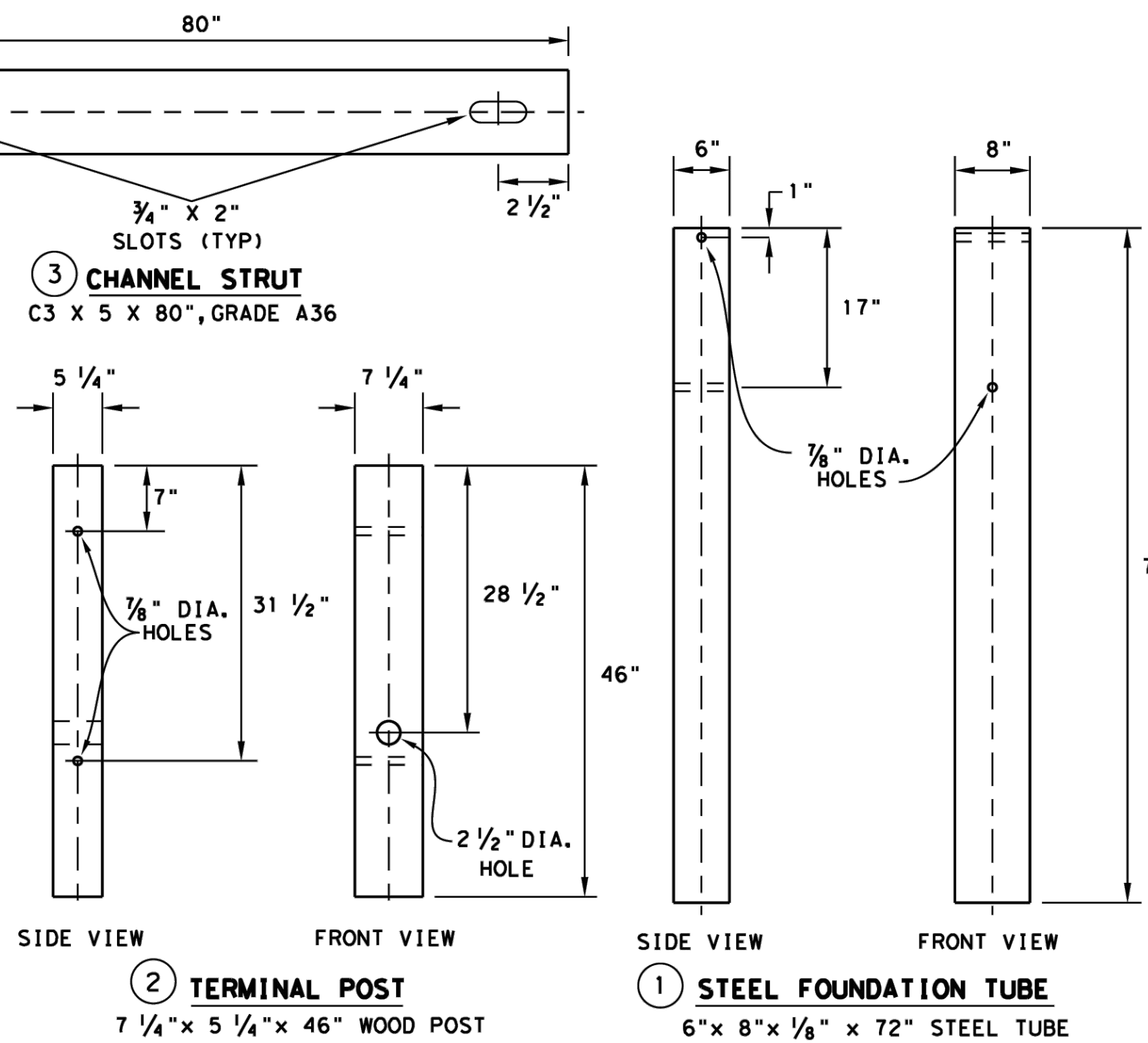
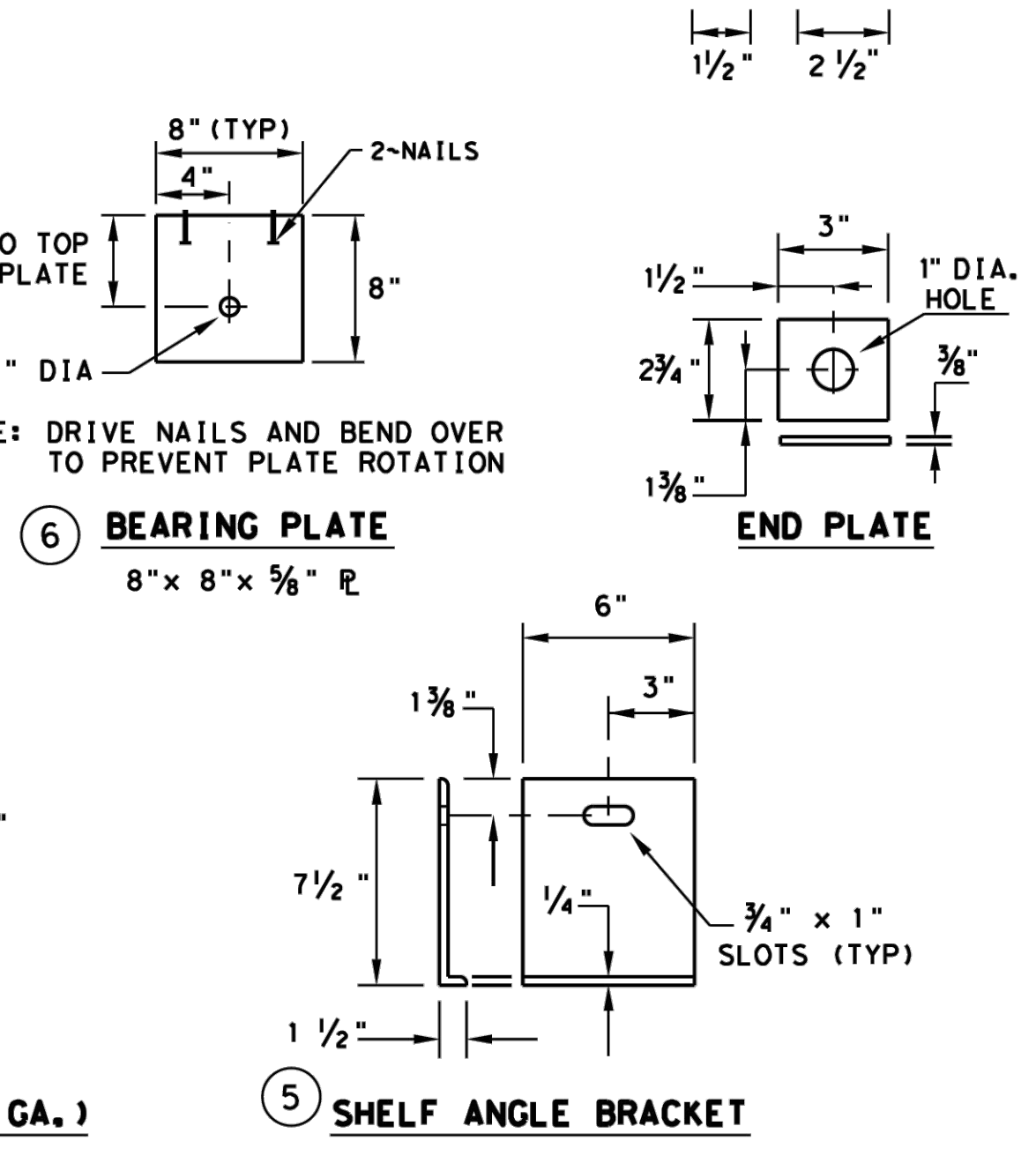
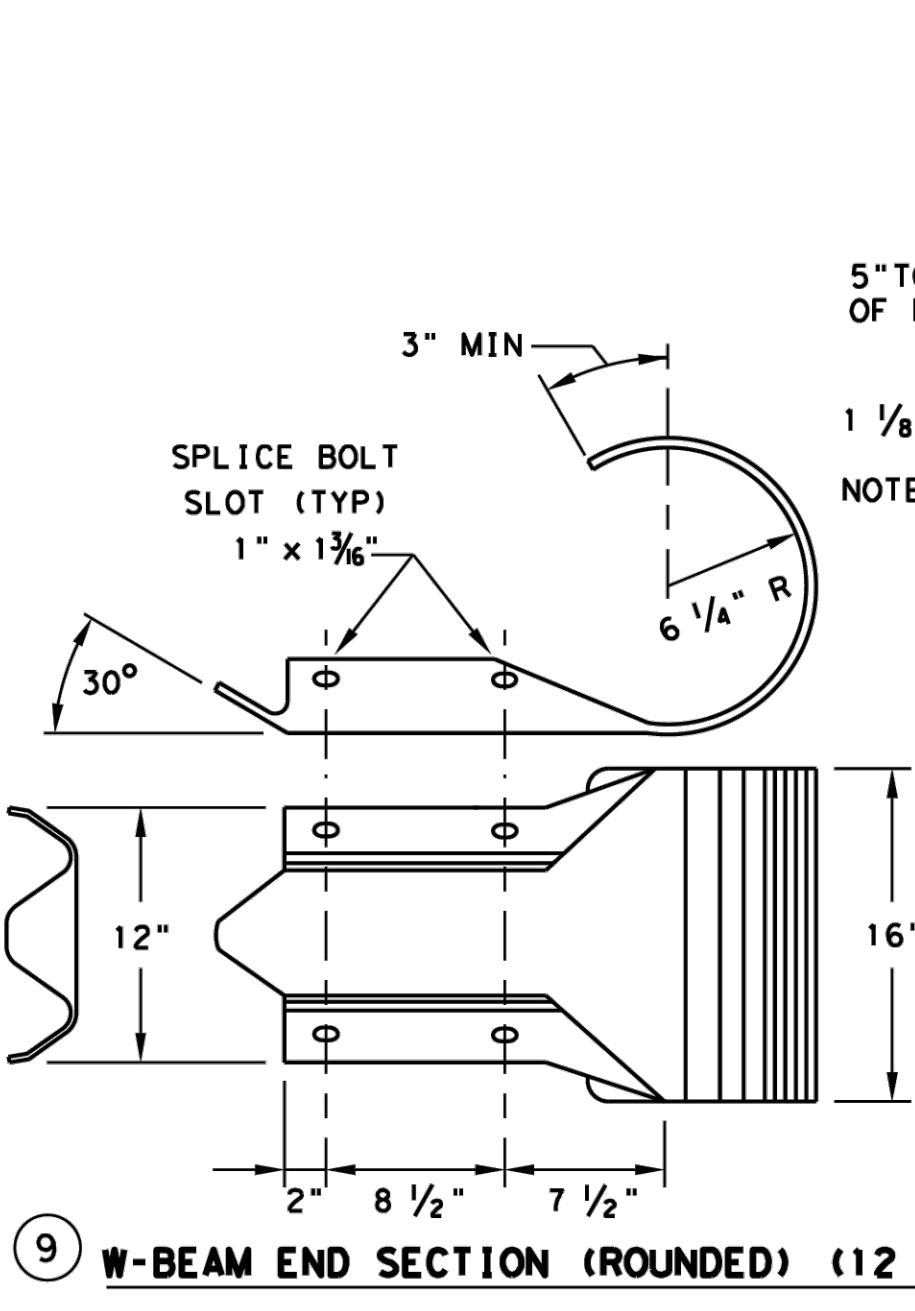
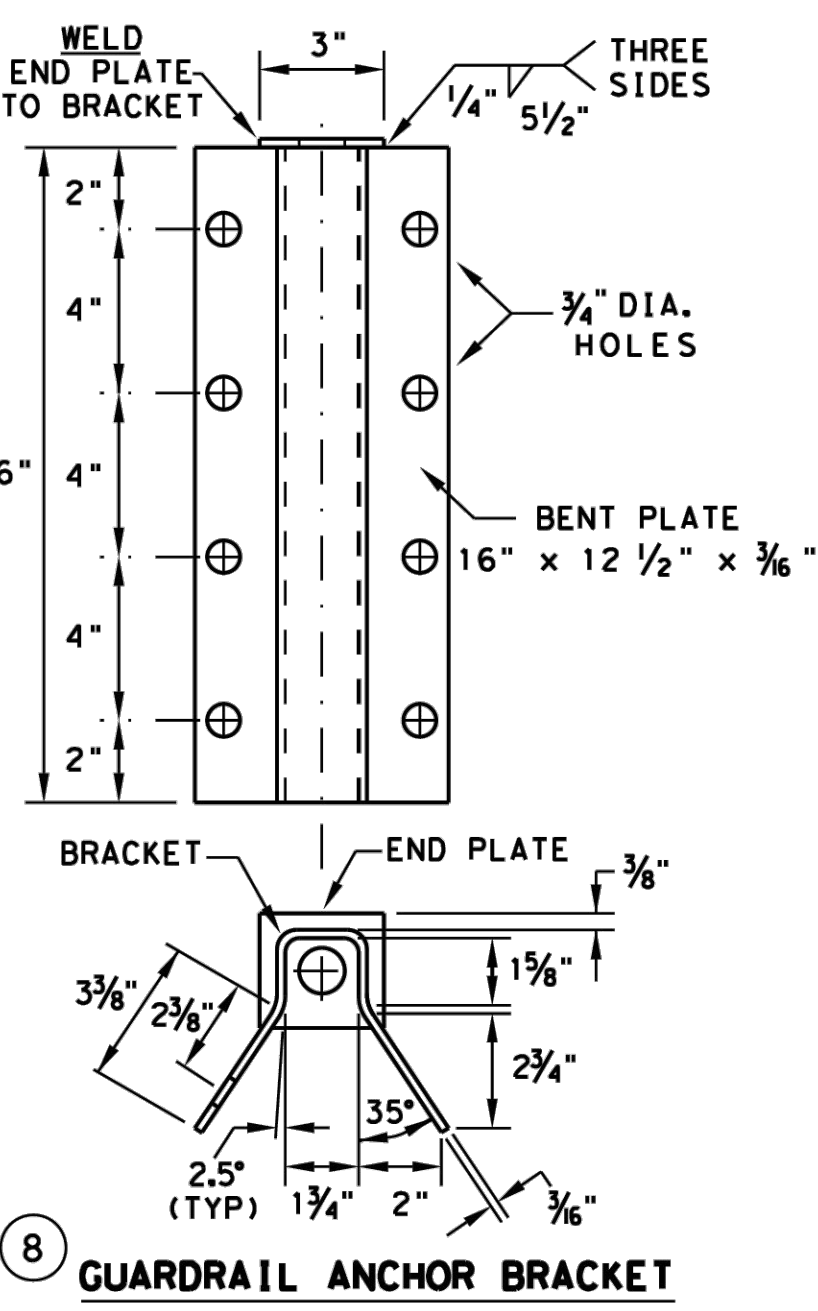
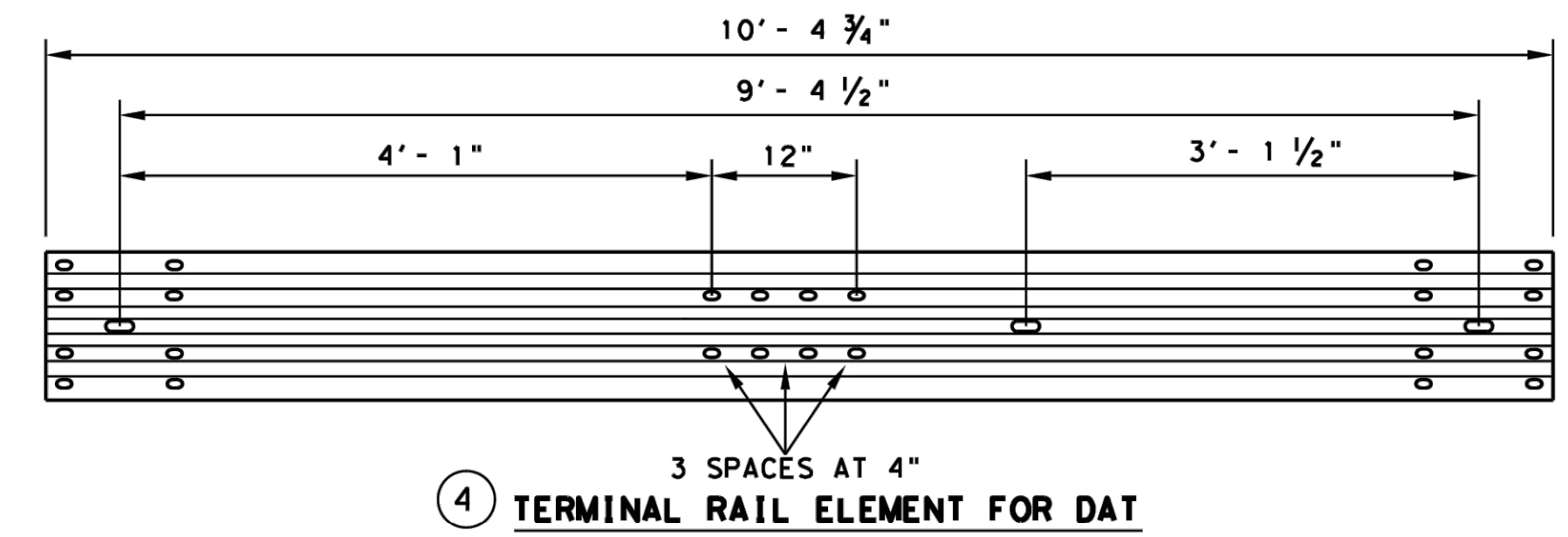
DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

- GENERAL NOTES**
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
 2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
 3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
 4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
 5. REFER TO GF (31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
1	STEEL FOUNDATION TUBE	2
2	DAT TERMINAL POST	2
3	CHANNEL STRUT	2
4	TERMINAL RAIL ELEMENT	1
5	SHELF ANGLE BRACKET	1
6	BCT BEARING PLATE	1
7	BCT POST SLEEVE	1
8	GUARDRAIL ANCHOR BRACKET	1
9	(ROUNDED) W-BEAM END SECTION	1
10	BCT CABLE ANCHOR	1
11	RECESSED NUT, GUARDRAIL	20
12	1 1/4" BUTTON HEAD BOLT	4
13	10" BUTTON HEAD BOLT	2
14	5/8" X 2" HEX HEAD BOLT	8
15	5/8" X 8" HEX HEAD BOLT	4
16	5/8" X 10" HEX HEAD BOLT	2
17	5/8" FLAT WASHER	18



Texas Department of Transportation
Design Division Standard

METAL BEAM GUARD FENCE (DOWNSTREAM ANCHOR TERMINAL) TL-3 MASH COMPLIANT GF (31) DAT-19

FILE: gf31dat19.dgn
DN: TxDOT CK: KM DW: VP CK: CGL/AG
© TxDOT: NOVEMBER 2019
REVISONS

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY	SHEET NO.	

HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

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ELLINGTON AIRPORT (EPD)

SOUTH CULVERT RECONSTRUCTION PAVING DETAILS

DOWNSTREAM ANCHOR TERMINAL

PROJECT MGR: HSC
DESIGNER: HSC
DRAWN BY: HSC
CHECK BY: NRP
SCALE: ---
DATE: 8/28/2023

STATE OF TEXAS
HOWARD S. CHANG
117939
REGISTERED PROFESSIONAL ENGINEER
8/28/2023

APPROVED BY: _____
DIRECTOR HOUSTON AIRPORT SYSTEM

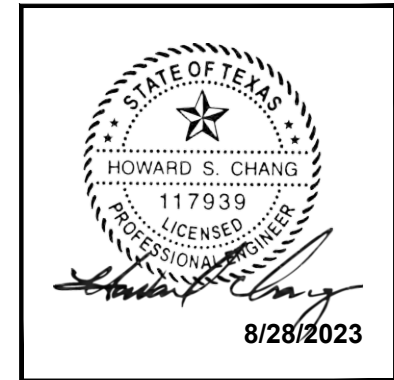
PROJECT NO. 100082467
A.I.P. NO. _____
C.I.P. NO. _____
H.A.S. NO. 954
SHEET NO. _____

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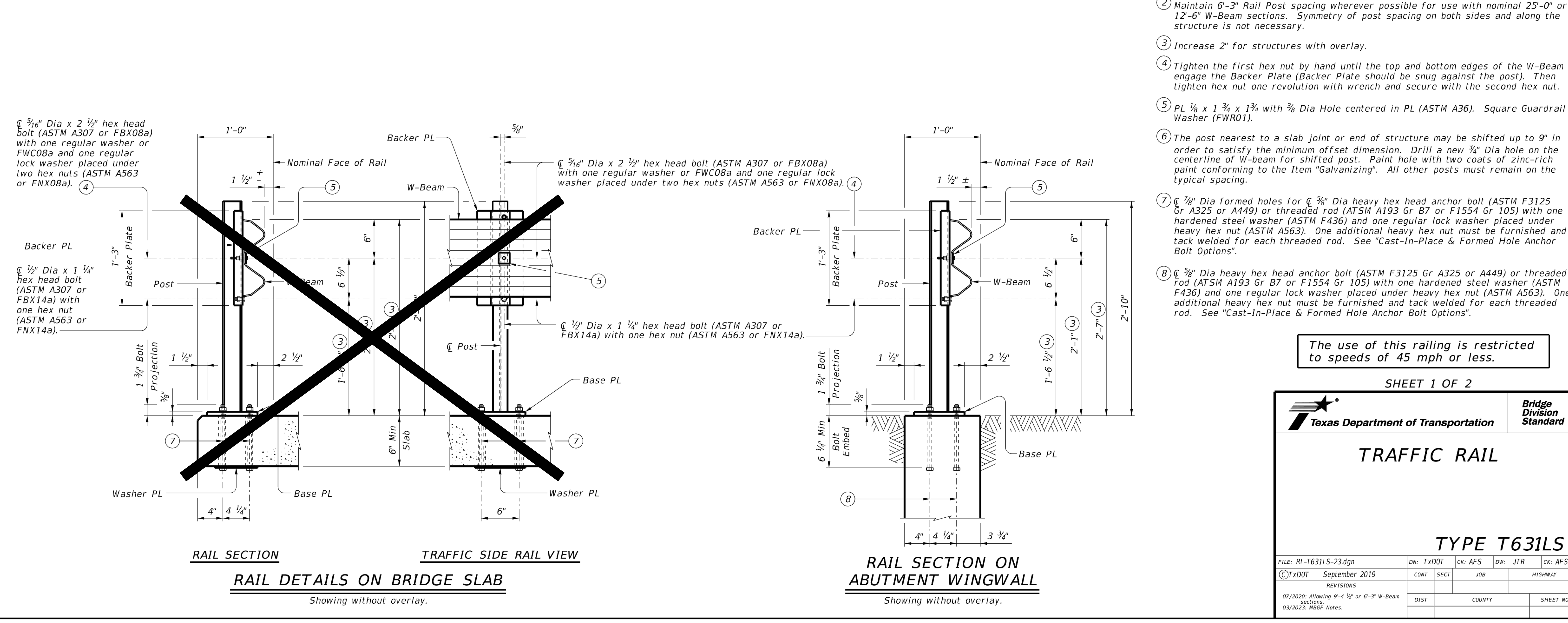
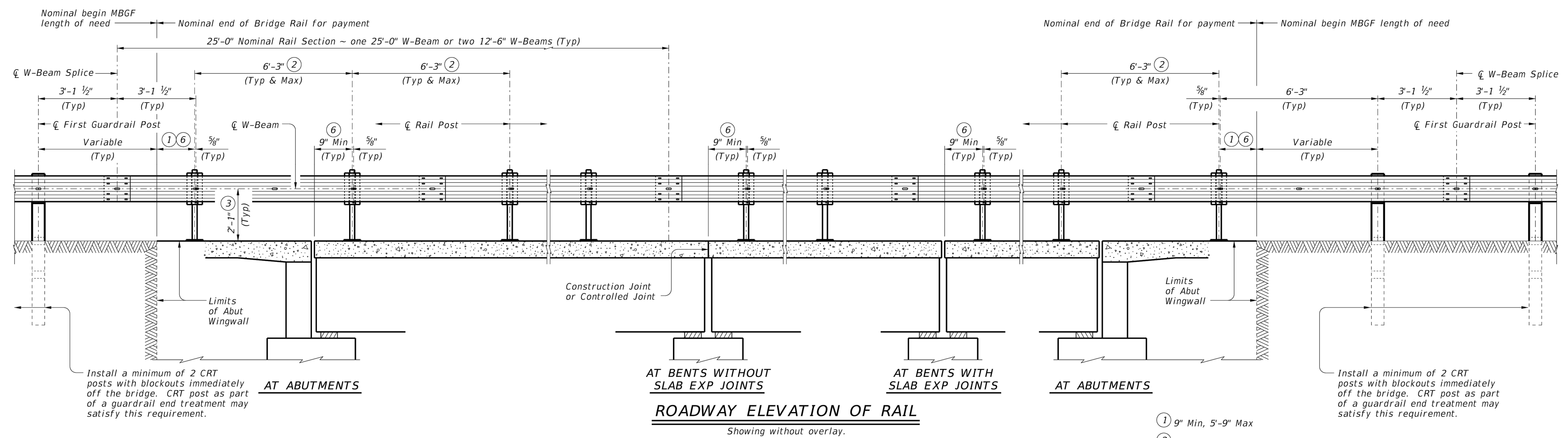
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**SOUTH CULVERT RECONSTRUCTION
 PAVING DETAILS
 TRAFFIC RAIL (1 OF 2)**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023



APPROVED BY:	
DIRECTOR	HOUSTON AIRPORT SYSTEM
PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	



- ① 9" Min, 5'-9" Max
- ② Maintain 6'-3" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.
- ③ Increase 2" for structures with overlay.
- ④ Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.
- ⑤ PL 1/8 x 1 3/4 x 1 3/4 with 3/8 Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).
- ⑥ The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new 3/4" Dia hole on the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.
- ⑦ 3/8" Dia formed holes for 3/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".
- ⑧ 3/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

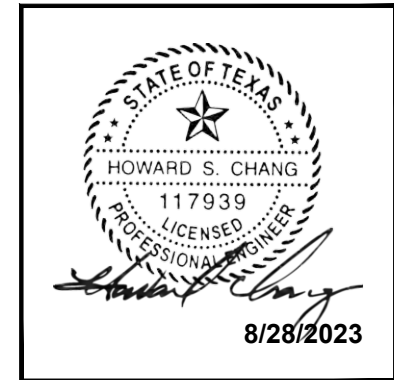
HAS FILED: EDGE ENGINEERING\PROJECTS - ROADWAYS\AS-981-01\TNS_LEFT_CULVERTS\AS-CAD\SHEETS\HAS_DOT_SHEET ROADWAY DETAILS

REVISIONS

NO.	DESCRIPTION	DATE BY

**SOUTH CULVERT RECONSTRUCTION
 ROADWAY DETAILS
 TRAFFIC RAIL (2 OF 2)**

PROJECT MGR: HSC
 DESIGNER: HSC
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 CHECK BY: NRP
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 DATE: 8/28/2023



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PROJECT NO.
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H.A.S. NO.
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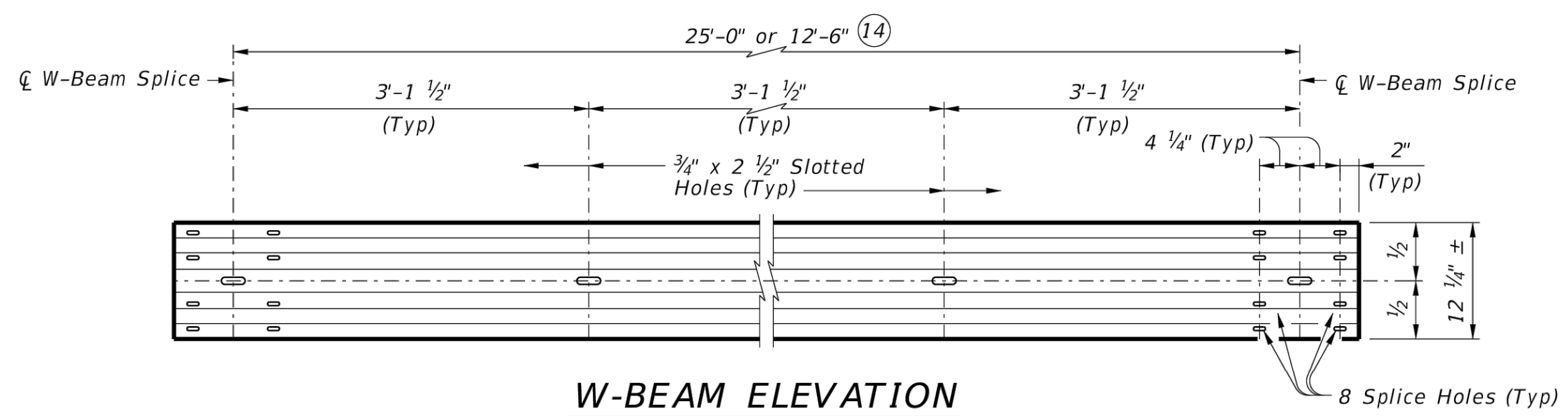
MBGF AND END TREATMENT NOTES:
 This traffic railing must be anchored by metal beam guard fence (MBGF) and/or guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is: SGT; or DAT plus 12.5' of MBGF, as applicable. Provide CRT posts as shown in "Roadway Elevation of Rail." The SGT and DAT plus 12.5' MBGF must be installed tangent to primary roadway.

CONSTRUCTION NOTES:
 Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.
 Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail. At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.
 It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.
 Round or chamfer exposed edges of rail post and backer plate to approximately 1/16" by grinding.
 Shop drawings are not required for this rail.

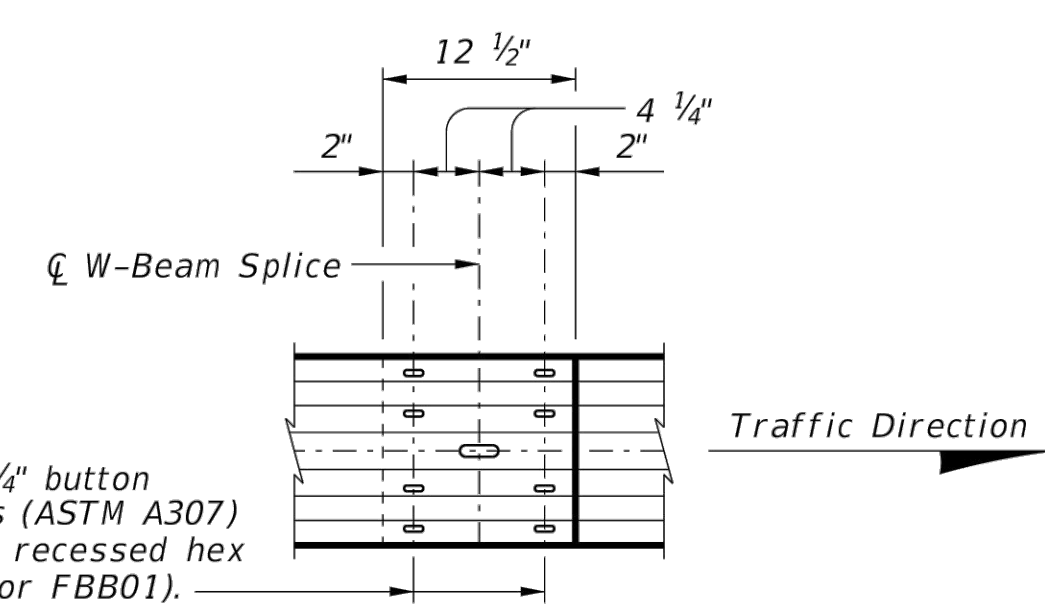
MATERIAL NOTES:
 Galvanize all steel components.
 Anchor bolts for base plate must be 5/8" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.
 Optional adhesive anchorage system must be 5/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 3/4". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

W-beam must meet the requirements of Item 540, "Metal Beam Guard Fence" in accordance with the plans. The Contractor may furnish rail elements of 25'-0" or 12'-6" (Nominal) lengths and a single rail element of 9'-4 1/2" or 6'-3" (Nominal) length. W-Beam must have slotted holes at 3'-1 1/2".
 Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

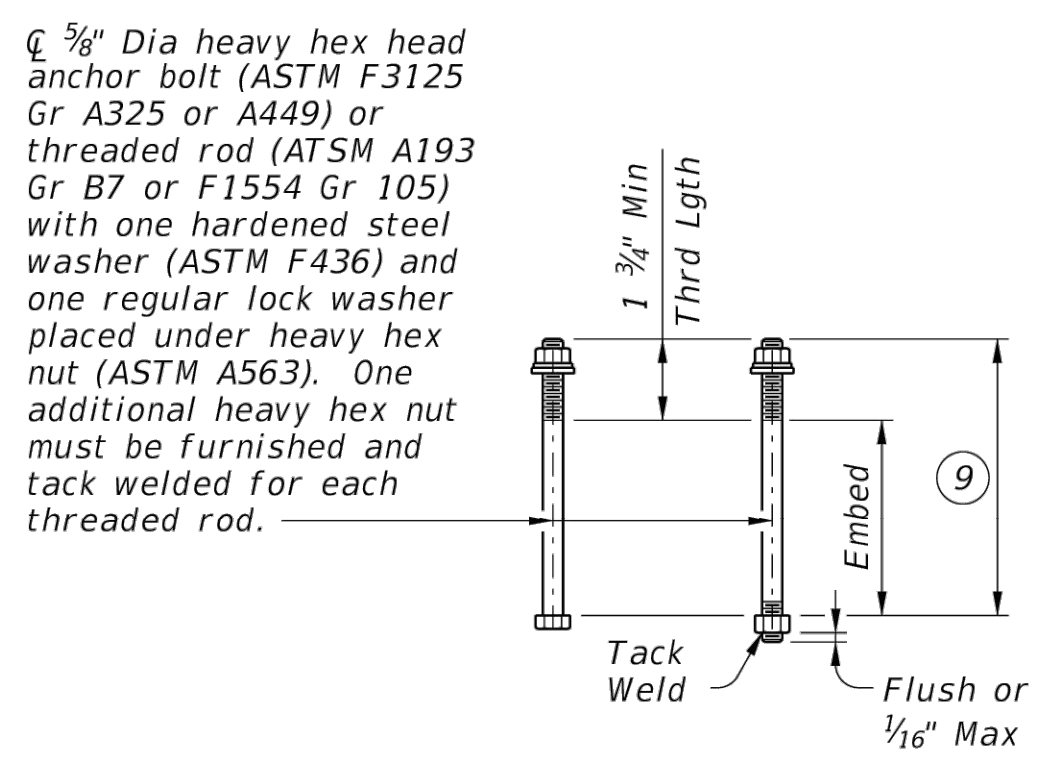
GENERAL NOTES:
 This railing has been successfully evaluated by full-scale crash test to meet MASH TL-2 criteria. This railing can be used for speeds of 45 mph and less.
 This rail is designed to deflect approximately 2' to 2'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.
 Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.
 Average weight of railing with no overlay: 13 plf total.



W-BEAM ELEVATION

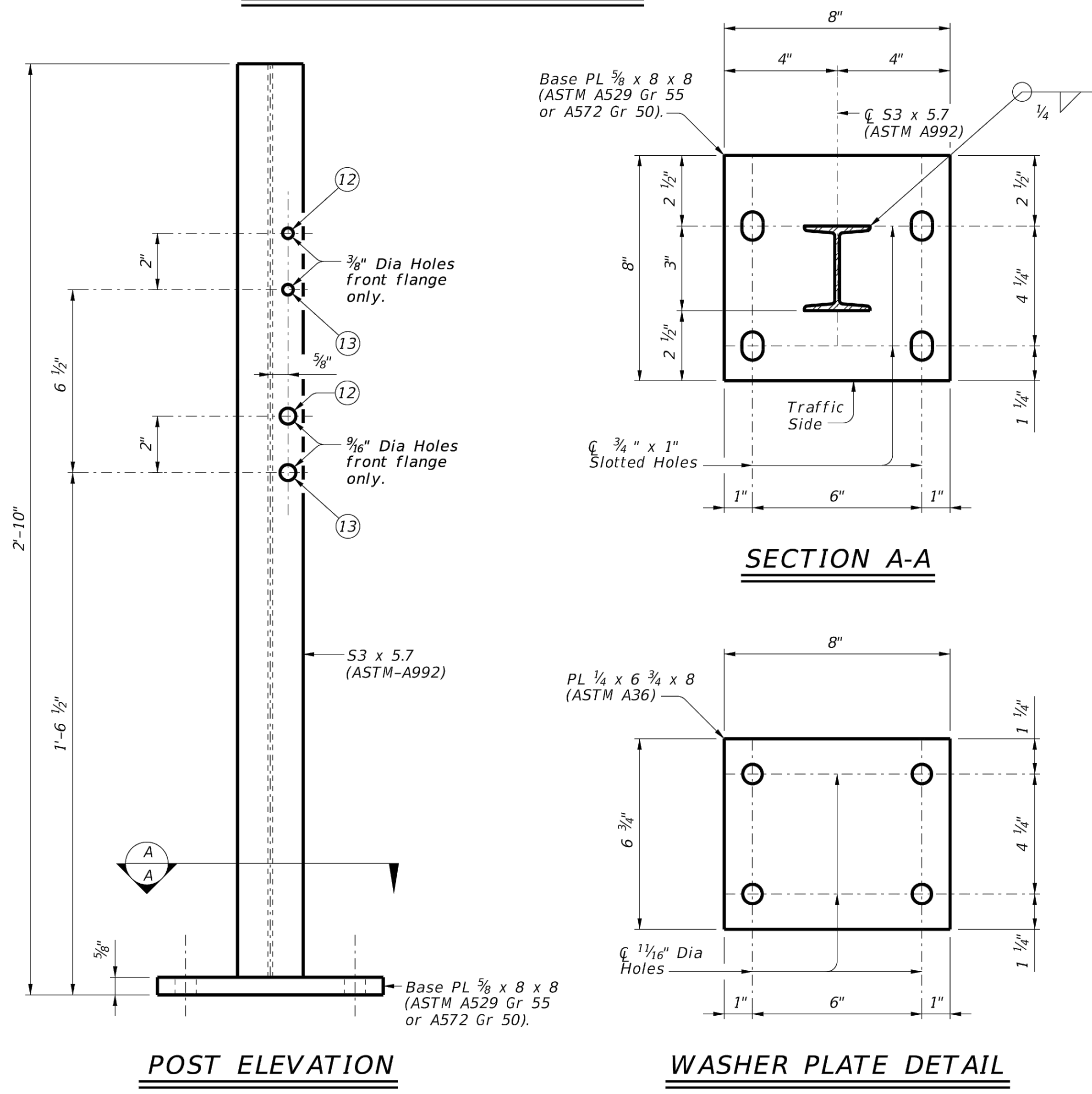


W-BEAM SPLICE ELEVATION



CAST-IN-PLACEMENT & FORMED HOLE ANCHOR BOLT OPTIONS 10

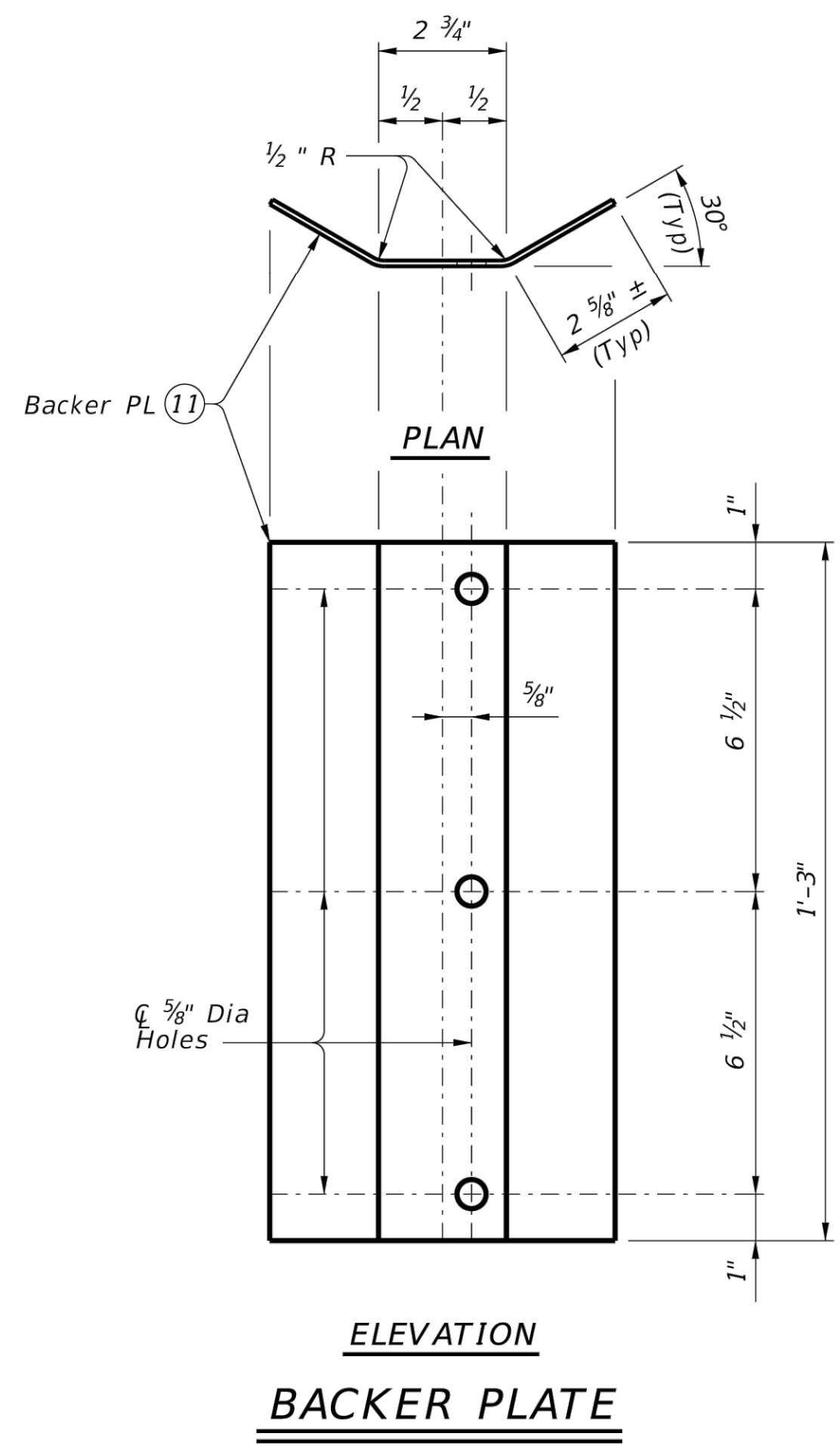
- 9 See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".
- 10 See "Material Notes" for anchor bolt information.
- 11 Backer PL 1/8 x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).
- 12 Used for structures with overlay.
- 13 Used for structures without overlay.
- 14 At the nominal end of the bridge rail for payment, one 9'-4 1/2" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



POST ELEVATION

WASHER PLATE DETAIL

SECTION A-A



BACKER PLATE

HAS FILED: EDGE ENGINEERING\PROJECTS - ROADWAY\AS-981-ATTN: LEO_VERTIS\HAS_DOT_SHEET ROADWAY DETAILS

SHEET 2 OF 2

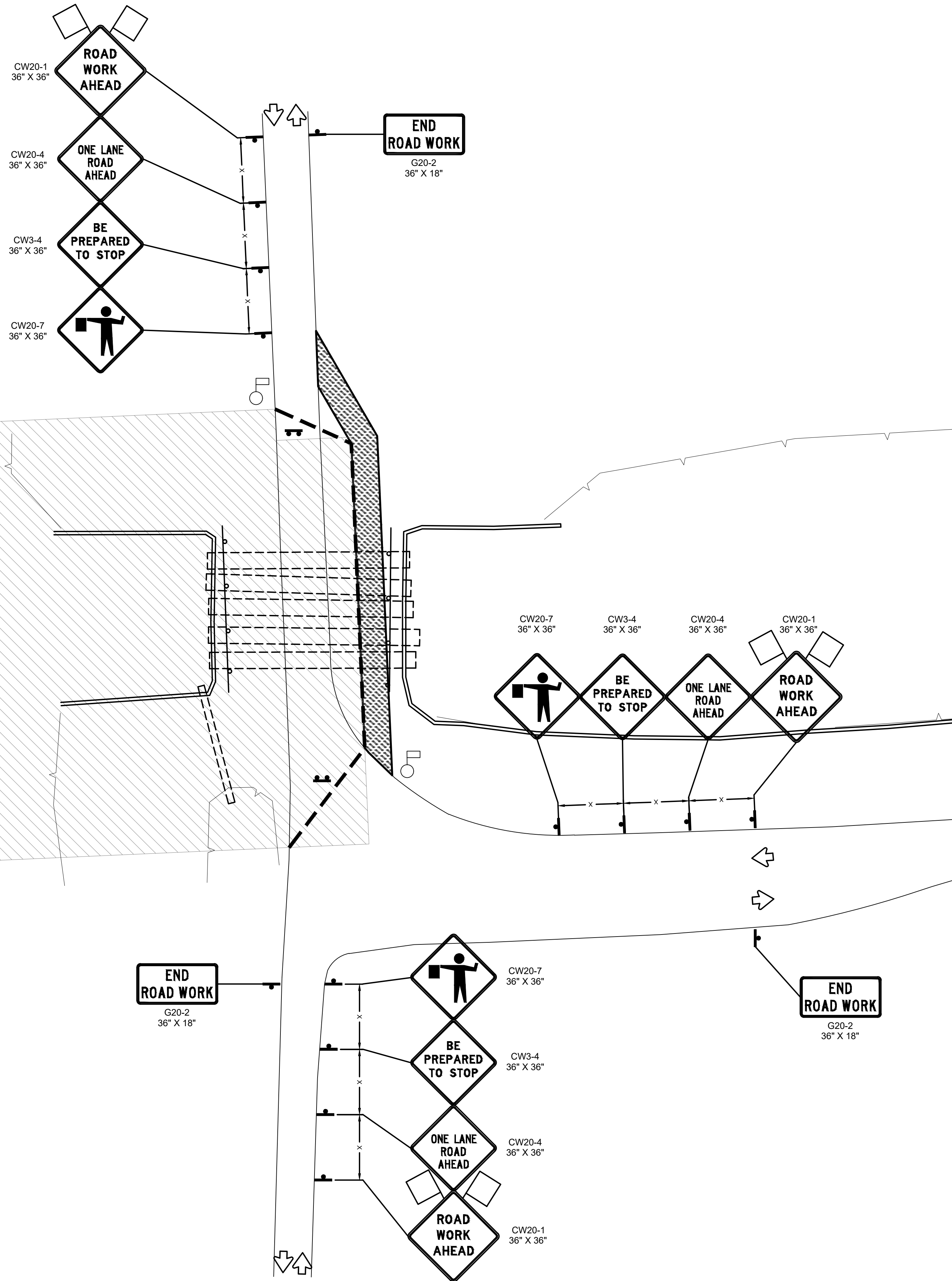
Texas Department of Transportation
 Bridge Division Standard

TRAFFIC RAIL

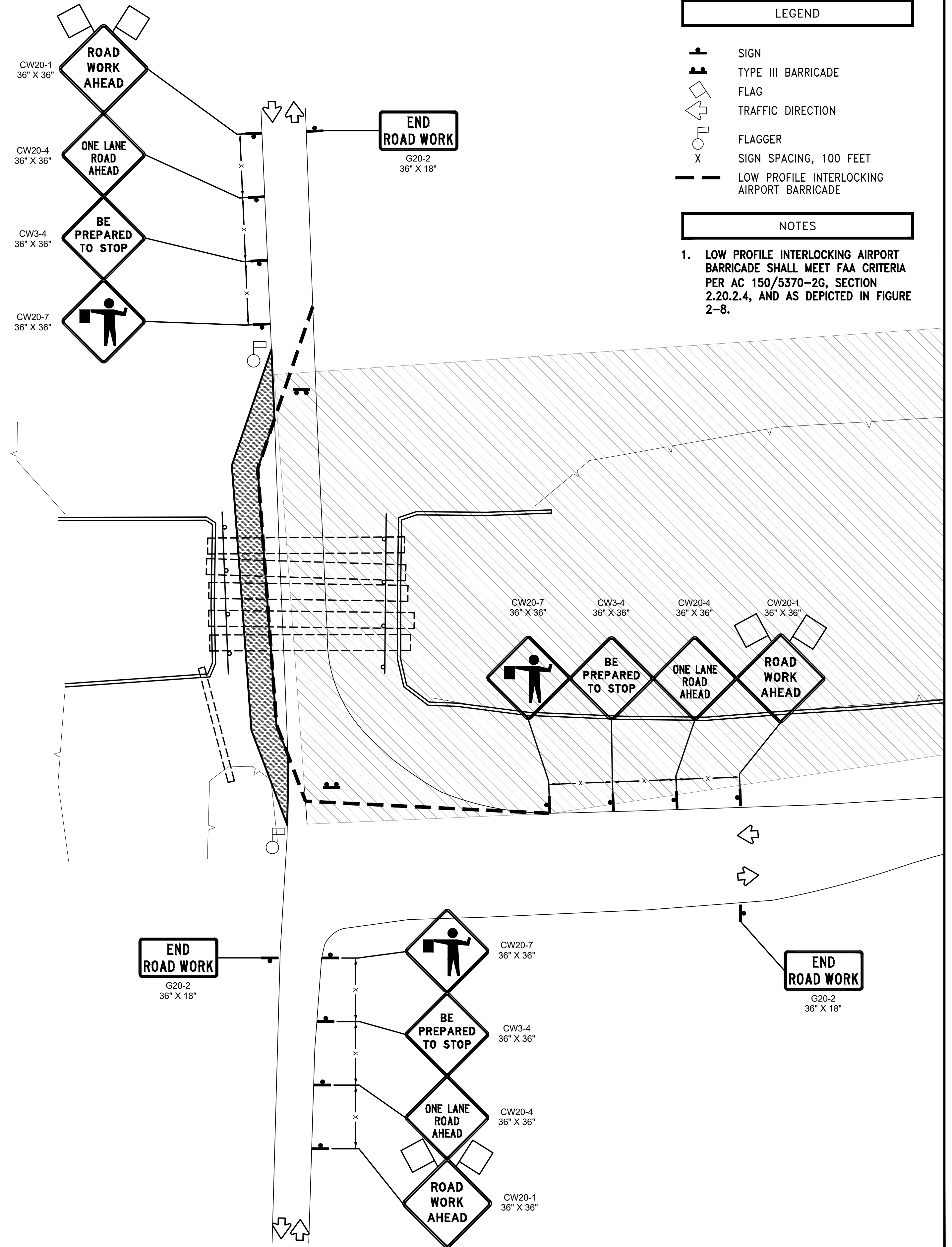
TYPE T631LS

FILE: RL-T631LS-23.dgn	DN: TXDOT	CK: AES	DW: JTR	CK: AES
©TXDOT	September 2019	CONT	SECT	JOB
REVISIONS				
07/2020: Allowing 9'-4 1/2" or 6'-3" W-Beam sections.	DIST	COUNTY	SHEET NO.	
03/2023: MBGF Notes.				

CONSTRUCTION PHASE 1



CONSTRUCTION PHASE 2



LEGEND

	SIGN
	TYPE III BARRICADE
	FLAG
	TRAFFIC DIRECTION
	FLAGGER
X	SIGN SPACING, 100 FEET
	LOW PROFILE INTERLOCKING AIRPORT BARRICADE

NOTES

1. LOW PROFILE INTERLOCKING AIRPORT BARRICADE SHALL MEET FAA CRITERIA PER AC 150/5370-2G, SECTION 2.20.2.4, AND AS DEPICTED IN FIGURE 2-8.

Houston Airport System
 GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING
 10351 STELLA LINK RD
 HOUSTON, TEXAS 77025
 512-767-1009
 TBPE FIRM No. 20690

REVISIONS

NO.	DESCRIPTION	DATE BY

SOUTH CULVERT RECONSTRUCTION TRAFFIC CONTROL PLAN
 ELLINGTON AIRPORT (EFD)

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023

STATE OF TEXAS
 HOWARD S. CHANG
 117939
 8/28/2023

APPROVED BY:

DIRECTOR
 HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

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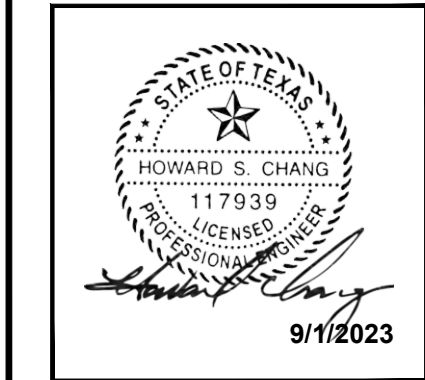
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REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
 GRADING AND DRAINAGE PLAN**

PROJECT MGR: HSC
 DESIGNER: HSC
 DRAWN BY: HSC
 CHECK BY: NRP
 SCALE: 1:20 H, 1:2, V
 DATE: 9/1/2023



APPROVED BY: _____
 DIRECTOR
 HOUSTON AIRPORT SYSTEM

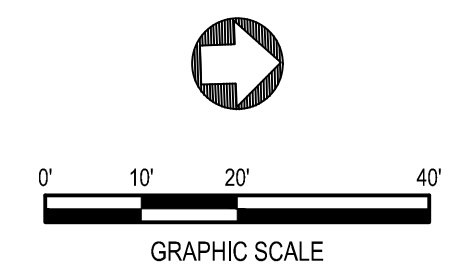
PROJECT NO.
 100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO.
 954

SHEET NO.

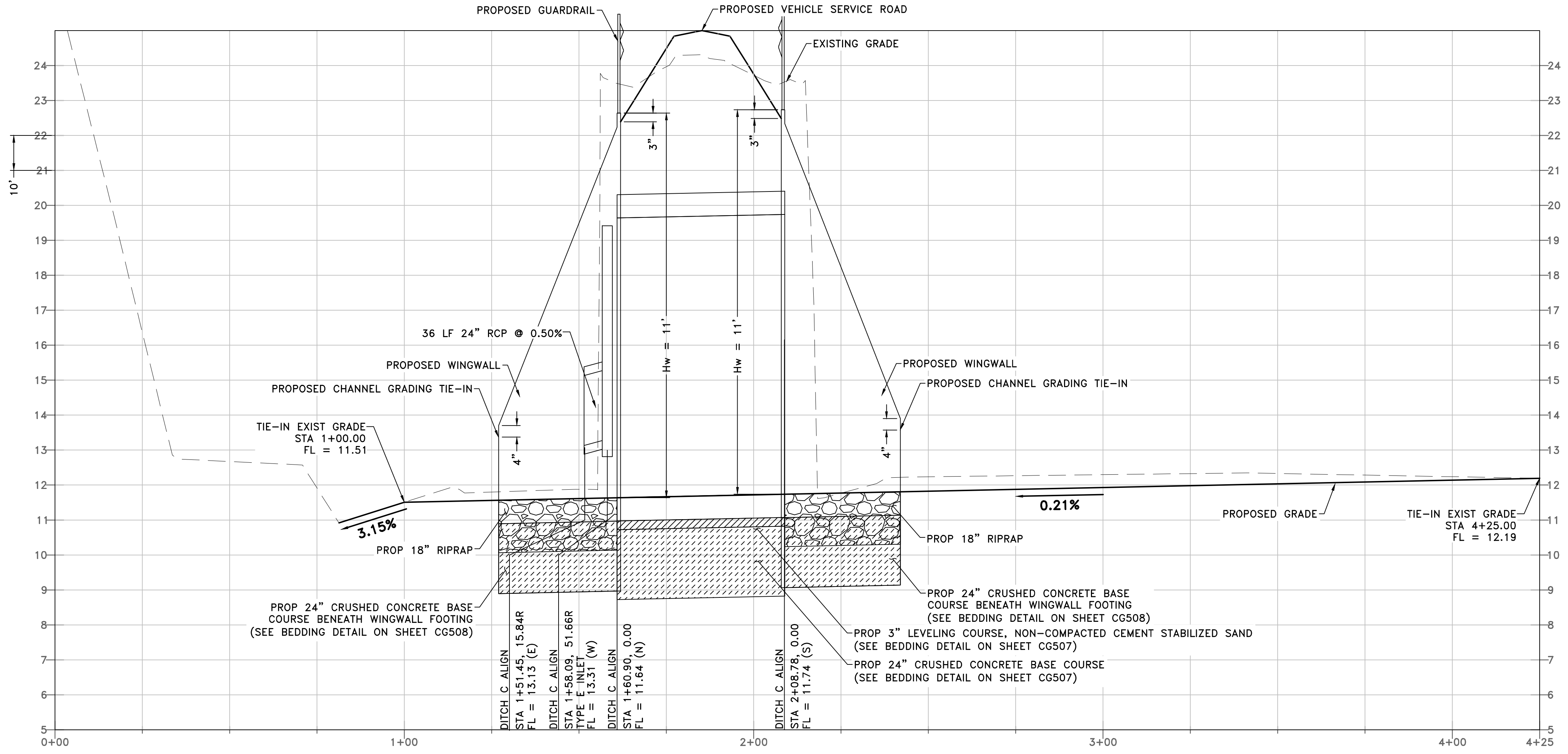
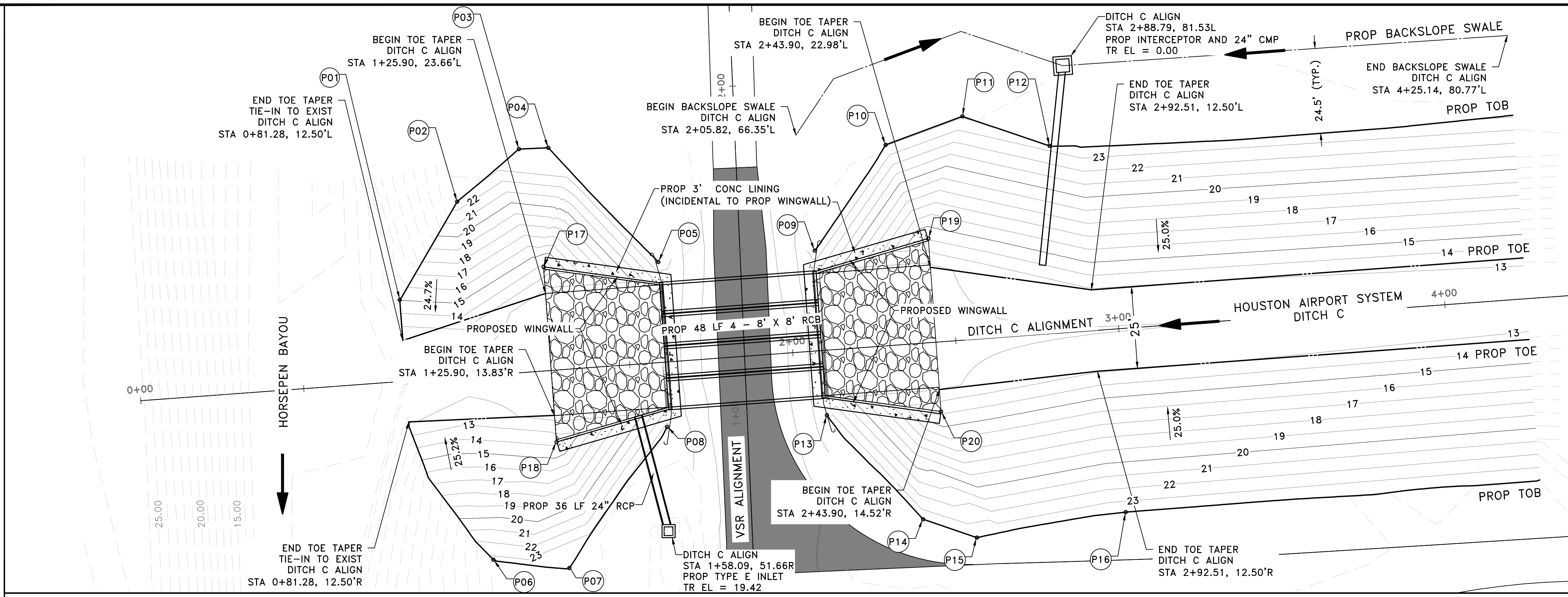


LEGEND

- PROP RIPRAP
- PROP NON-COMPACTED CEMENT STABILIZED SAND
- PROP CRUSHED CONCRETE BASE COURSE
- PROP CONC LINING
- PROP ASPHALT PVMT
- GRADING POINT TABLE
- PROP STORM SEWER
- PROP TYPE E INLET

NOTES

- SEE DRAINAGE DETAILS ON SHEETS CG506 TO CG512
- SEE BACKSLOPE SWALE DETAILS ON SHEET CG511
- SEE BACKSLOPE INTERCEPTOR DETAIL ON SHEET CG512
- CONTRACTOR RESPONSIBLE FOR SELECTING, DESIGNING, CONSTRUCTING, MAINTAINING, AND MONITORING A GROUNDWATER CONTROL SYSTEM AND ADAPTING HIS OPERATIONS TO ENSURE THE STABILITY OF THE EXCAVATIONS AND THE QUALITY OF SUBGRADE PREPARATION WORK.



GRADING POINT TABLE

POINT	ALIGN	STA	OFF	ELEV
P01	DITCH C ALIGN	0+81.28	-24.99 L	15.04
P02	DITCH C ALIGN	1+01.00	-53.64 L	22.66
P03	DITCH C ALIGN	1+21.00	-68.29 L	23.56
P04	DITCH C ALIGN	1+30.00	-68.03 L	23.67
P05	DITCH C ALIGN	1+61.00	-30.70 L	23.83
P06	DITCH C ALIGN	1+04.00	56.44 R	23.31
P07	DITCH C ALIGN	1+27.00	60.68 R	23.37
P08	DITCH C ALIGN	1+60.00	19.84 R	23.30
P09	DITCH C ALIGN	2+09.00	-30.66 L	23.79
P10	DITCH C ALIGN	2+33.00	-61.33 L	24.08
P11	DITCH C ALIGN	2+57.00	-68.30 L	24.12
P12	DITCH C ALIGN	2+83.00	-57.34 L	23.39
P13	DITCH C ALIGN	2+09.00	19.84 R	23.55
P14	DITCH C ALIGN	2+36.00	53.74 R	23.72
P15	DITCH C ALIGN	2+52.00	60.55 R	23.77
P16	DITCH C ALIGN	2+98.00	56.10 R	23.83
P17	DITCH C ALIGN	1+25.90	-31.79 L	13.37
P18	DITCH C ALIGN	1+25.90	21.96 R	13.37
P19	DITCH C ALIGN	2+43.90	-31.79 L	13.57
P20	DITCH C ALIGN	2+43.90	21.27 R	13.57



HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

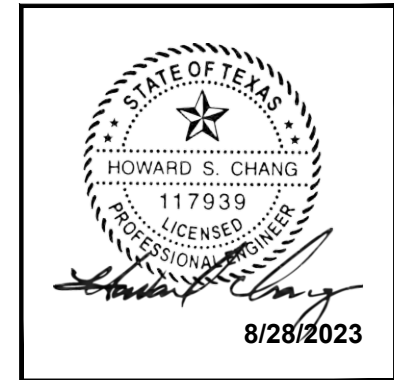
EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
 CROSS SECTIONS
 (SHEET 1 OF 2)**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	1:20 H, 1:2, V
DATE:	8/28/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467

A.I.P. NO.

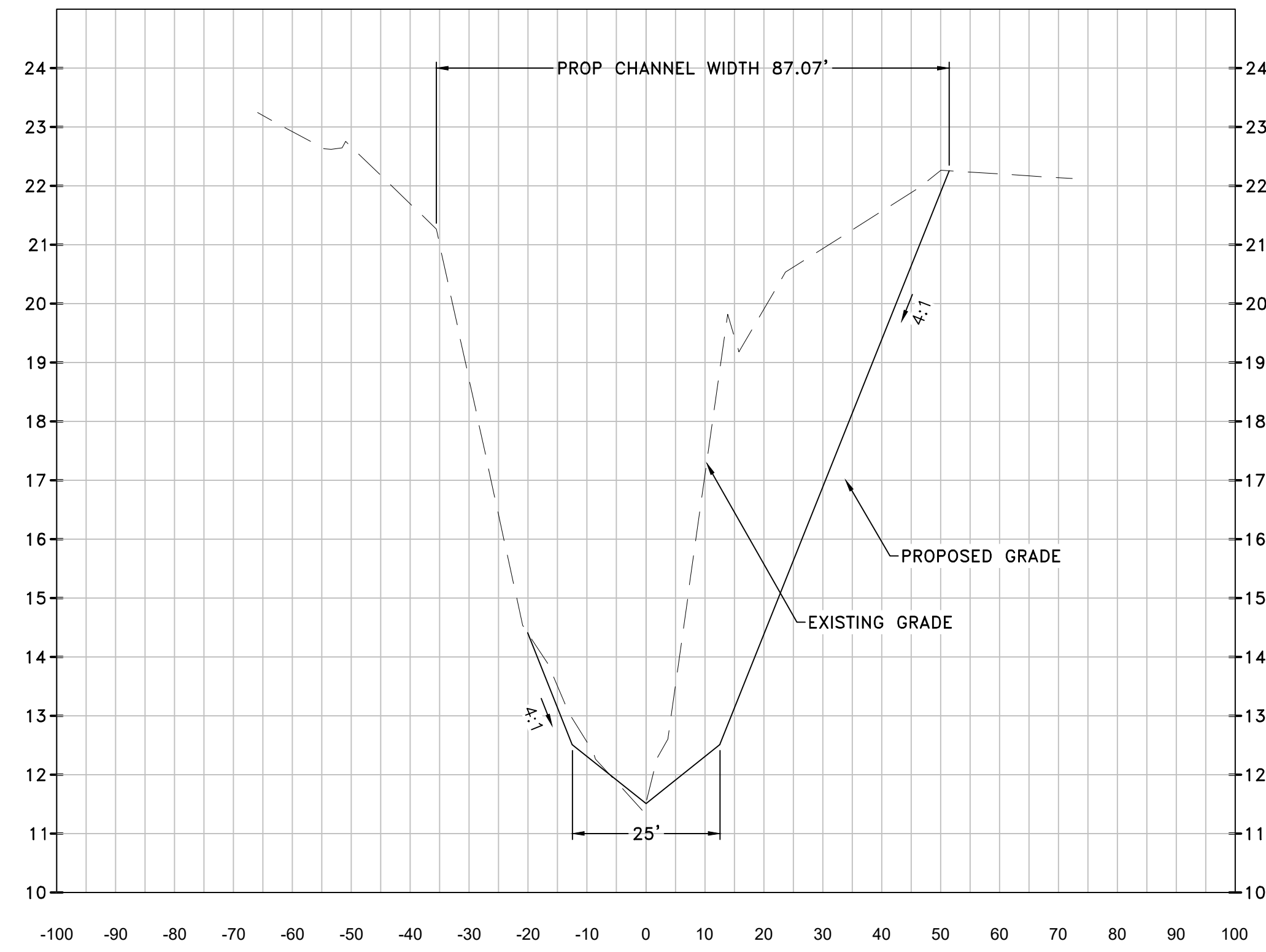
C.I.P. NO.

H.A.S. NO.
954

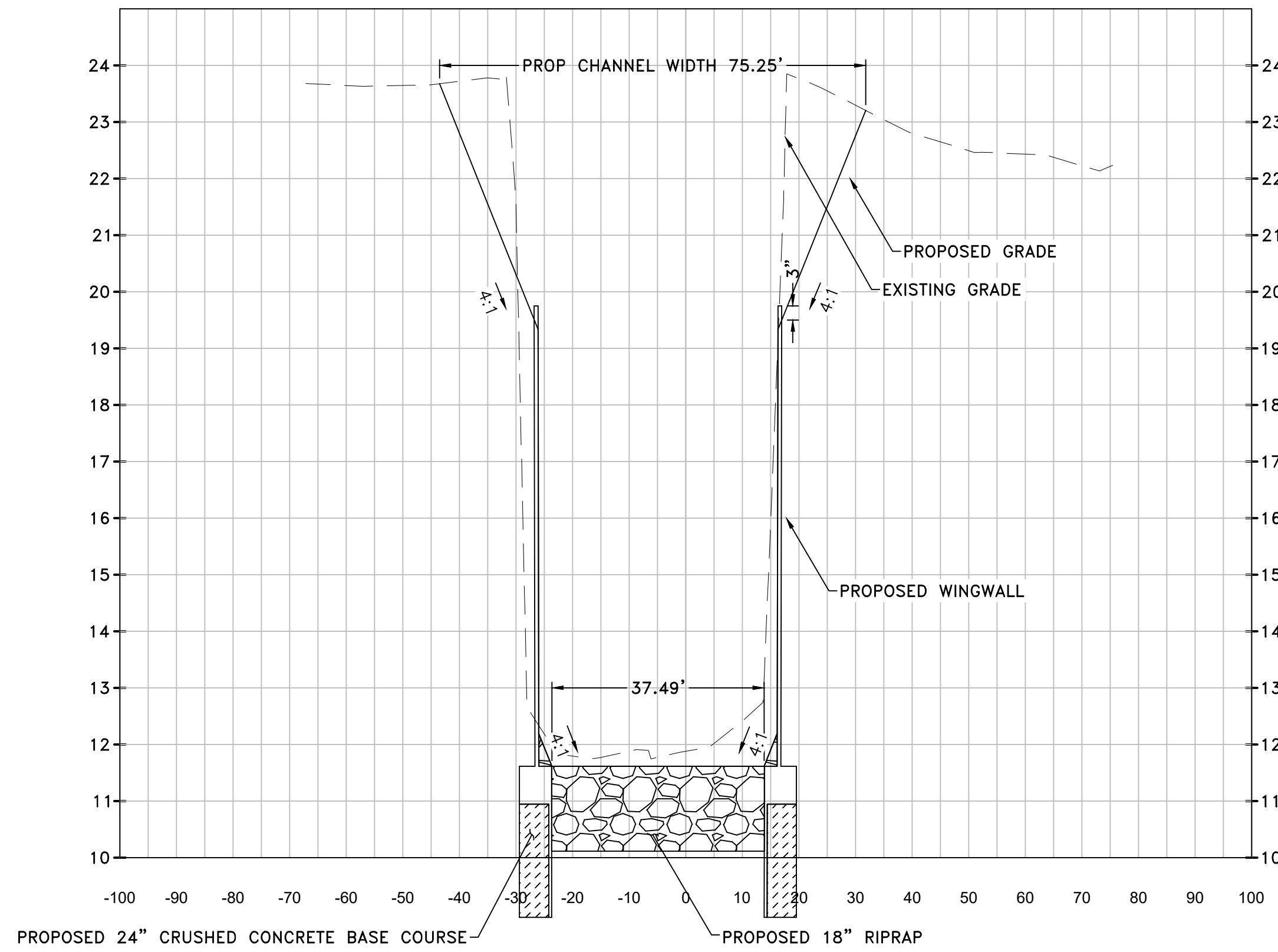
SHEET NO.

CG302

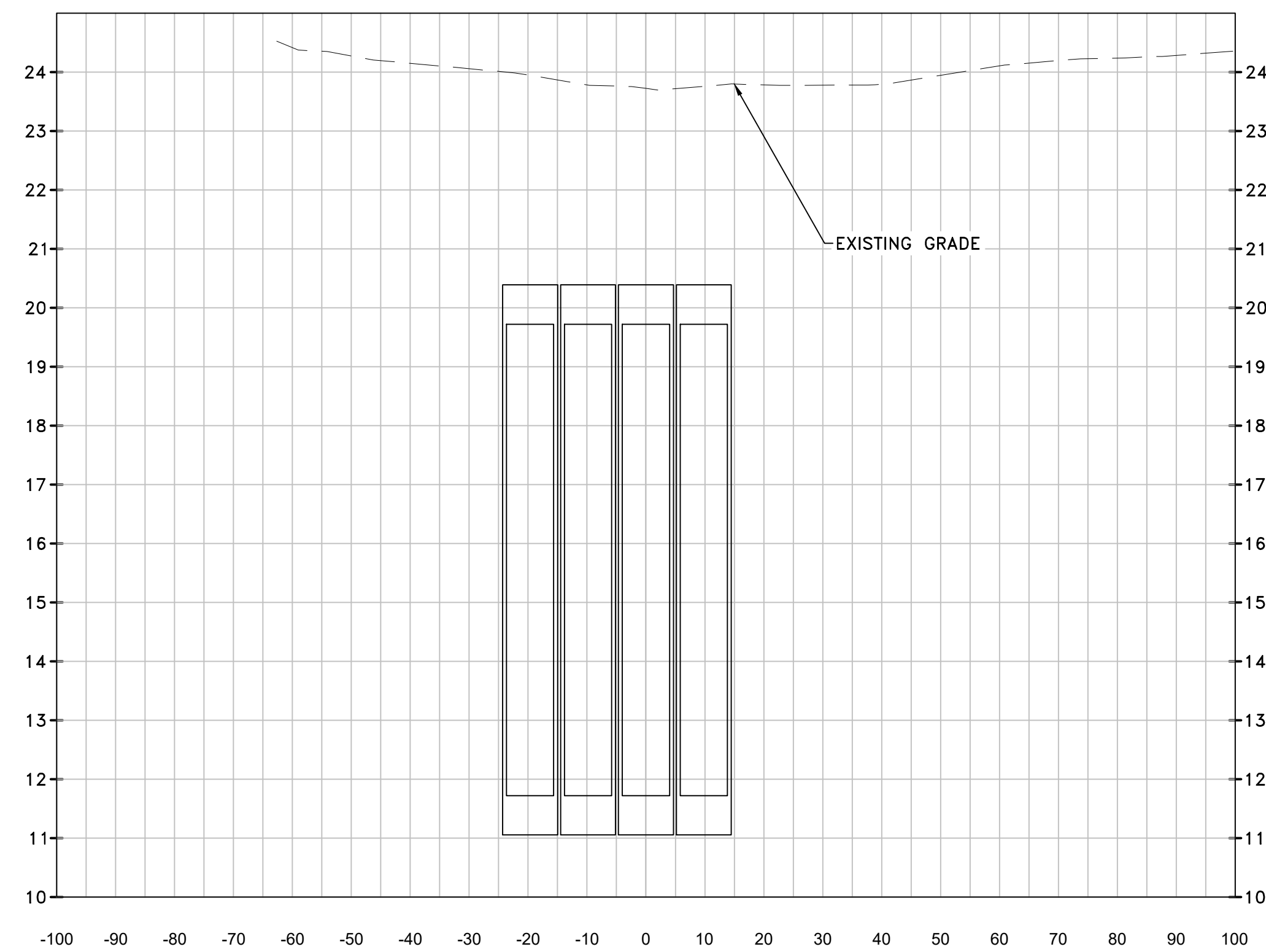
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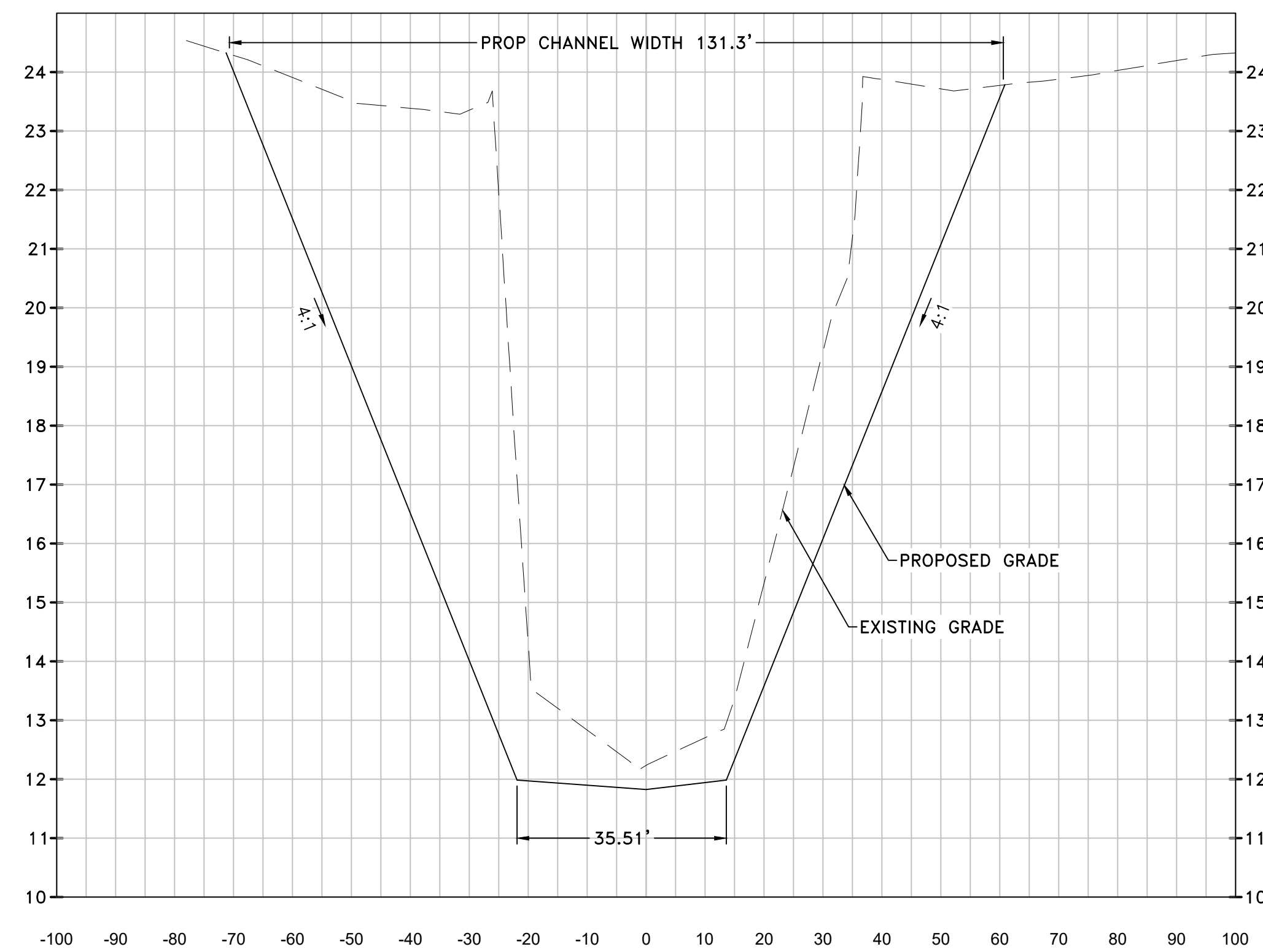
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2+00.00



2+50.00



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HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

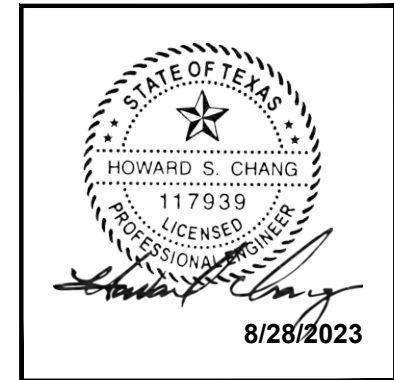
EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
 CROSS SECTIONS
 (SHEET 2 OF 2)**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	1:20 H, 1:2, V
DATE:	8/28/2023



APPROVED BY: _____

DIRECTOR
HOUSTON AIRPORT SYSTEM

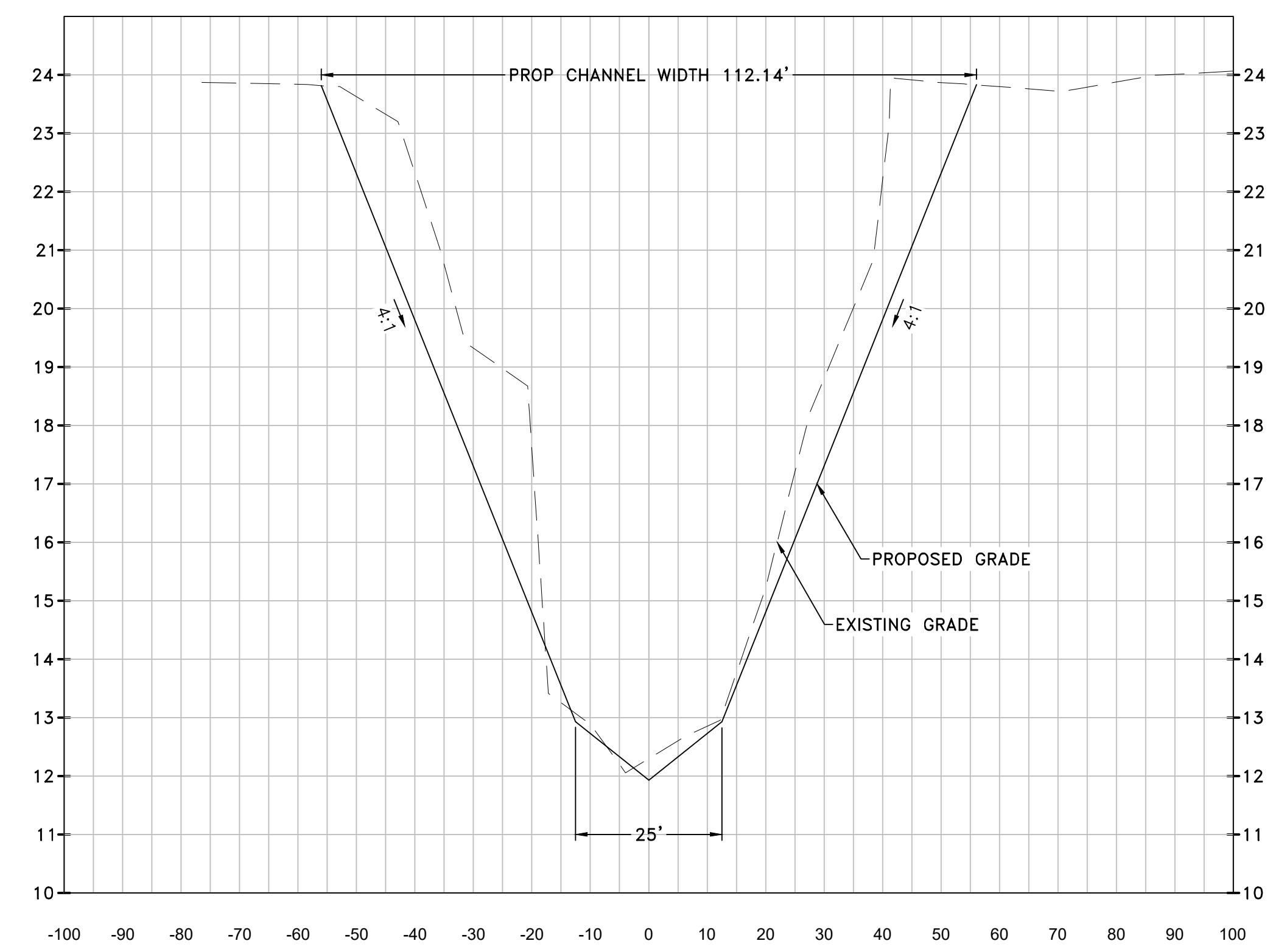
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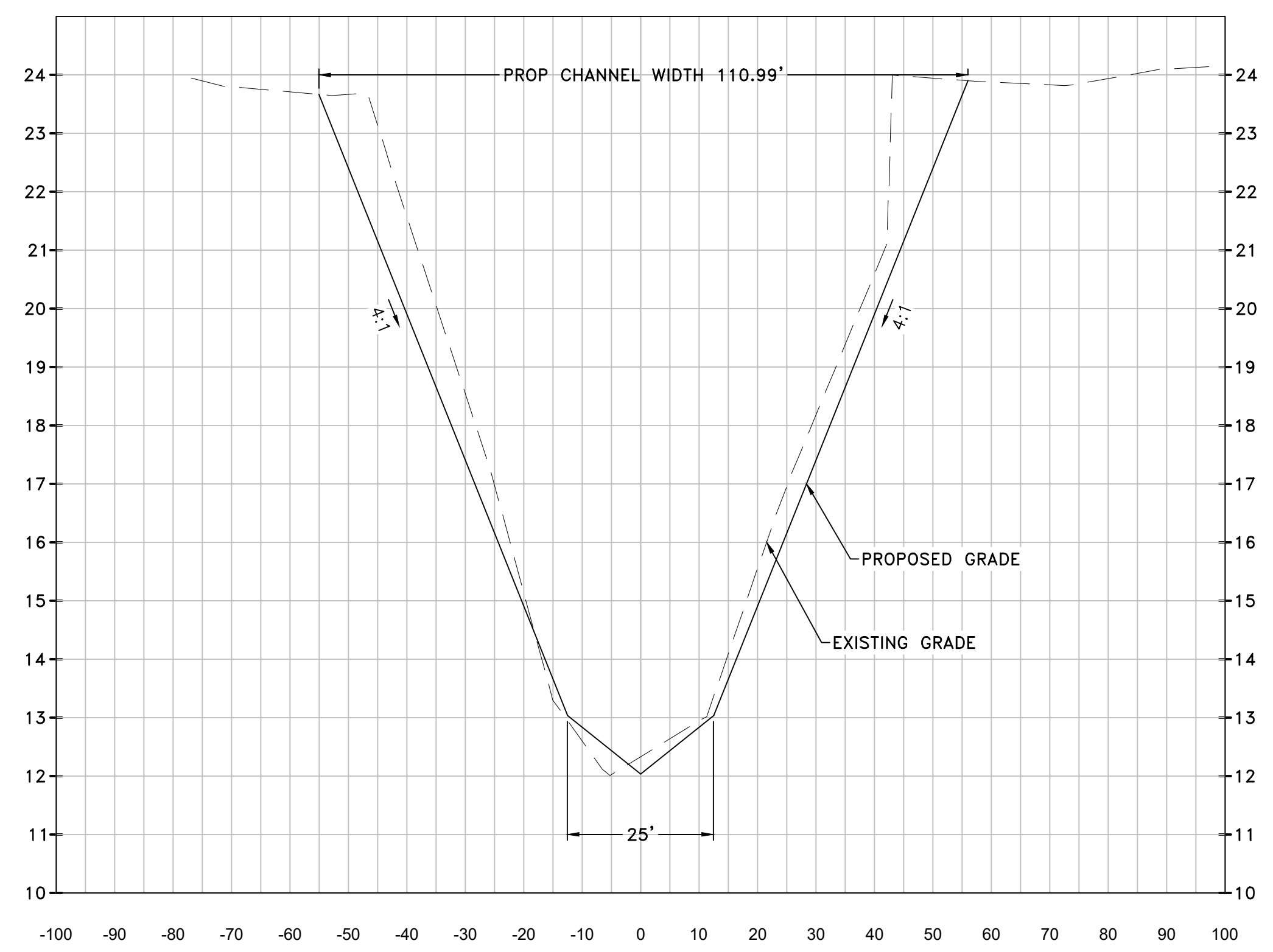
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954
SHEET NO.

CG303

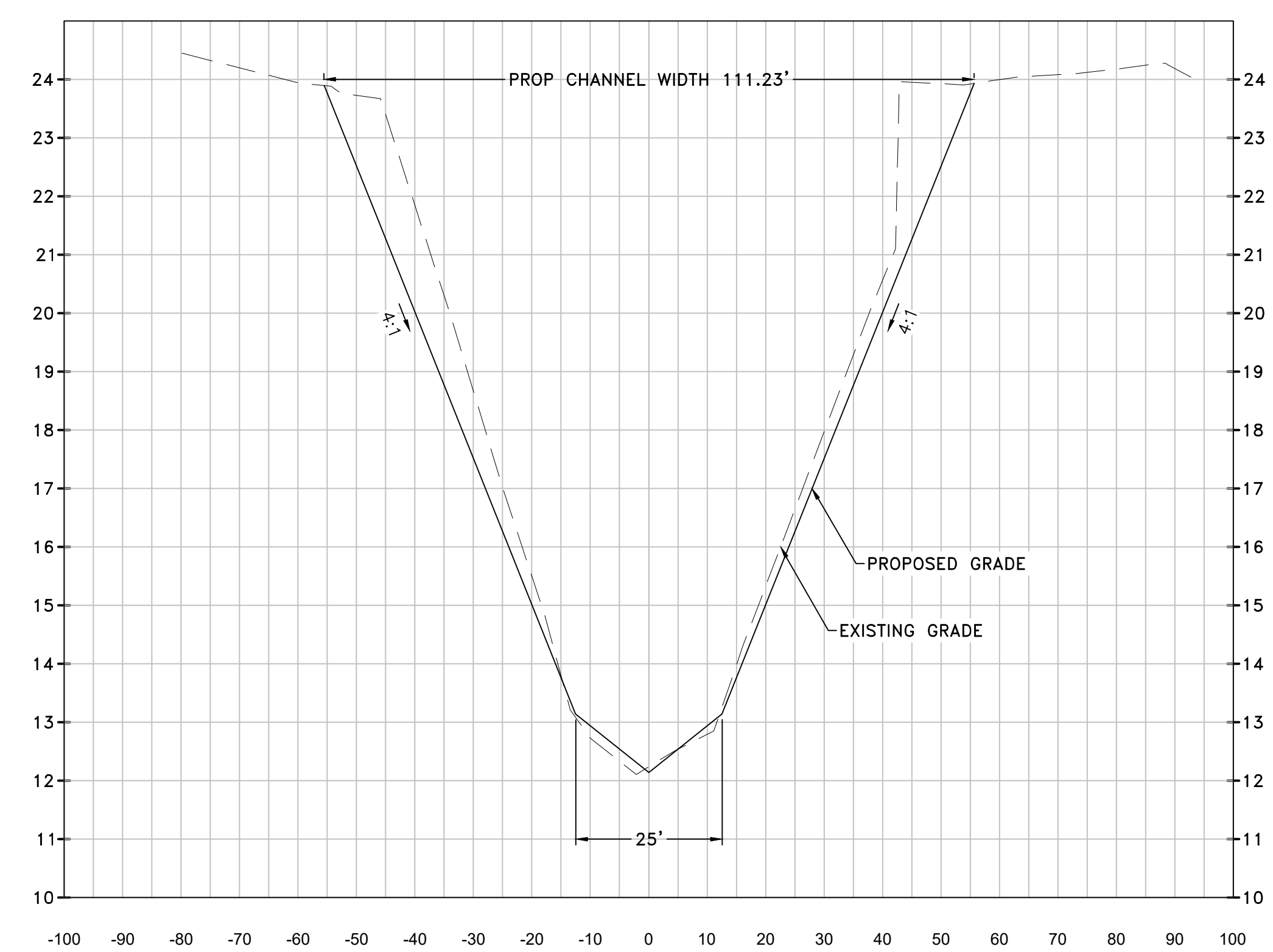
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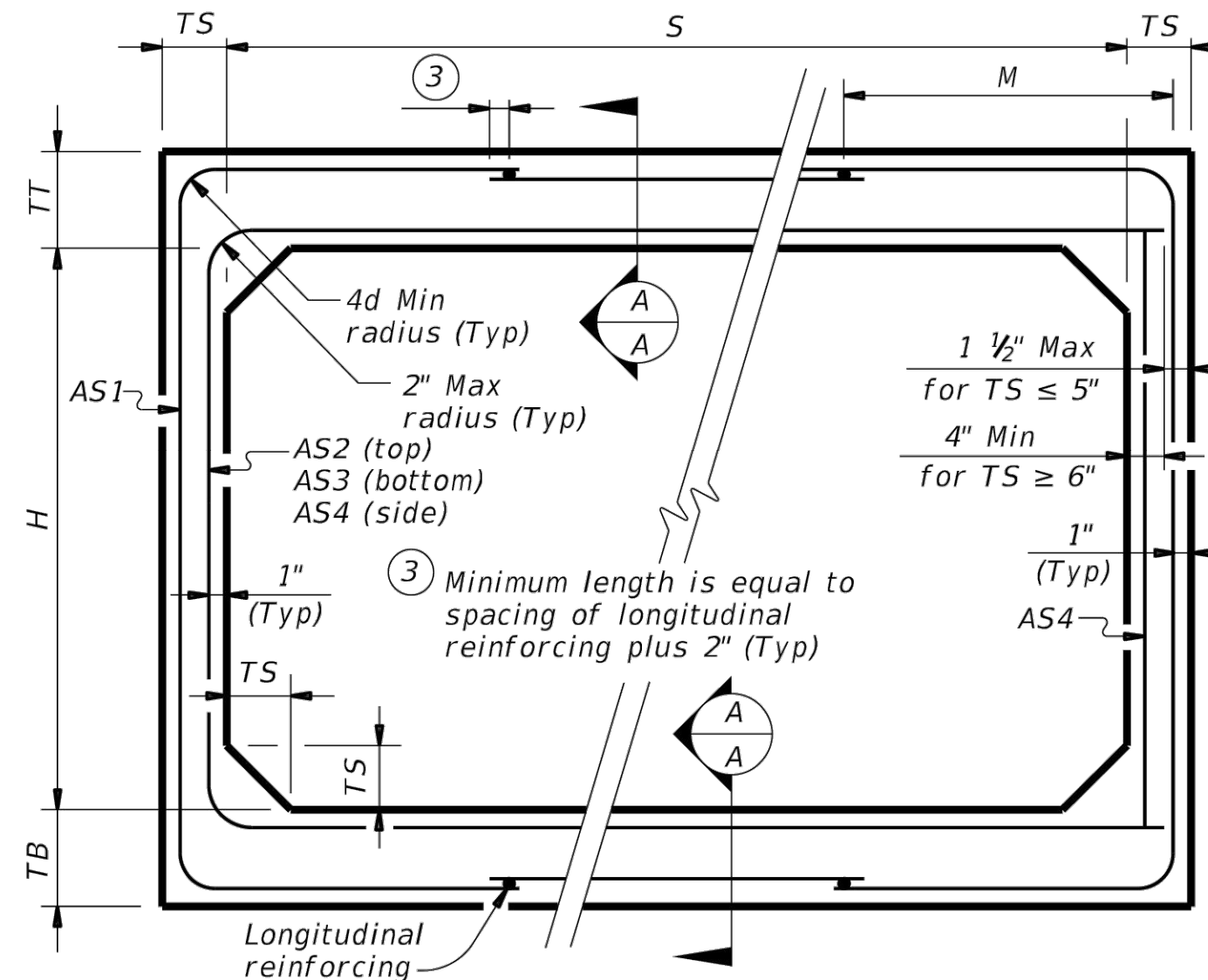
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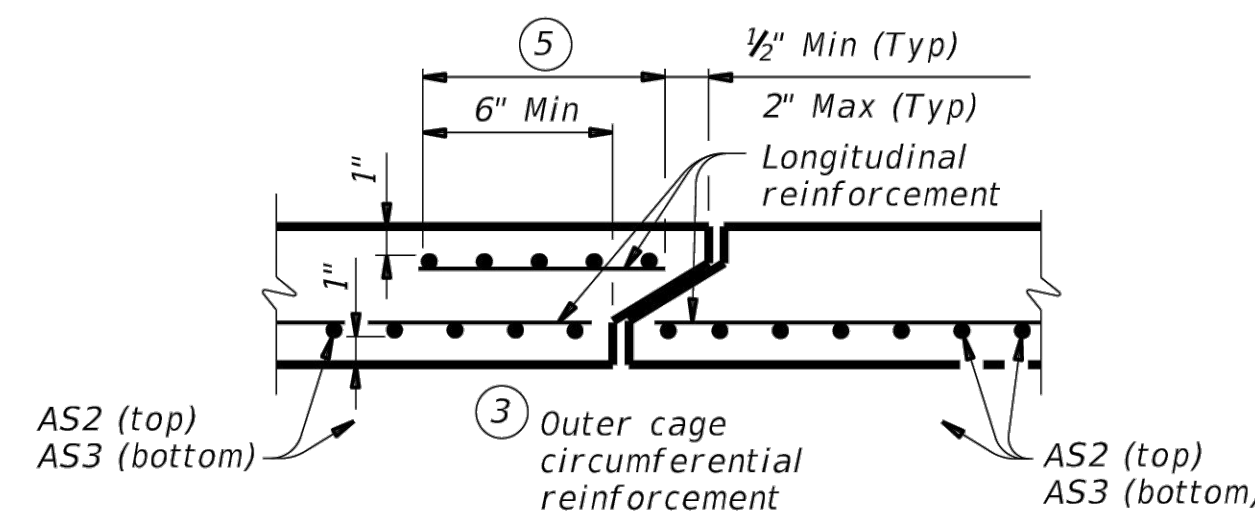
BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4	
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4	
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4	
8	3	8	8	8	10	45	0.29	0.23	0.26	0.19	-	-	-	10.4	
8	3	8	8	8	15	45	0.39	0.23	0.34	0.19	-	-	-	10.4	
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4	
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4	
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2	
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2	
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2	
8	4	8	8	8	10	45	0.27	0.28	0.29	0.19	-	-	-	11.2	
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2	
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2	
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0	
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0	
8	5	8	8	8	3 - 5	45	0.23	0.29	0.28	0.19	-	-	-	12.0	
8	5	8	8	8	10	45	0.27	0.31	0.32	0.19	-	-	-	12.0	
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0	
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0	
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8	
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8	
8	6	8	8	8	3 - 5	50	0.21	0.32	0.29	0.19	-	-	-	12.8	
8	6	8	8	8	10	45	0.23	0.33	0.34	0.19	-	-	-	12.8	
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8	
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8	
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8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6	
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6	
8	7	8	8	8	10	50	0.22	0.34	0.36	0.19	-	-	-	13.6	
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6	
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6	
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4	
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4	
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4	
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4	



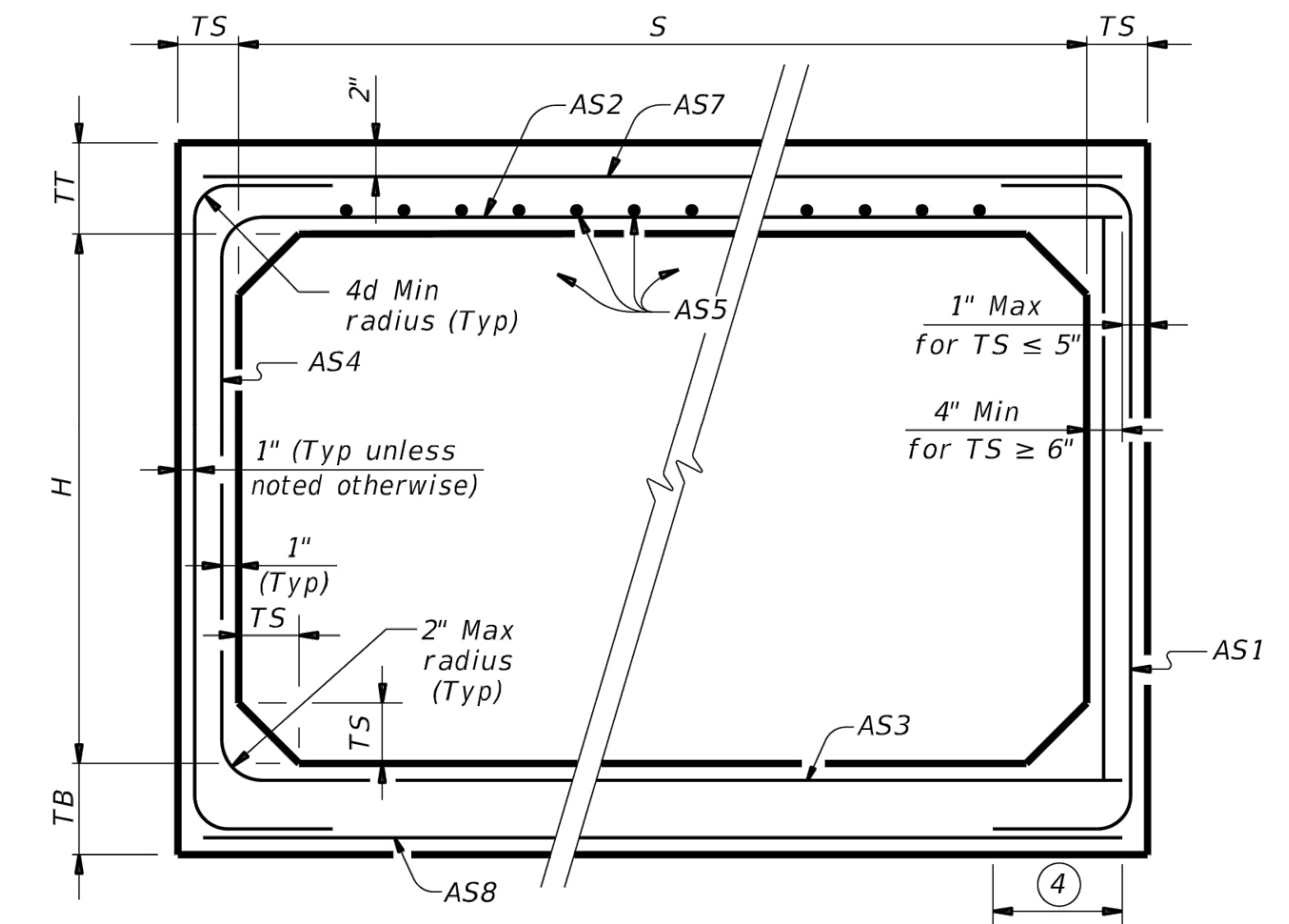
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2\"/>

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcing at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

REVISIONS

NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)

**SOUTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
BOX CULVERTS**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO.
954

SHEET NO.

HL93 LOADING

Texas Department of Transportation Bridge Division Standard

**SINGLE BOX CULVERTS
PRECAST
8'-0" SPAN**

SCP-8

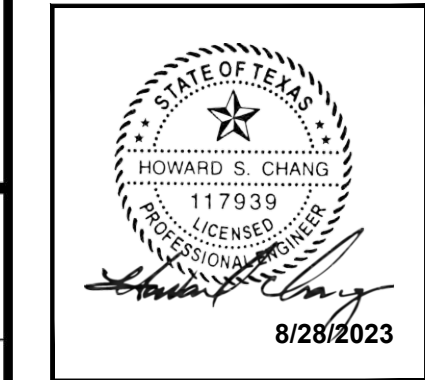
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©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY	SHEET NO.	

HAS FILED: EDGE ENGINEERING\PROJECTS - HOUSTON\HAS-98-01\BOX_CULVERTS\8-CAD SHEETS\HAS_001_SHEET DRAINAGE DETAILS.dwg

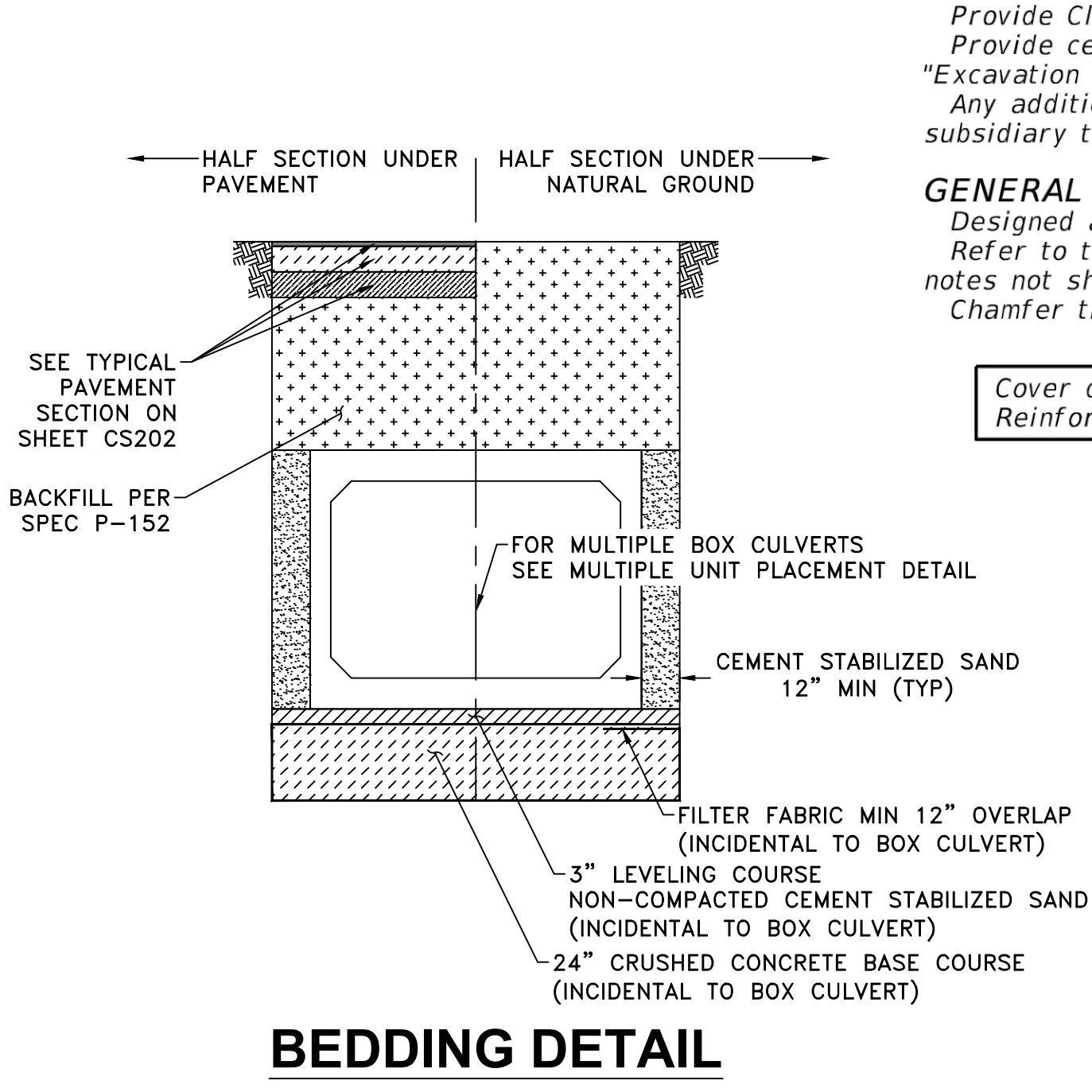
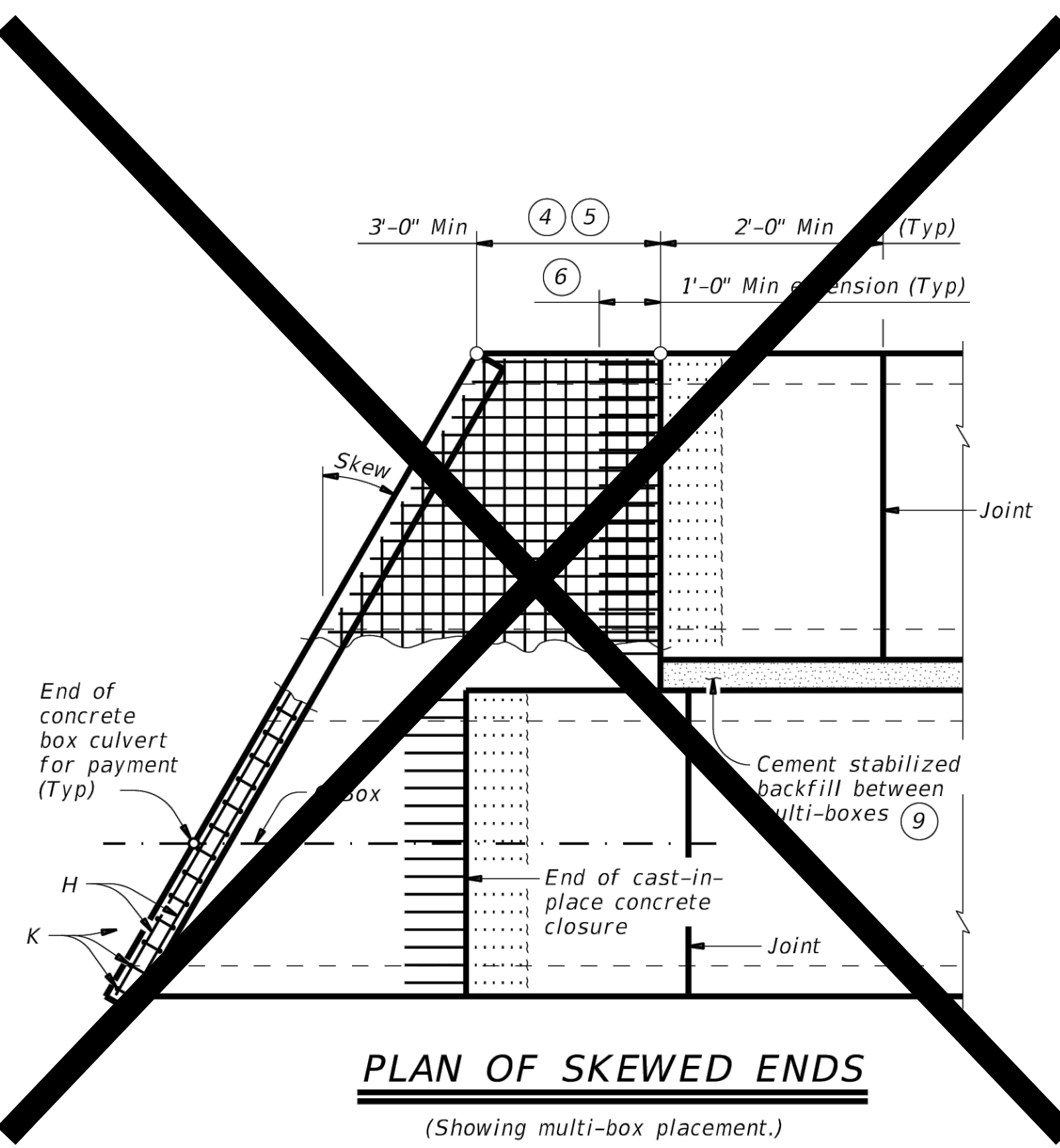
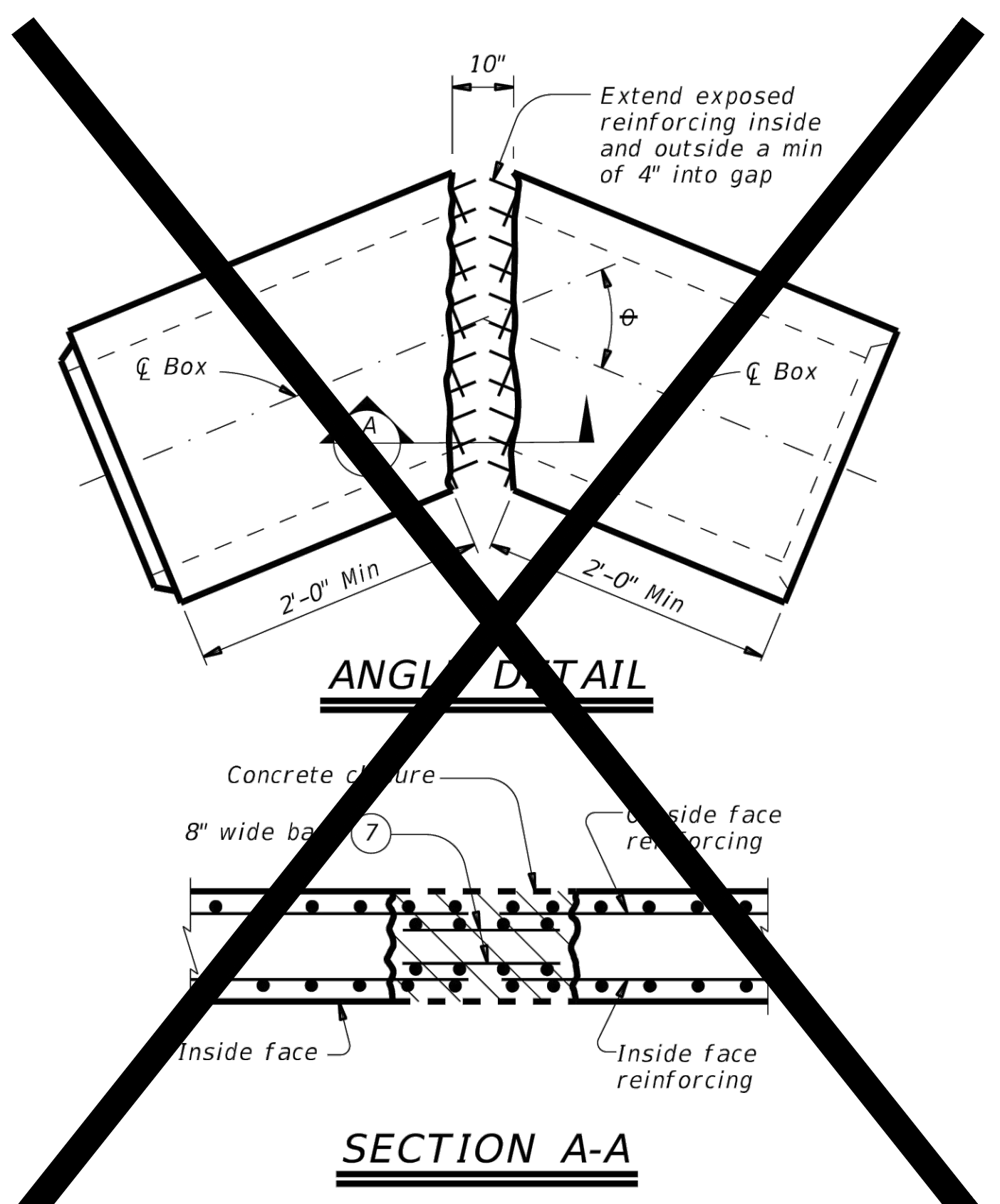
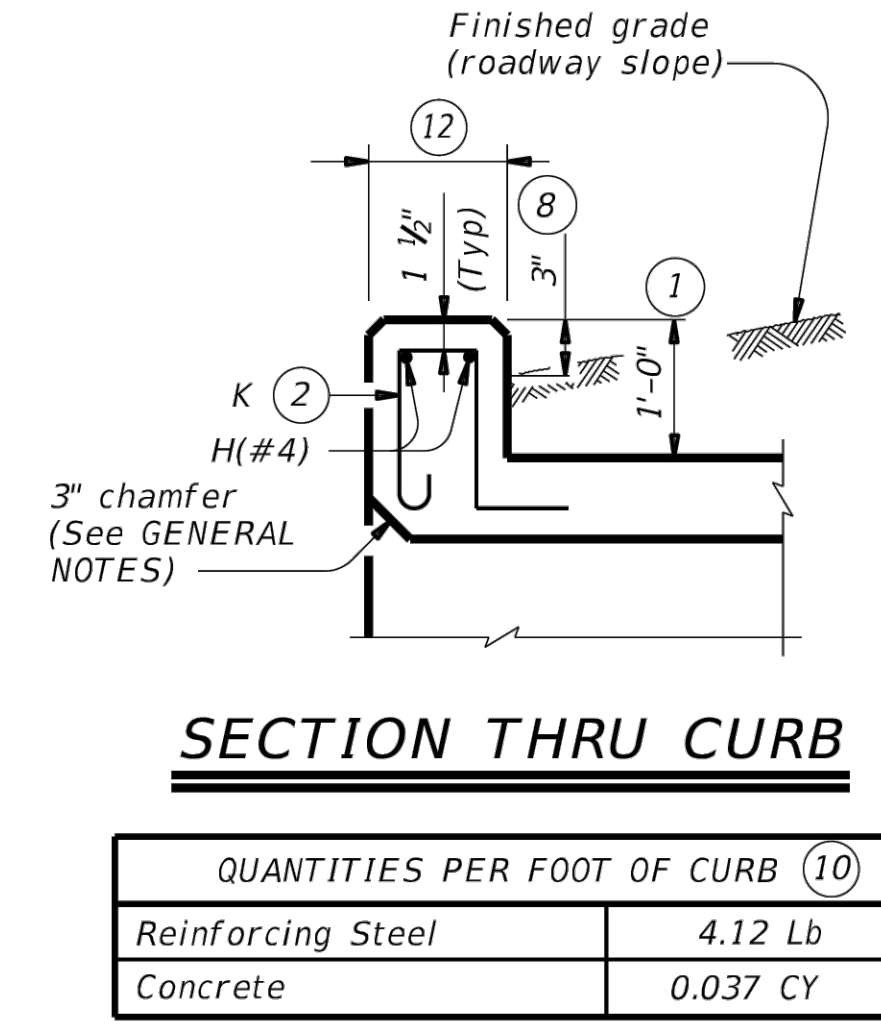
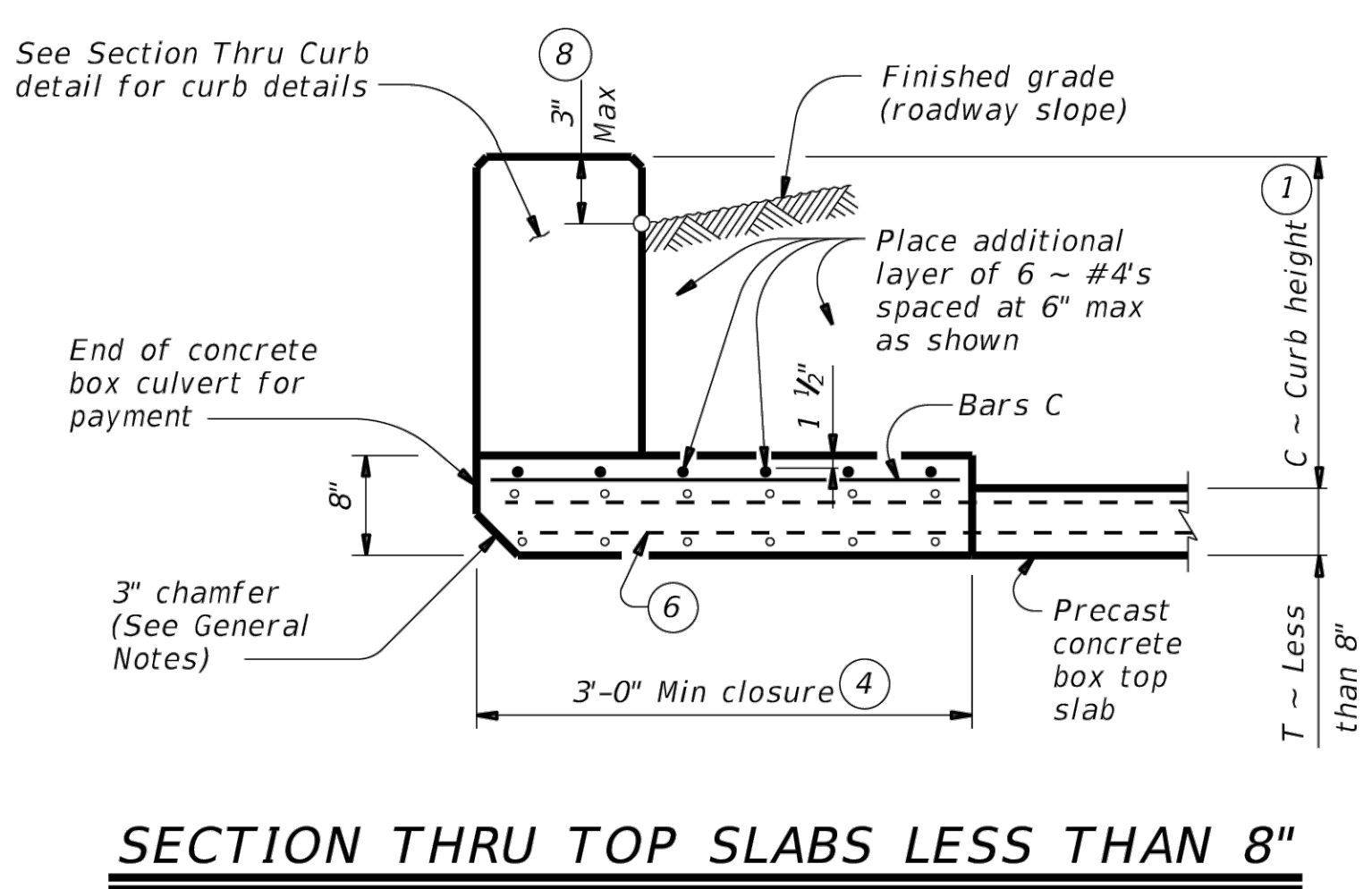
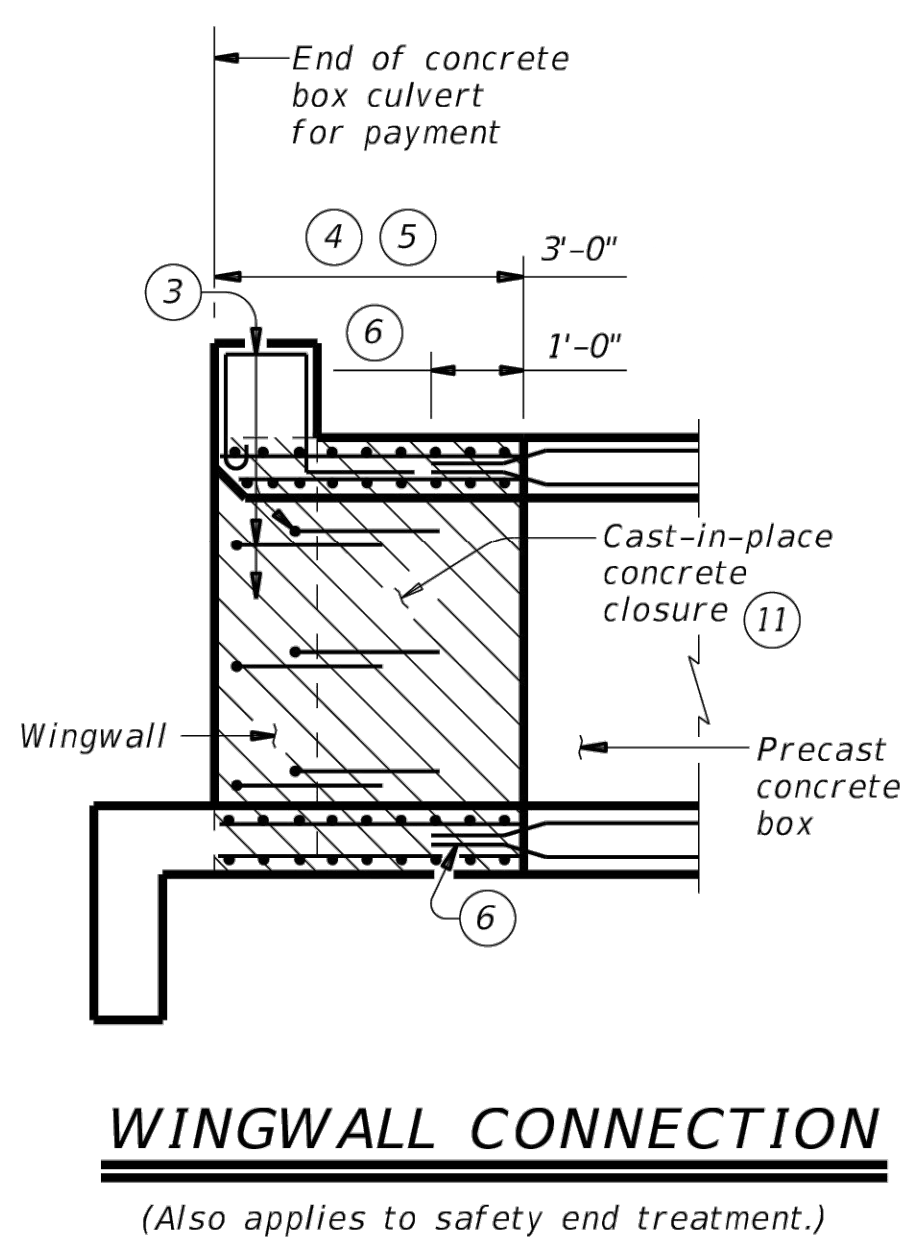
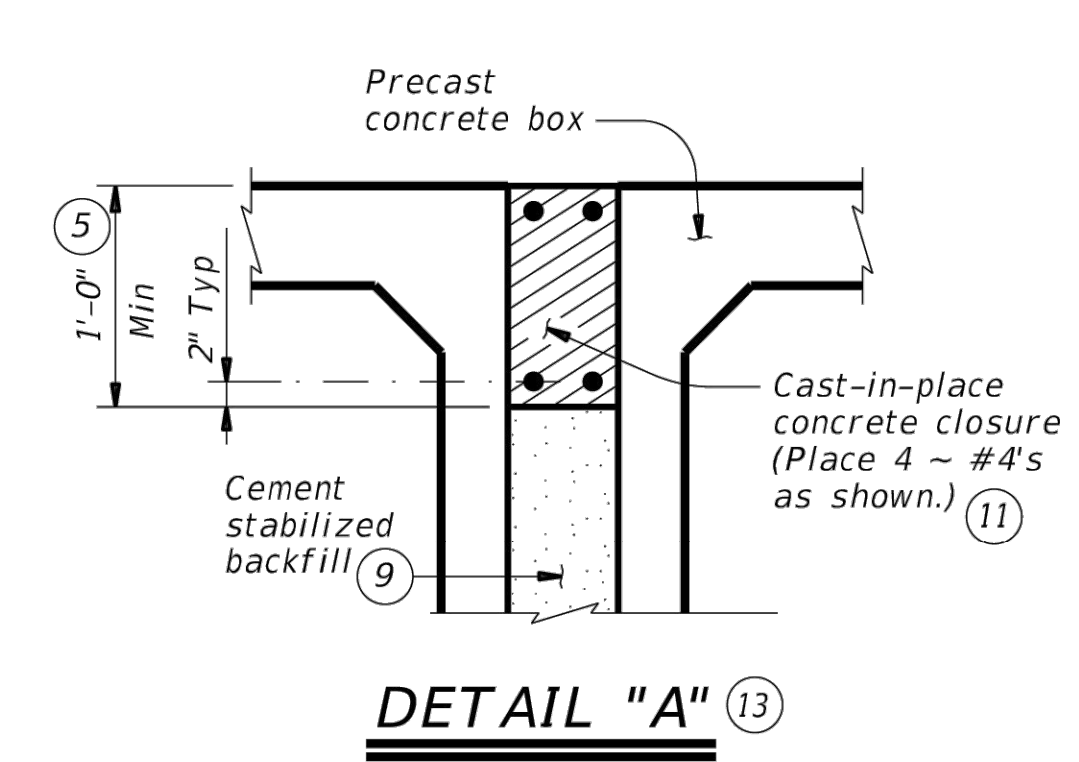
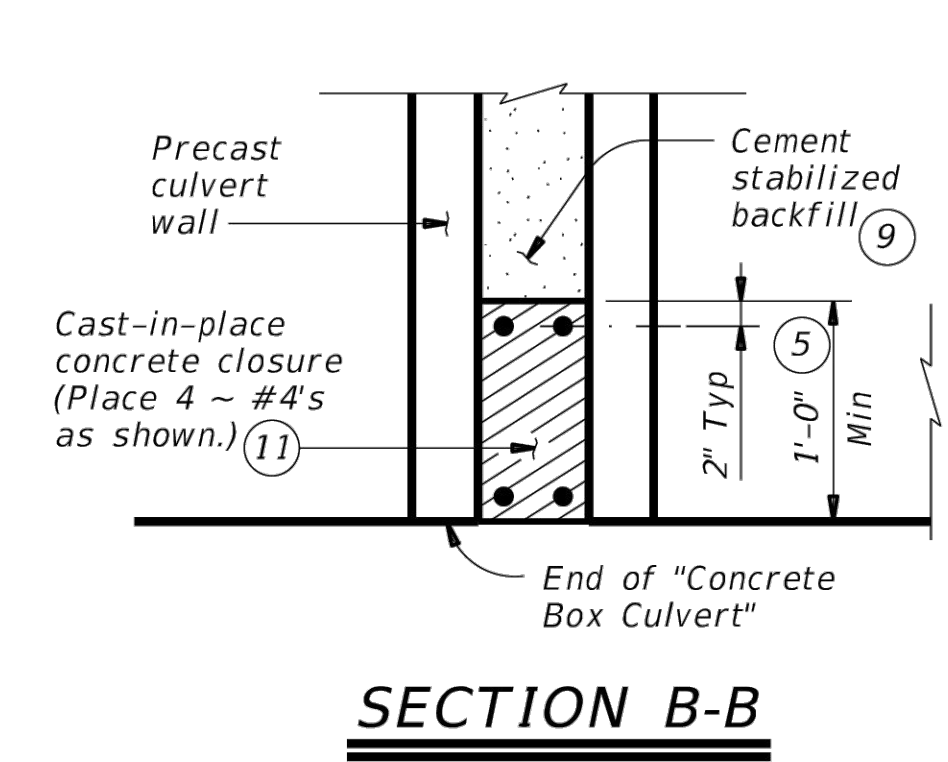
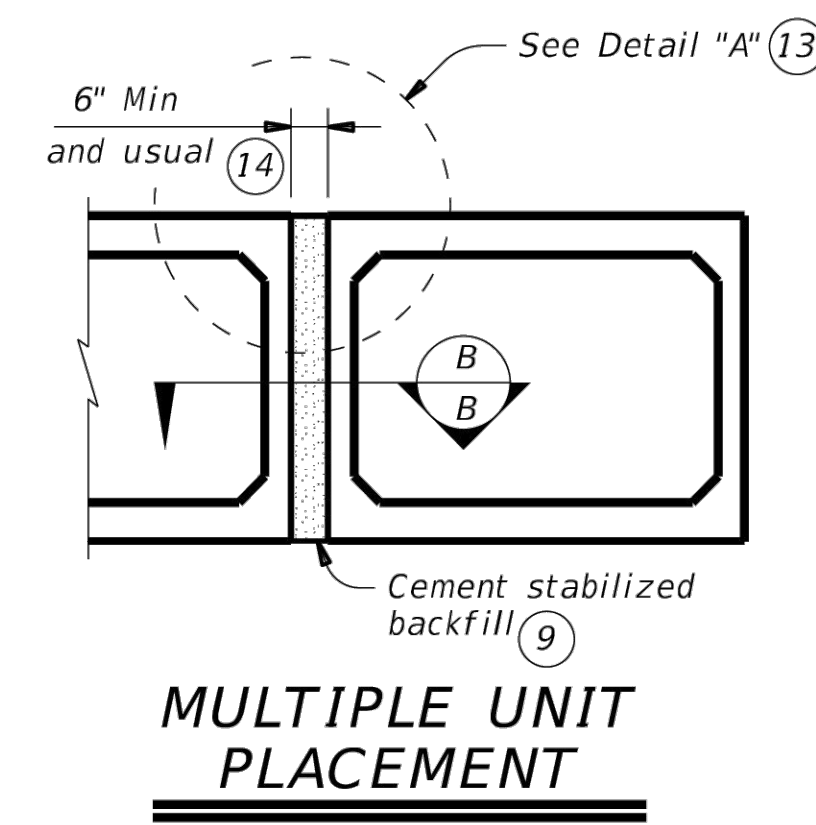
REVISIONS		
NO.	DESCRIPTION	DATE BY

**SOUTH CULVERT RECONSTRUCTION
 DRAINAGE DETAILS
 BOX CULVERTS**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023



APPROVED BY:	
DIRECTOR	HOUSTON AIRPORT SYSTEM
PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	



- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- Provide a 3'-0" cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- All curb concrete and reinforcing is considered part of the box culvert for payment.
- Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 1'-0" typical, 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide ASTM A1064 welded wire reinforcement.
 Provide Class C concrete (f'c = 3,600 psi) for the closures.
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bars dimensions are out-to-out of bars.

HL93 LOADING

Texas Department of Transportation Bridge Division Standard

**BOX CULVERTS
 PRECAST
 MISCELLANEOUS DETAILS**

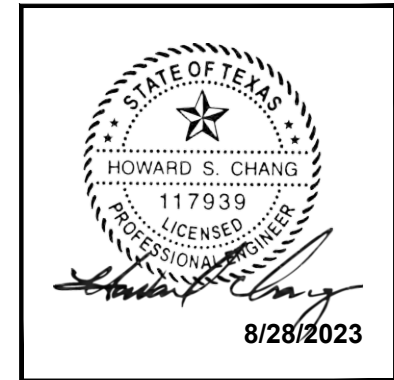
SCP-MD

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©TXDOT	February 2020	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
DIST	COUNTY			SHEET NO.					

REVISIONS		
NO.	DESCRIPTION	DATE BY

**SOUTH CULVERT RECONSTRUCTION
 DRAINAGE DETAILS
 WINGWALLS**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	HRP
SCALE:	---
DATE:	8/28/2023



APPROVED BY:	
DIRECTOR	HOUSTON AIRPORT SYSTEM
PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for one structure end)										
Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing length (2-wings)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)
					Size	Spa	Size	Spa		
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.594
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.25	0.724
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

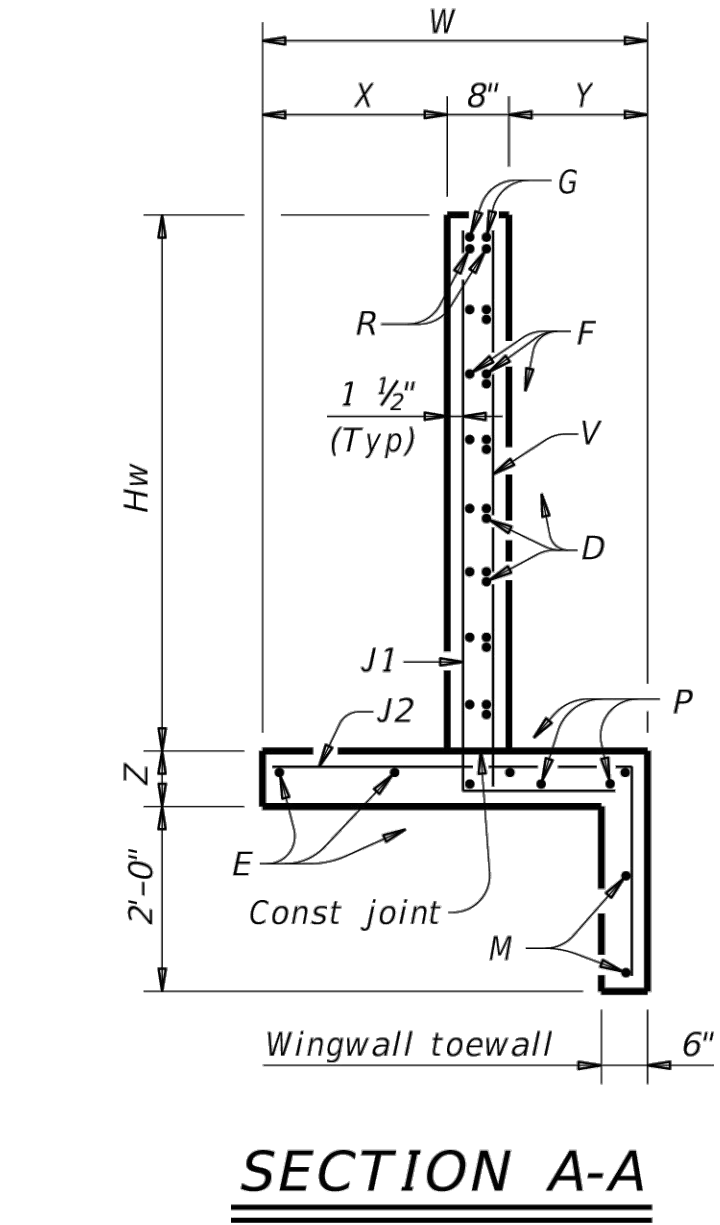
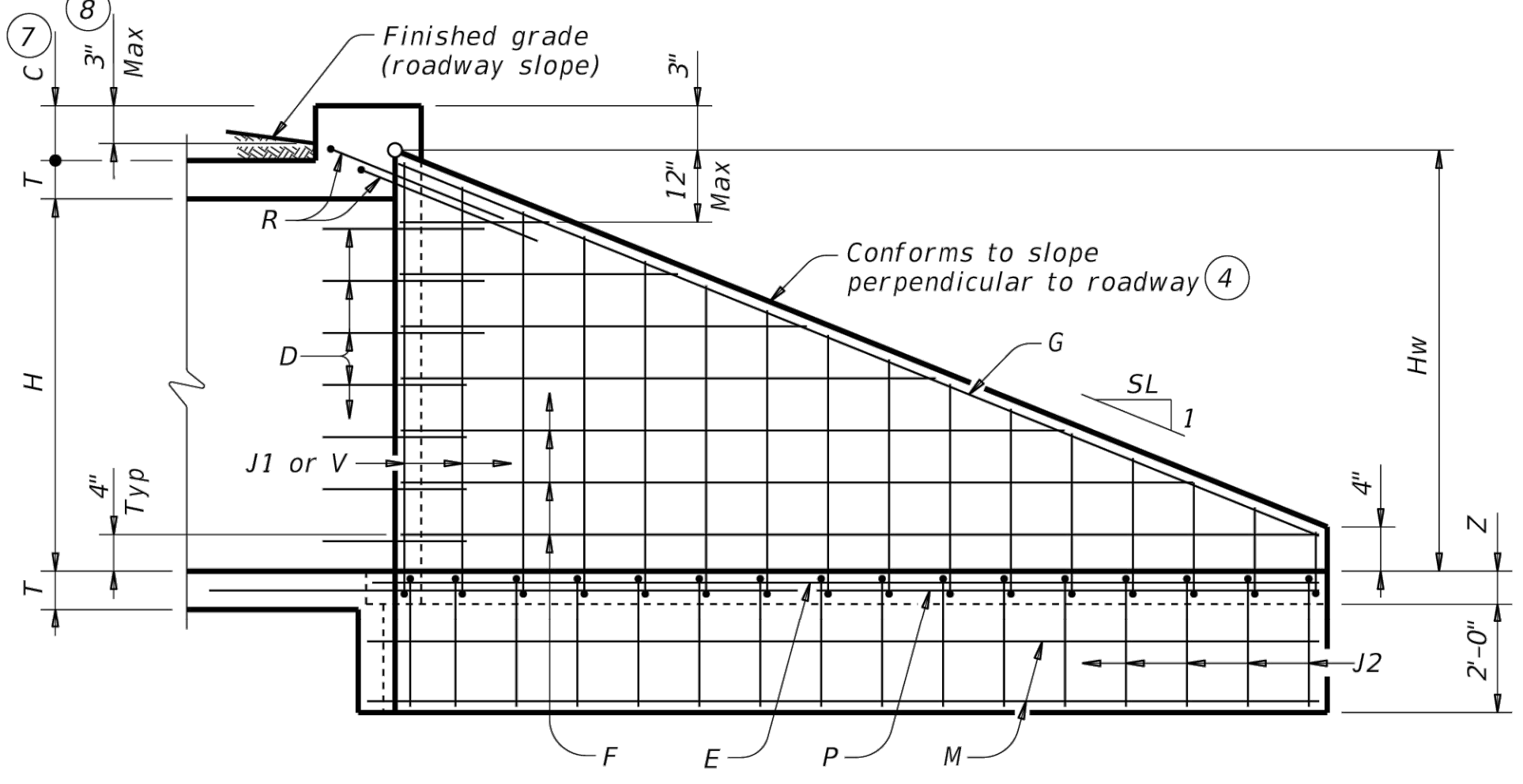
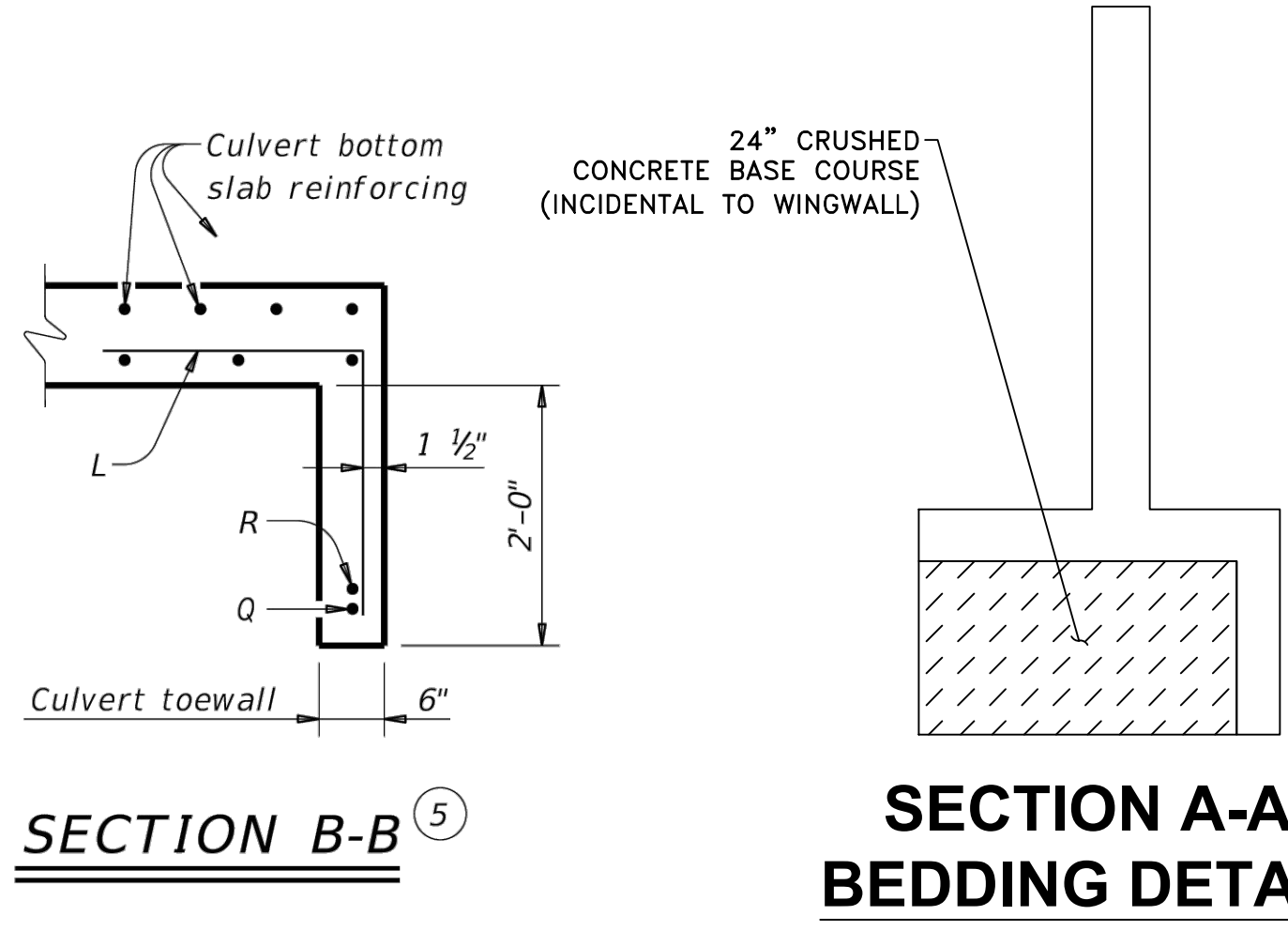
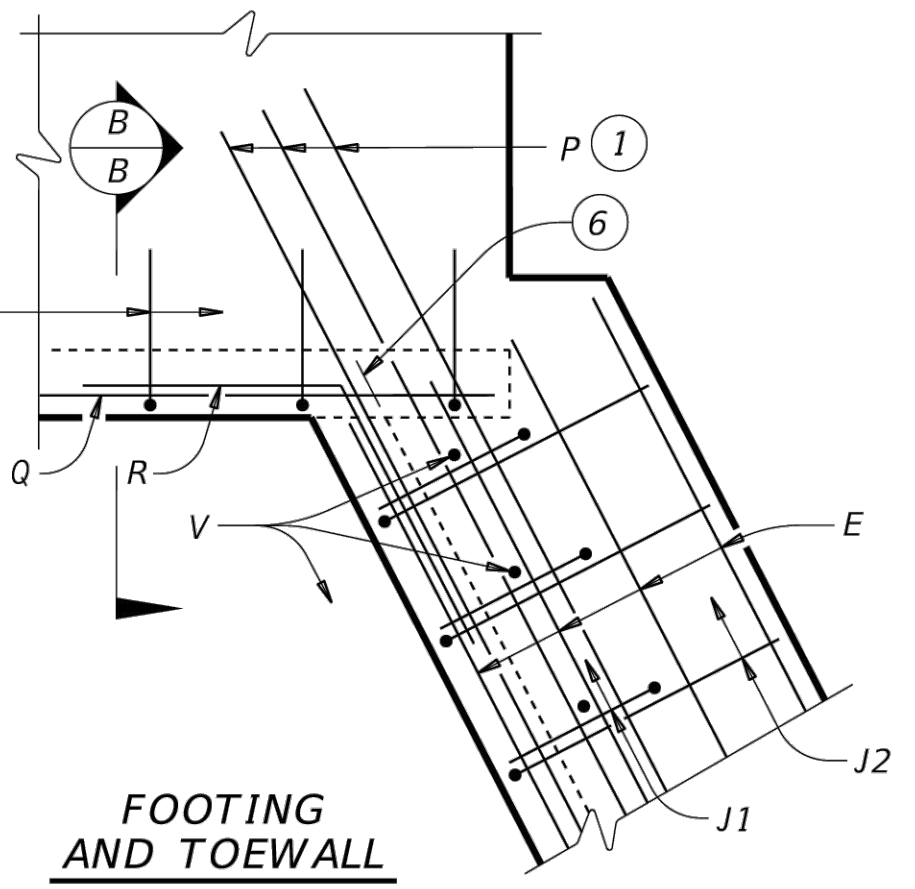
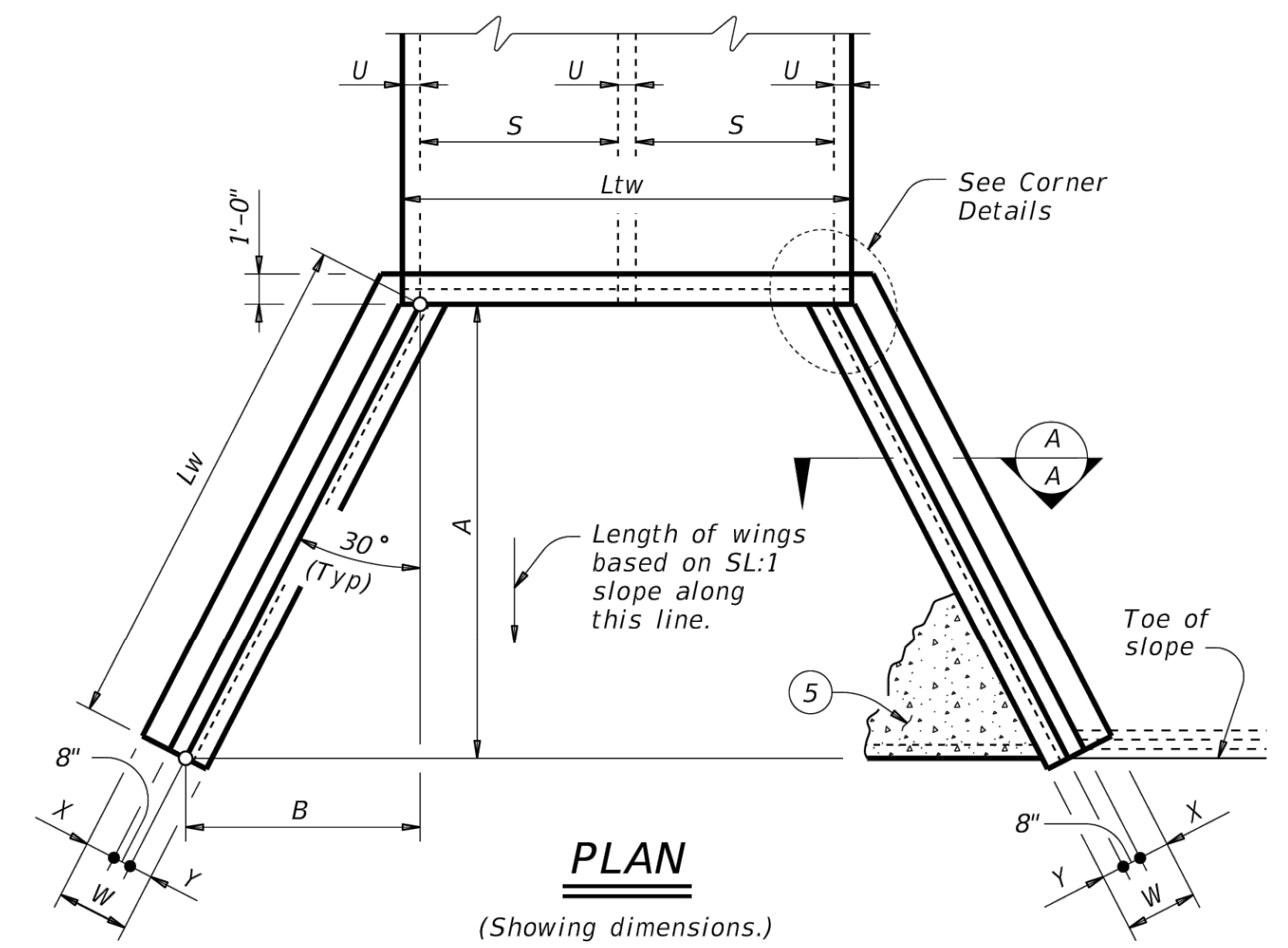
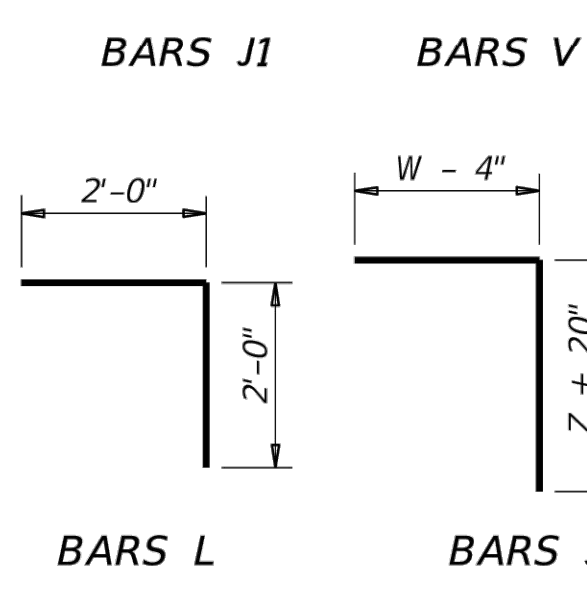
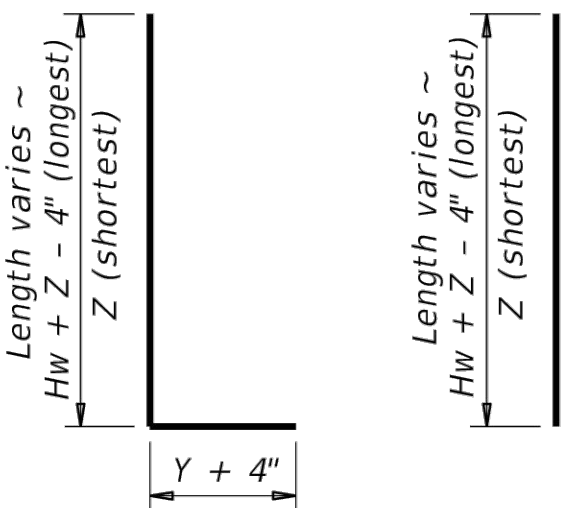
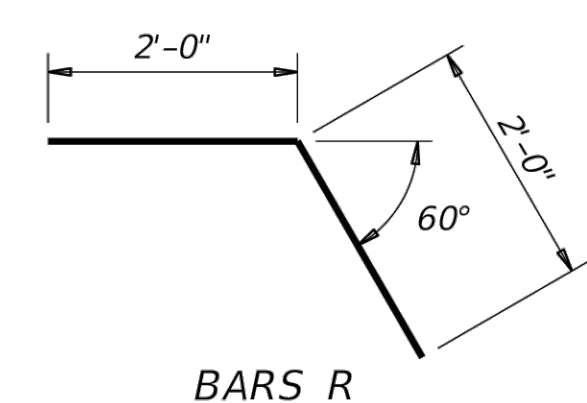
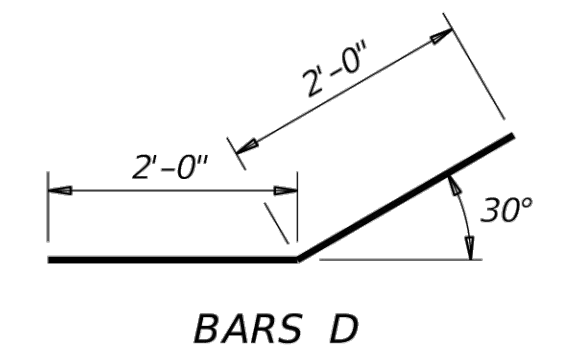
TABLE OF WINGWALL REINFORCING (2-wings)			
Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES			
Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)	2.45		
Conc (CY/Ft)	0.037		

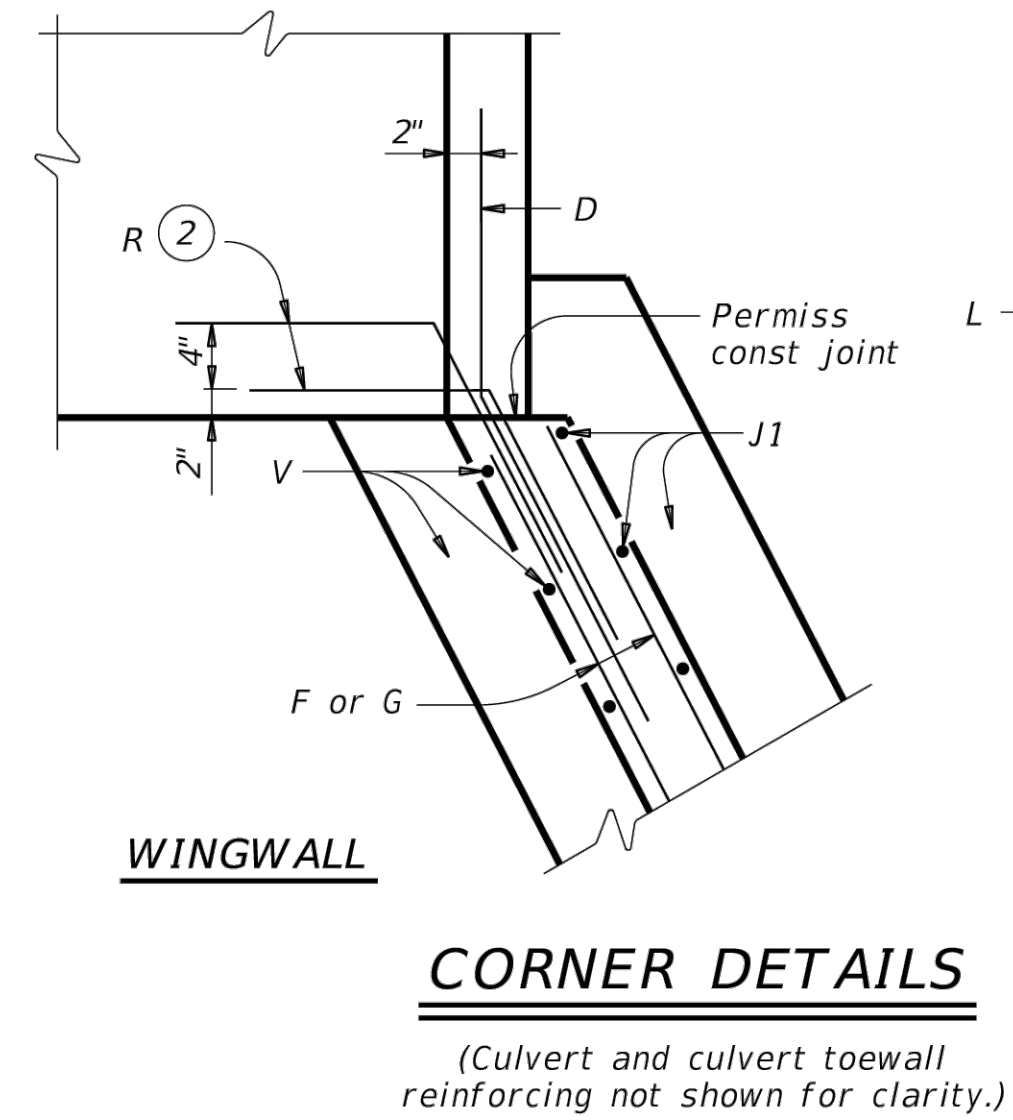
WING DIMENSION FORMULAS:
 (All values are in feet.)
 $Hw = H + T + C - 0.250'$
 $A = (Hw - 0.333') (SL)$
 $B = (A) \text{ tangent } (30^\circ)$
 $Lw = (A) \div \text{cosine } (30^\circ)$
 For cast-in-place culverts:
 $Ltw = (N) (S) + (N + 1) (U)$
 For precast culverts:
 $Ltw = (N) (2U + S) + (N - 1) (0.5')$
 Total wingwall area (two wings ~ SF) = $(Hw + 0.333') (Lw)$

Hw = Height of wingwall
 SL:1 = Side slope ratio (horizontal:1 vertical)
 Lw = Length of wingwall
 Ltw = Culvert toewall length
 N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



INSIDE ELEVATION
 (Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)



CORNER DETAILS
 (Culvert and culvert toewall reinforcing not shown for clarity.)

- Extend Bars P 3'-0" minimum into bottom slab of box culvert.
- Adjust as necessary to maintain 1 1/2" clear cover and 4" minimum between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
- Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
- When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
- At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade.
 Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
 Provide Class C concrete (f'c=3,600 psi).
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.
 In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
 See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
 The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation Bridge Division Standard

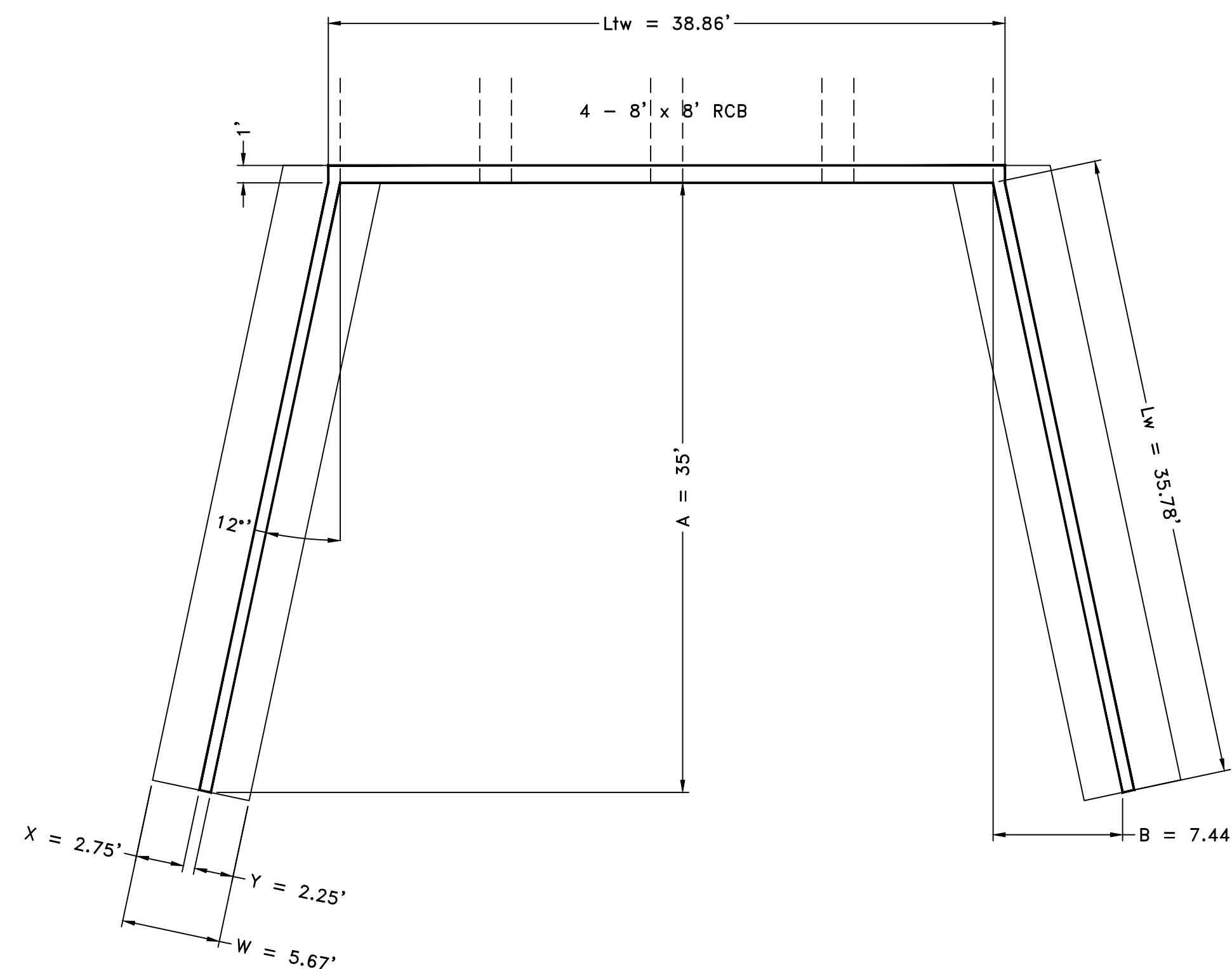
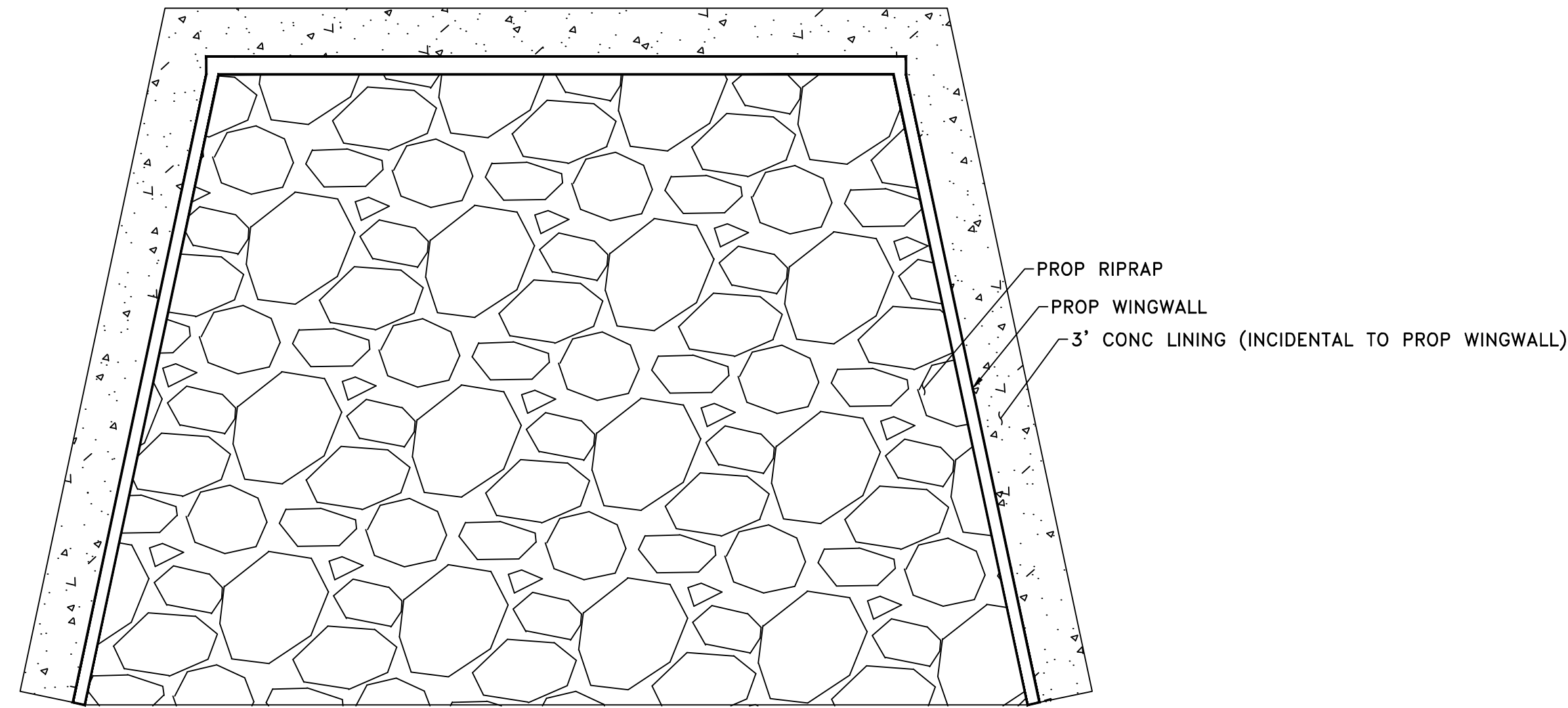
CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

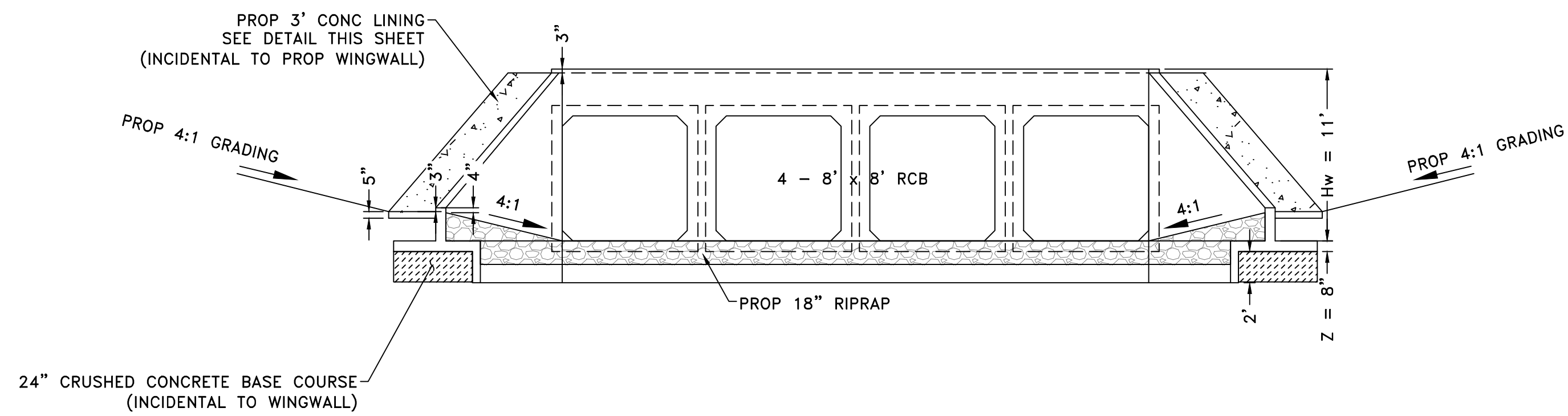
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©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
DIST	COUNTY				SHEET NO.				

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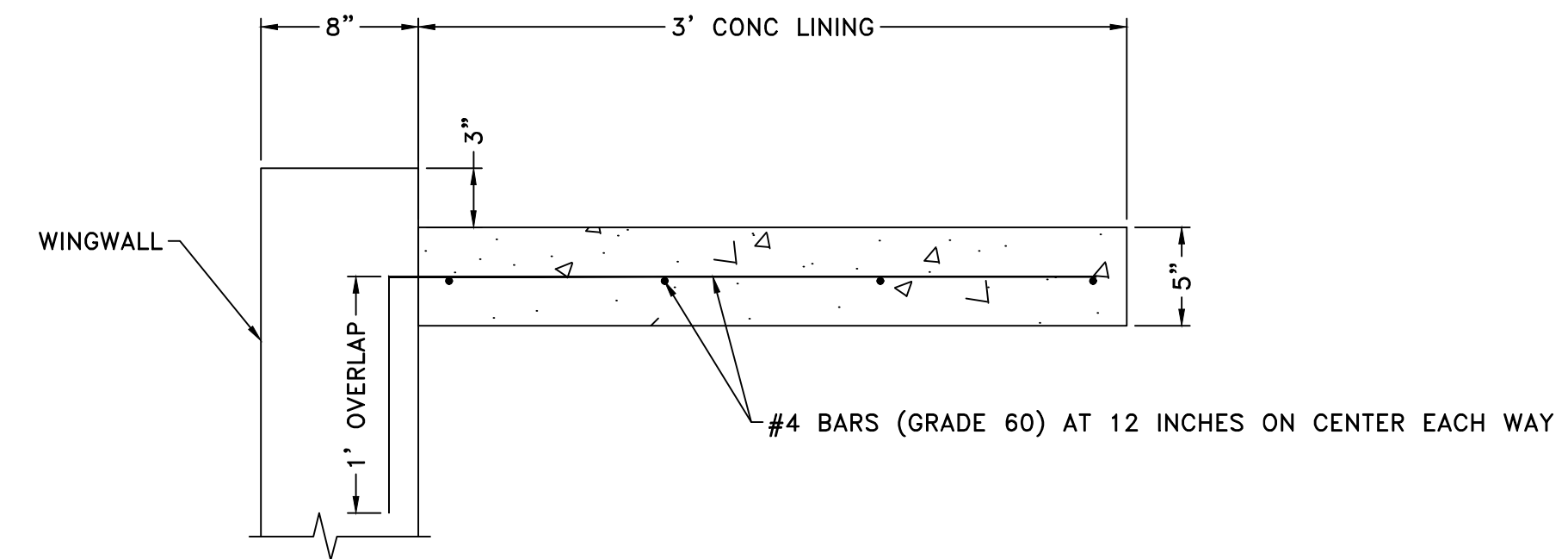
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PLAN
N.T.S.



ELEVATION
N.T.S.



CONC LINING DETAIL

NOTES

- SEE SHEET CG508 FOR ADDITIONAL WINGWALL DETAILS

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
WINGWALLS**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	NTS
DATE:	8/28/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.
100082467

A.I.P. NO.

C.I.P. NO.

H.A.S. NO.
954

SHEET NO.

02632-09

02632-10



Houston Airport System
George Bush Intercontinental Airport / Houston, TX

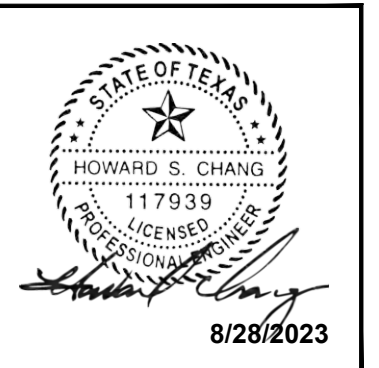
EDGE
ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
SOUTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
TYPE E INLET

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023

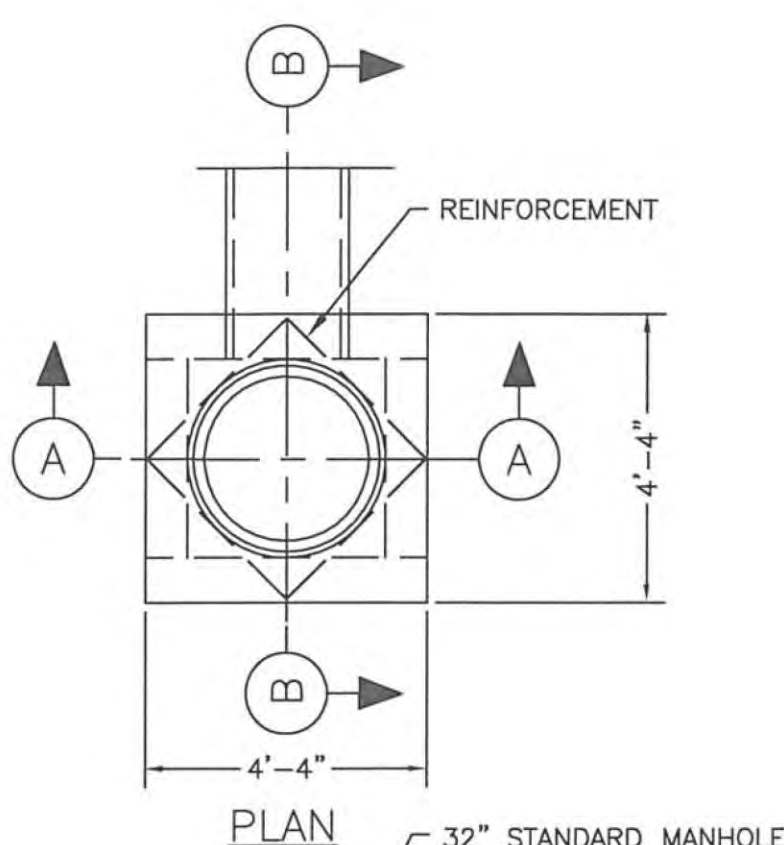


APPROVED BY:	
DIRECTOR	HOUSTON AIRPORT SYSTEM
PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

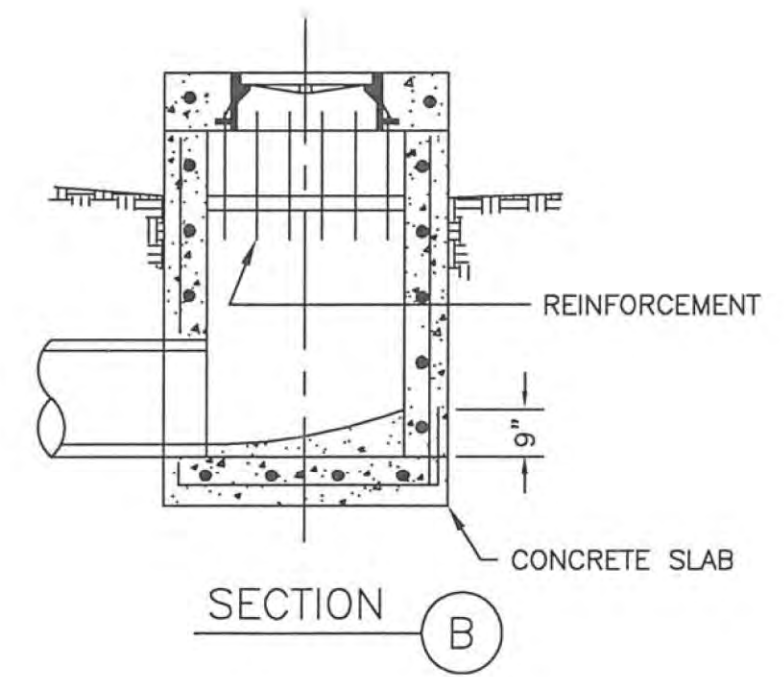
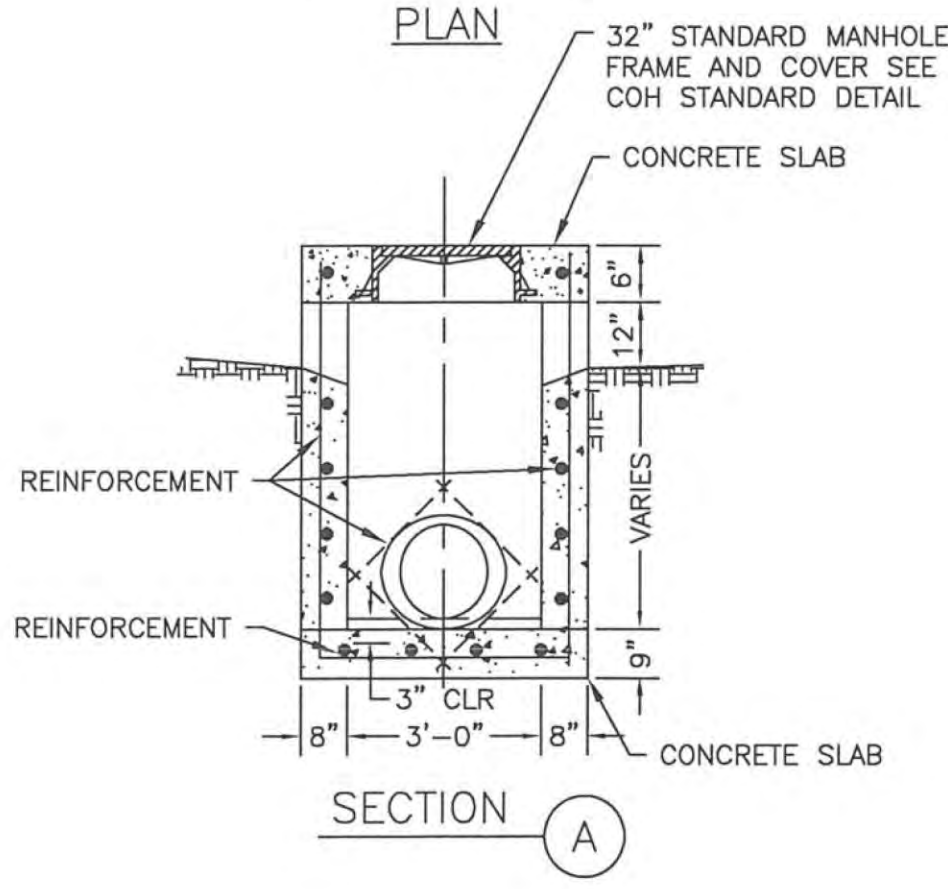
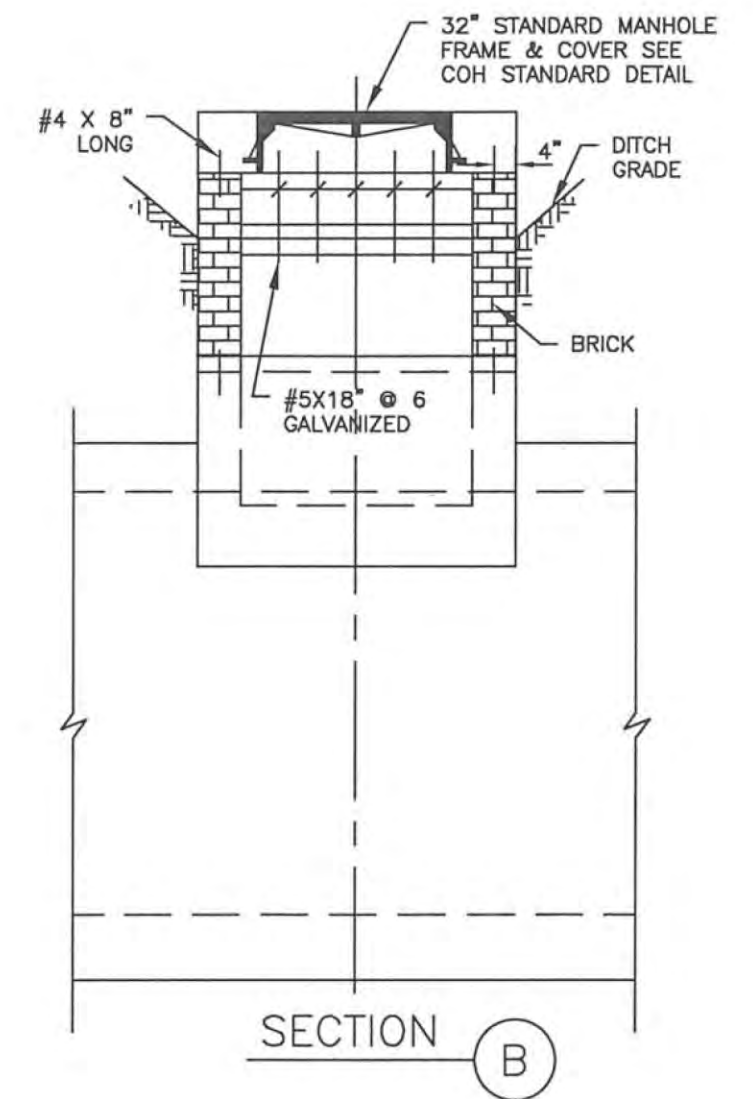
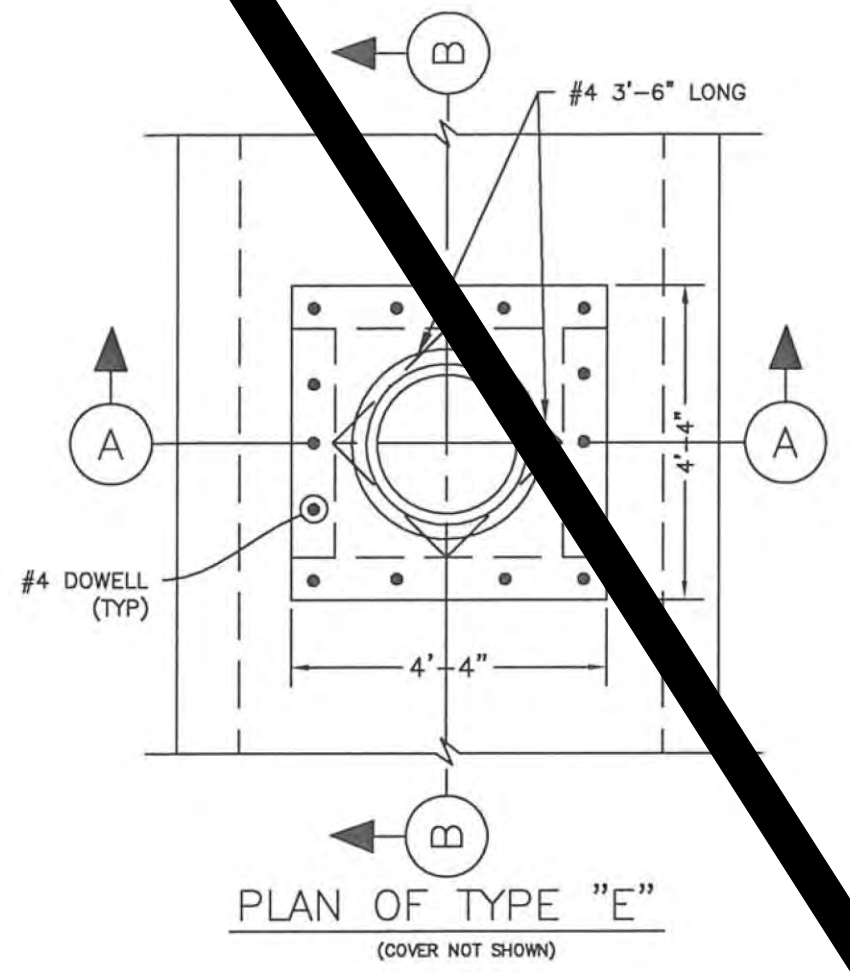
CG510

COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2023

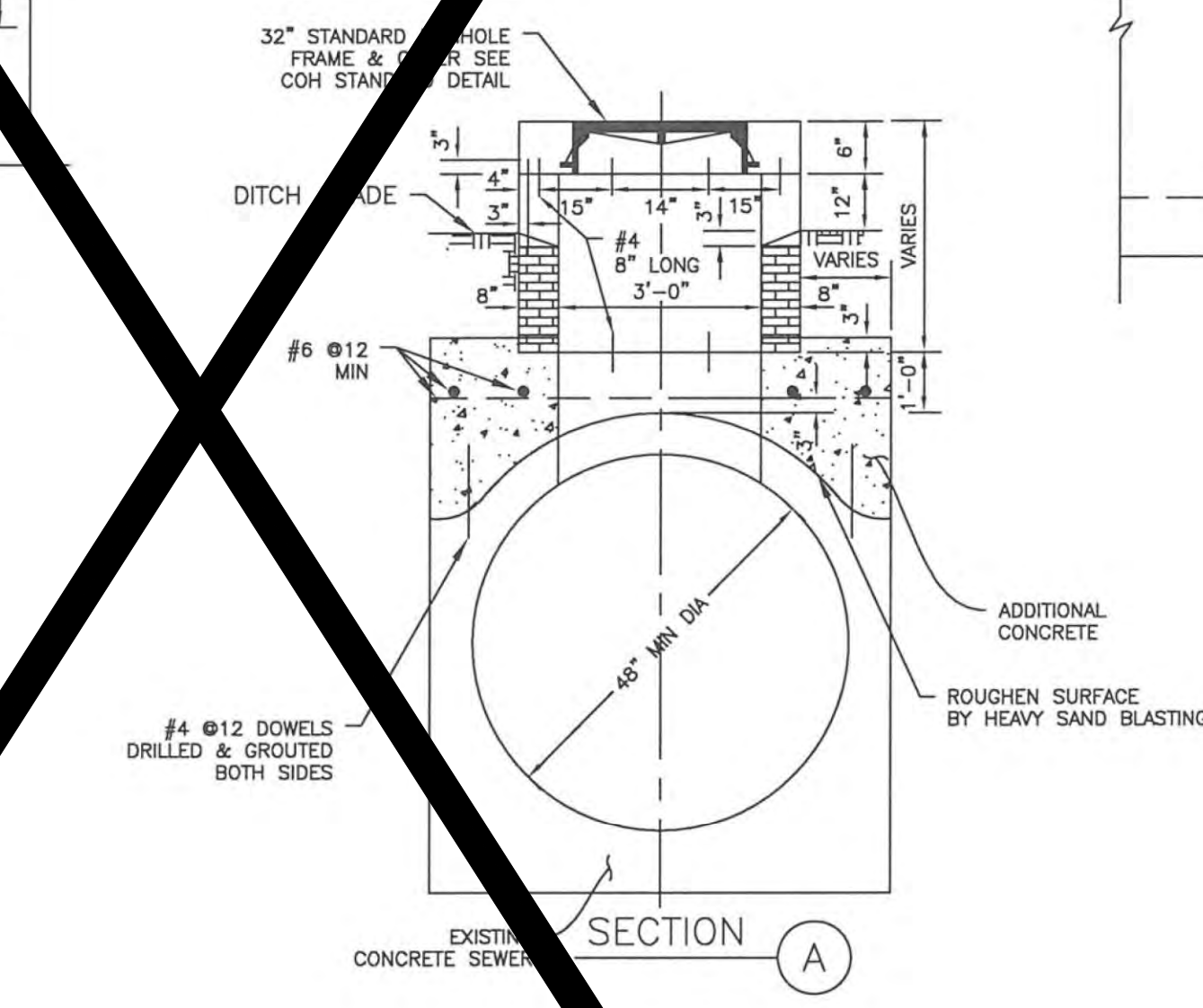
NOTE:
 1. 8" CONCRETE WALLS MAY BE CONSTRUCTED IN LEU OF 8" BRICK WALL



NOTE:
 1. TYPE "E" INLET TOP CAN BE CONSTRUCTED ON A STANDARD "C" MANHOLE.

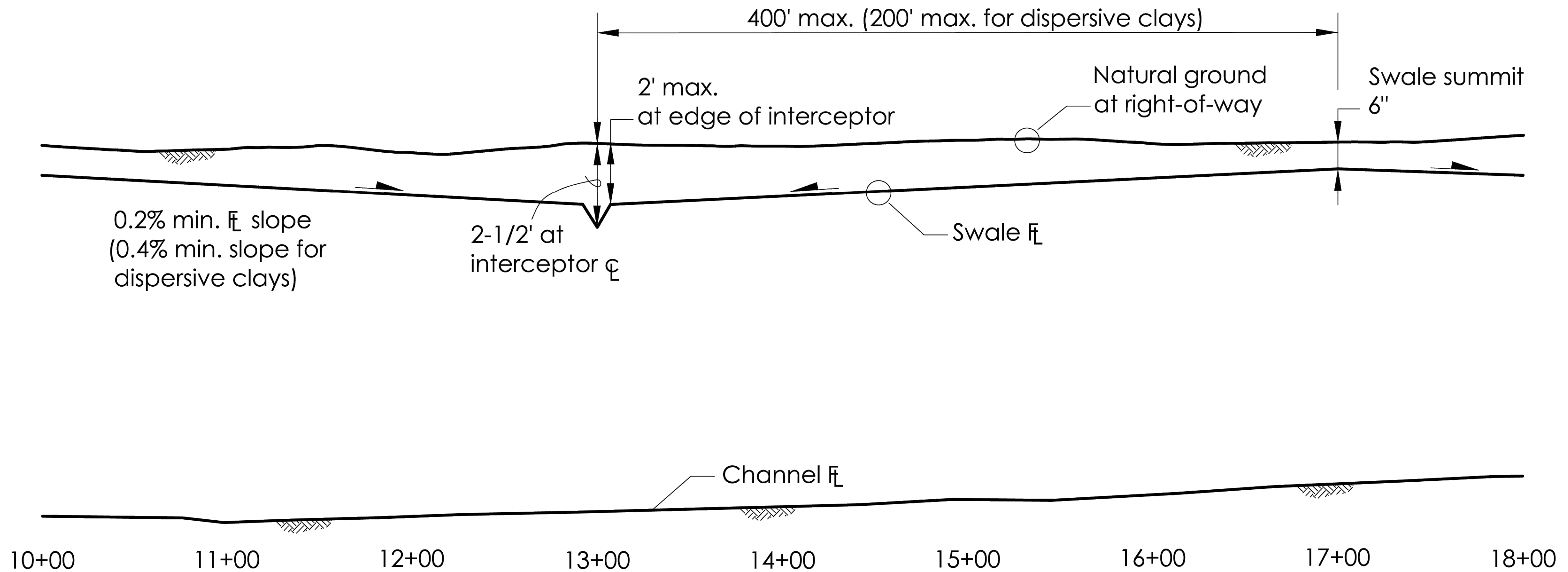


STORM SEWER TYPE "E" INLET
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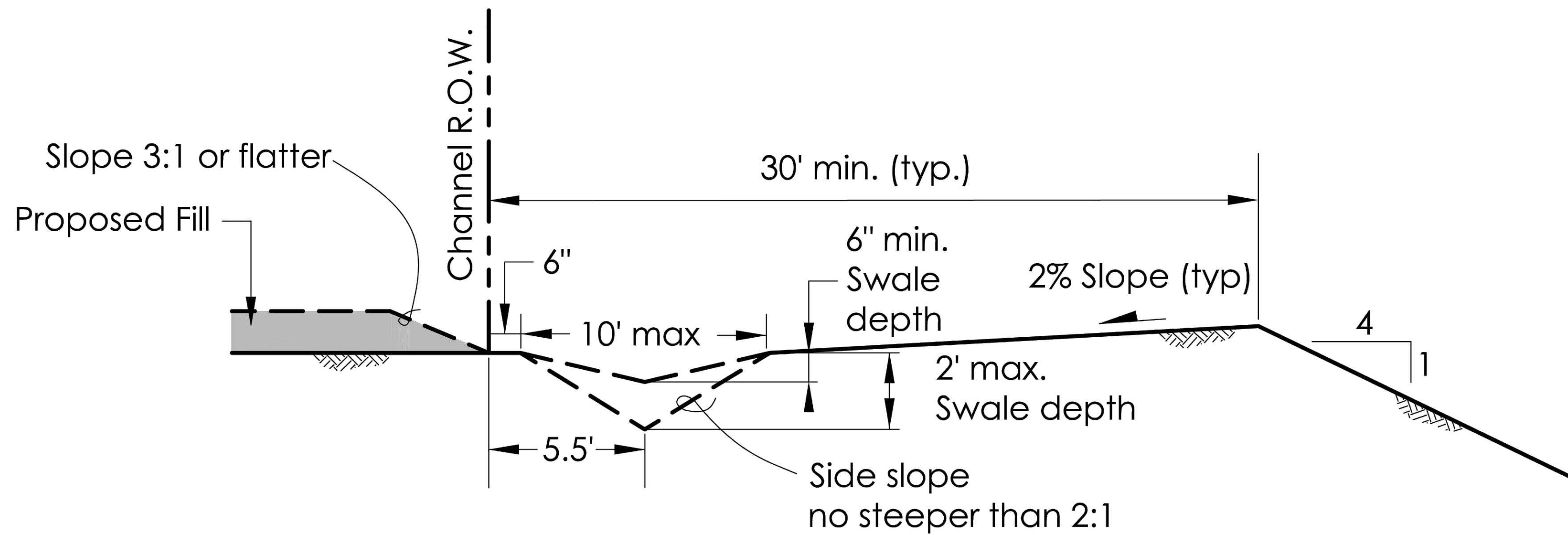


STORM SEWER TYPE "E" INLET ON EXIST
MONOLITHIC CONC SEWERS OF 18" DIA & GREATER
NTS

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BACKSLOPE SWALE PROFILE

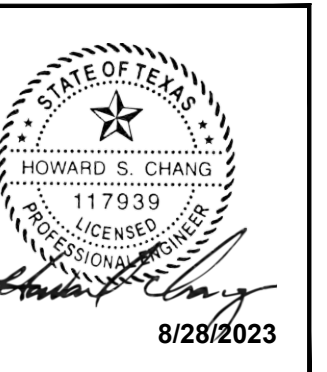


BACKSLOPE SWALE SECTION

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
SOUTH CULVERT RECONSTRUCTION
DRAINAGE DETAILS
BACKSLOPE SWALE

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023



APPROVED BY:

DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	



HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

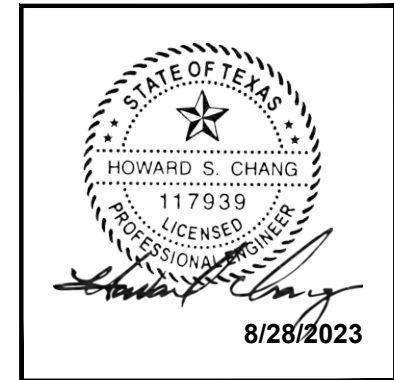
EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

REVISIONS		
NO.	DESCRIPTION	DATE BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
EROSION CONTROL PLAN**

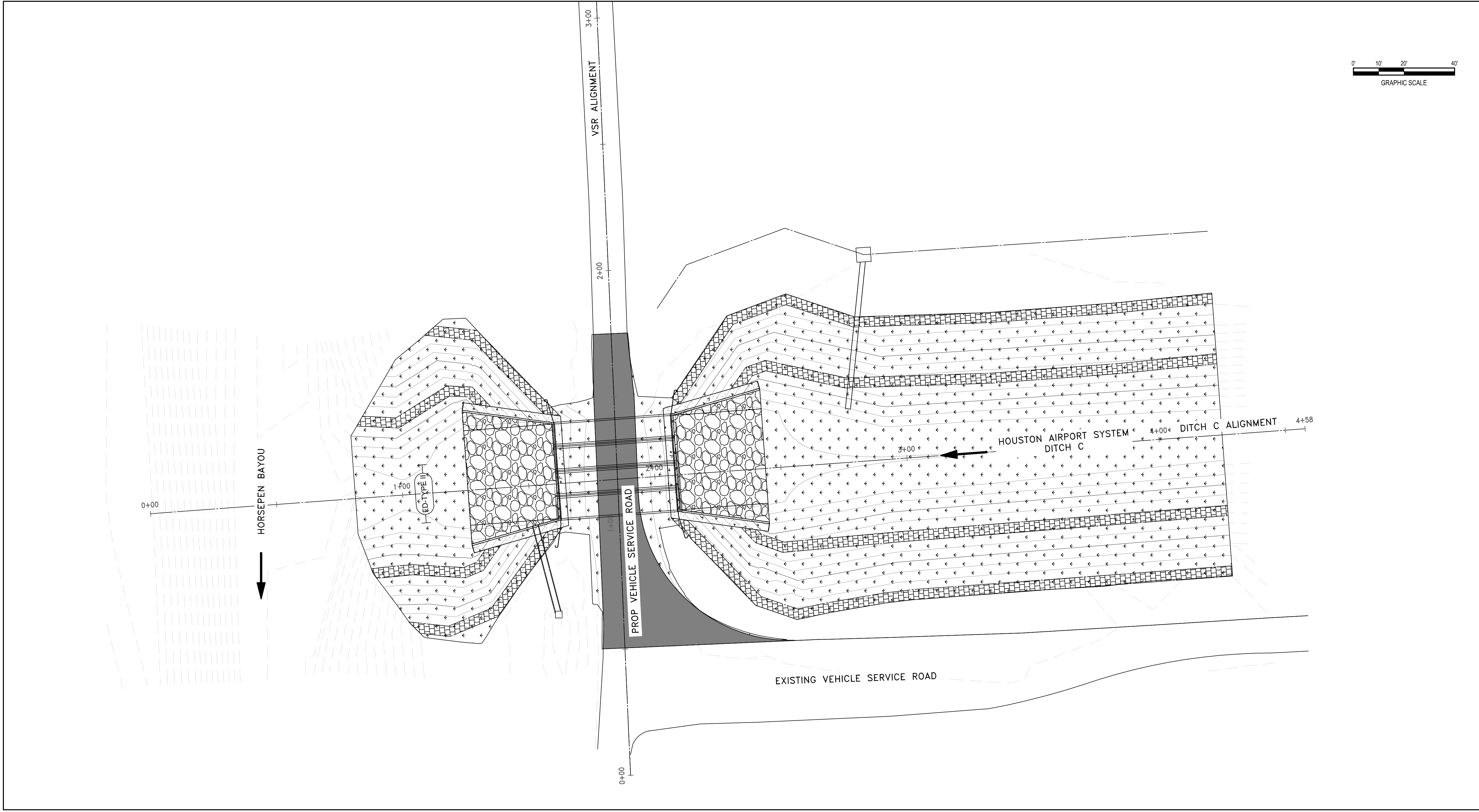
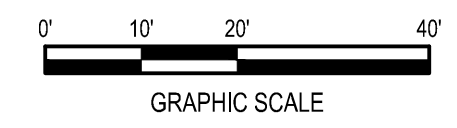
PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	1:20
DATE:	8/28/2023



APPROVED BY:
DIRECTOR
HOUSTON AIRPORT SYSTEM

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

CE102



LEGEND

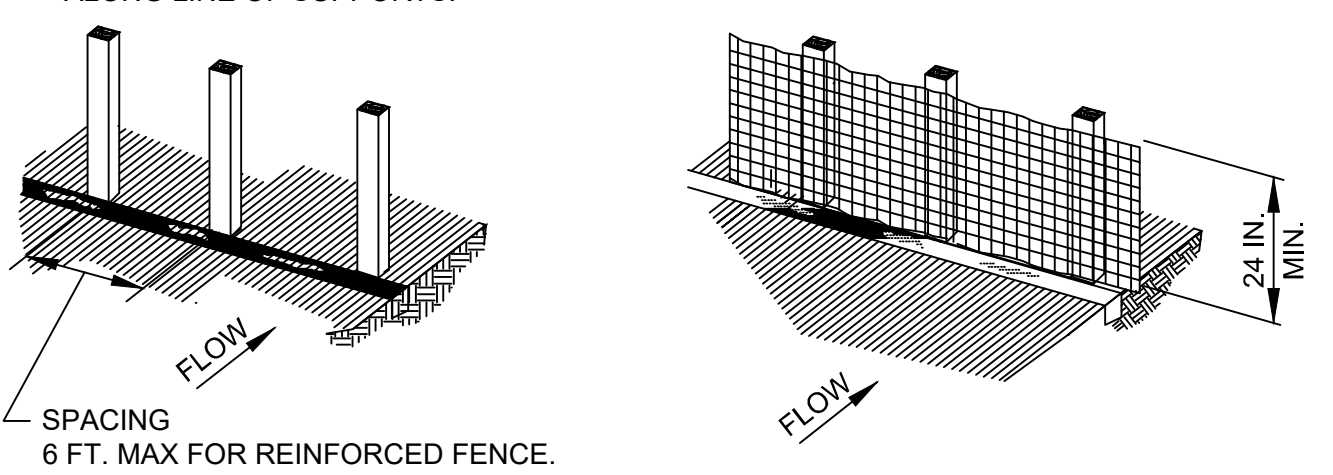
- FLOW DIRECTION
- PROP SEEDING AND SOIL RETENTION BLANKET
- PROP SODDING
- PROP FILTER DAM TYPE II
- PROP VEHICLE SERVICE ROAD

NOTES

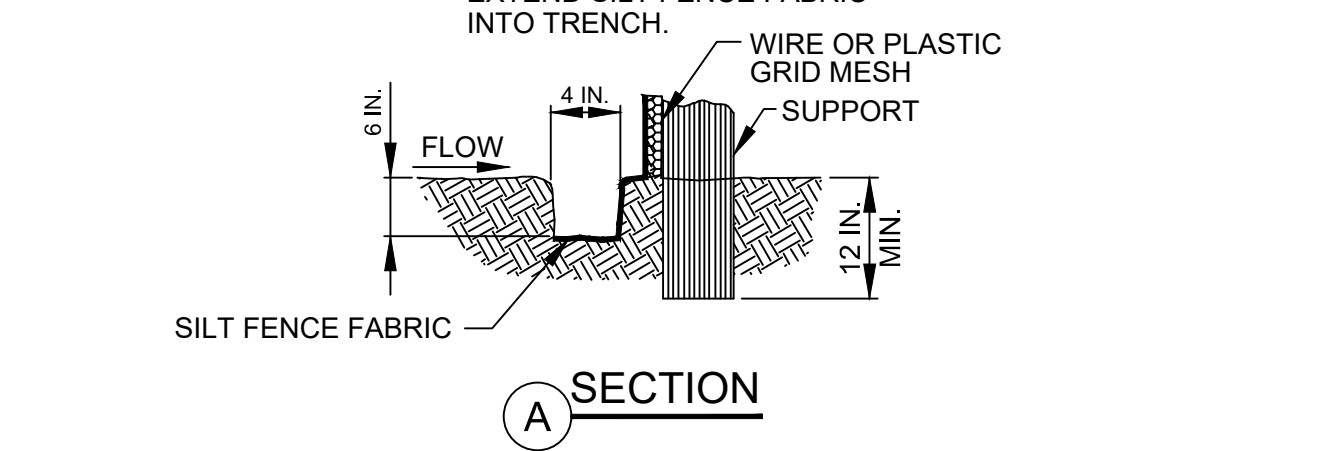
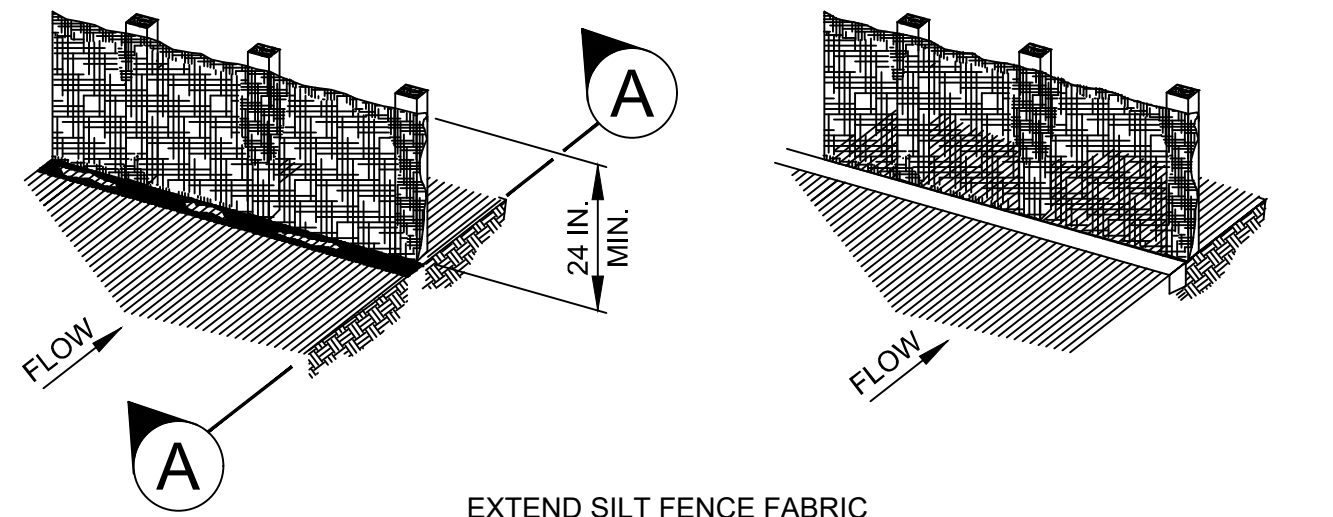
1. SEE SWPPP DETAILS ON SHEET CE202
2. CONTRACTOR SHALL RE-ESTABLISH TURF FOR ANY DISTURBED AREAS OUTSIDE OF SEEDING AND SODDING LIMITS AT CONTRACTOR'S OWN EXPENSE.
3. CONTRACTOR SHALL MAINTAIN SEEDING AND SODDING UNTIL TURF IS FULLY ESTABLISHED.

HAS FILED: EDGE ENGINEERING\PROJECTS - P000\HASTAS-981-00\TINS_LFD_CULVERTS\6-CAD\SHEETS\HAS_001_SHEET SWPPP.DWG

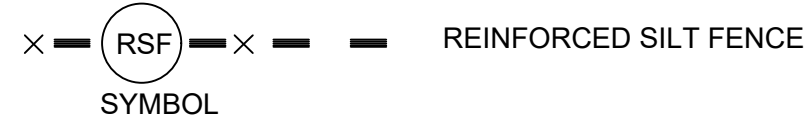
1. SET SUPPORTS AND EXCAVATE 4 IN. X 6 IN. TRENCH UPSLOPE ALONG LINE OF SUPPORTS.
2. SECURE WIRE FENCING TO SUPPORTS.



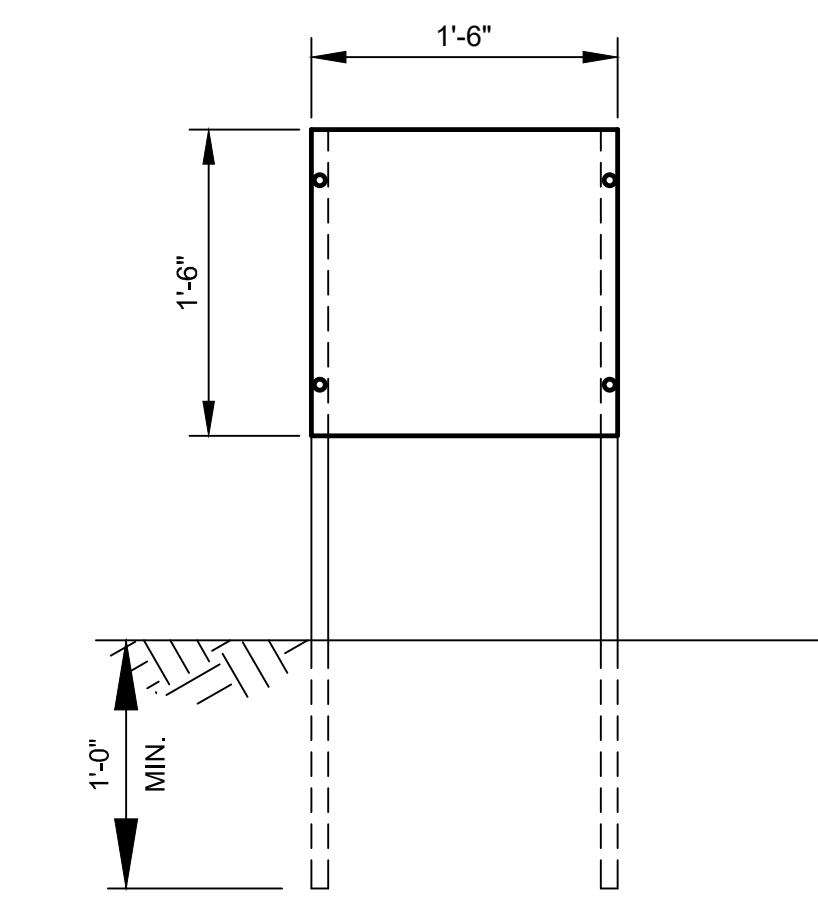
3. ATTACH SILT FENCE FABRIC TO WIRE FENCE AND EXTEND INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



NOTE:
1. SEE SPECIFICATION SECTION NO. 02361-SILT FENCES.

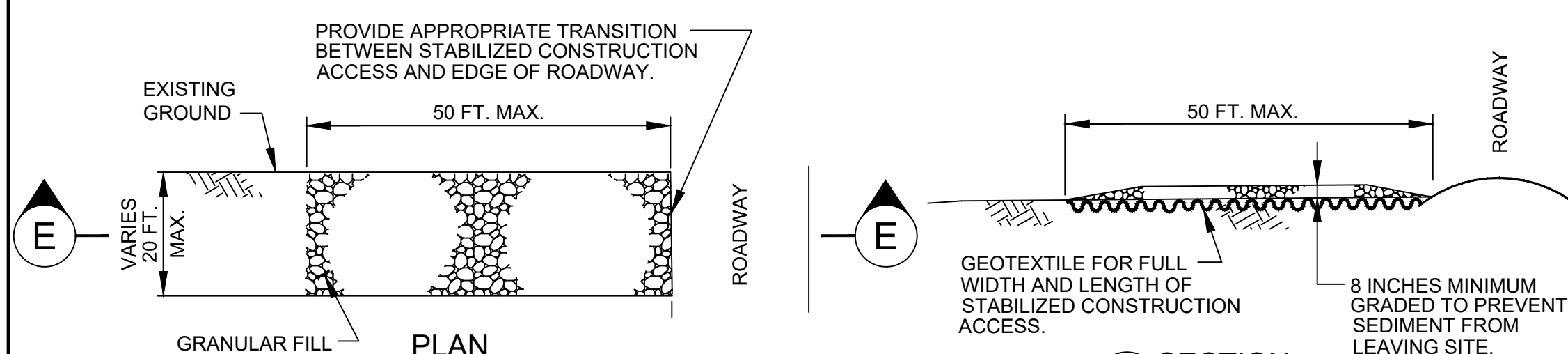


REINFORCED SILT FENCE



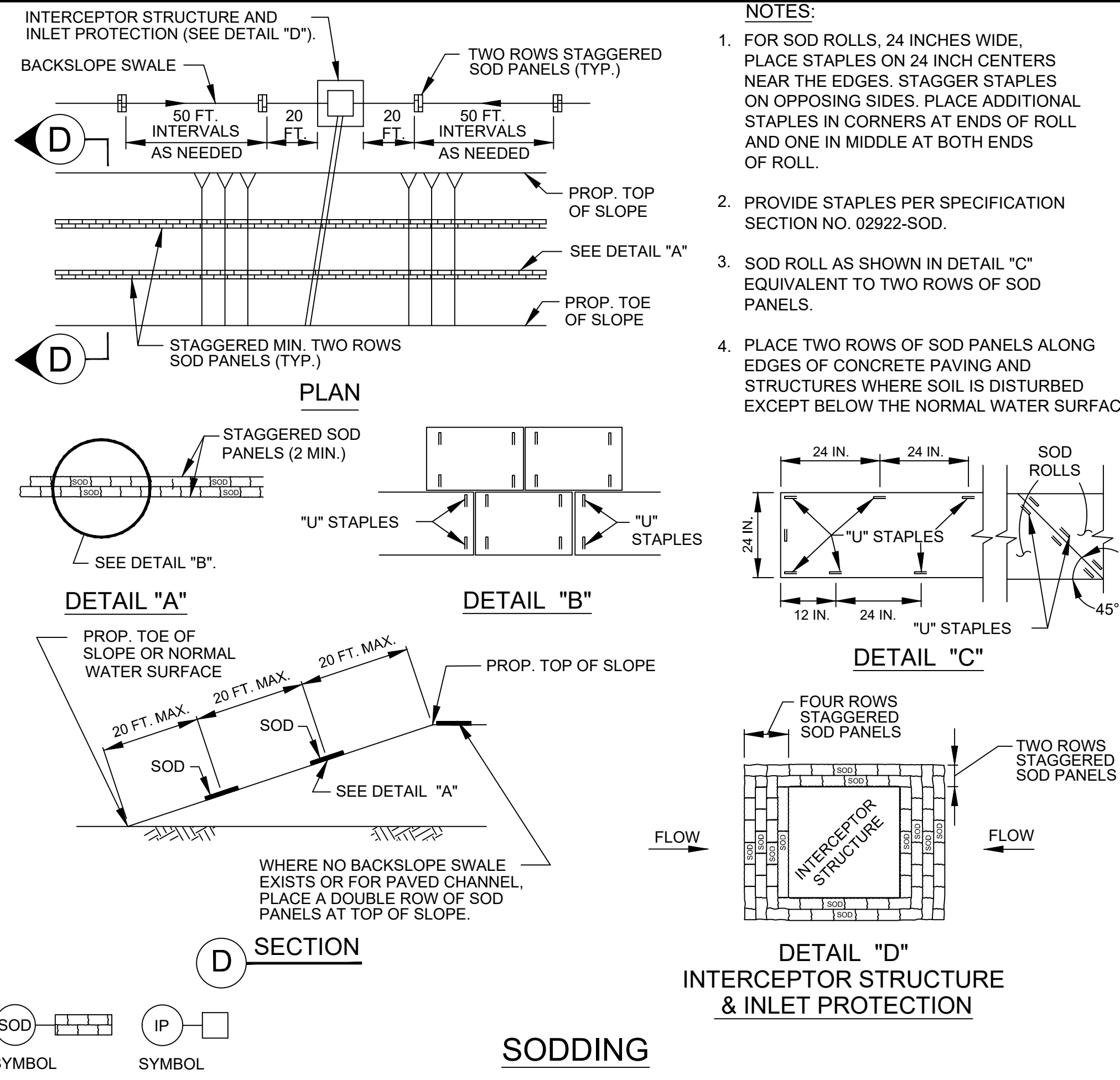
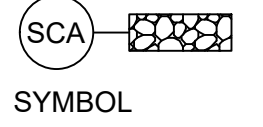
NOTE:
CONSTRUCT IN ACCORDANCE WITH HCFCD SPECIFICATION SECTION 01580 - PROJECT SIGNS.

CSN HOLDER
SWPPP / BMP SIGN AND CONSTRUCTION
SITE NOTICE HOLDER DETAILS



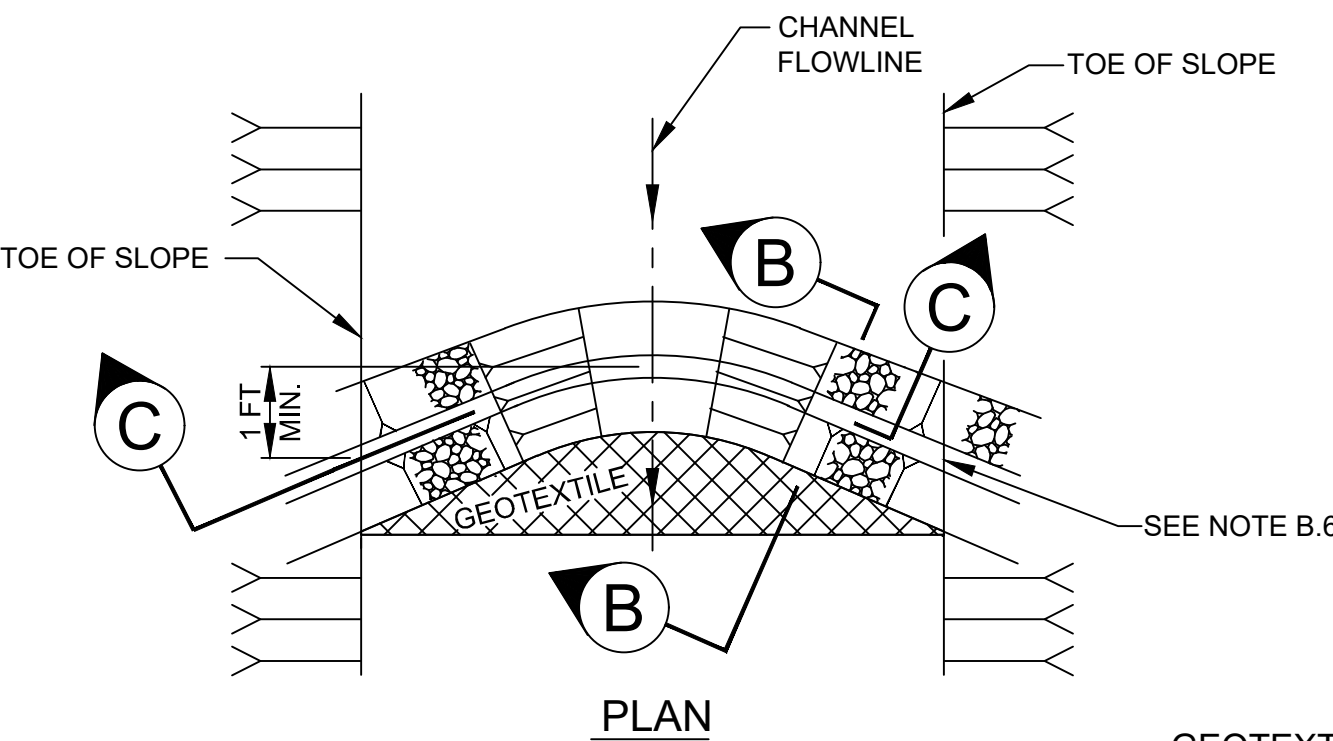
CONSTRUCTION NOTES:
1. SEE SPECIFICATION SECTION NO. 02365-STABILIZED CONSTRUCTION ACCESS.

STABILIZED CONSTRUCTION ACCESS

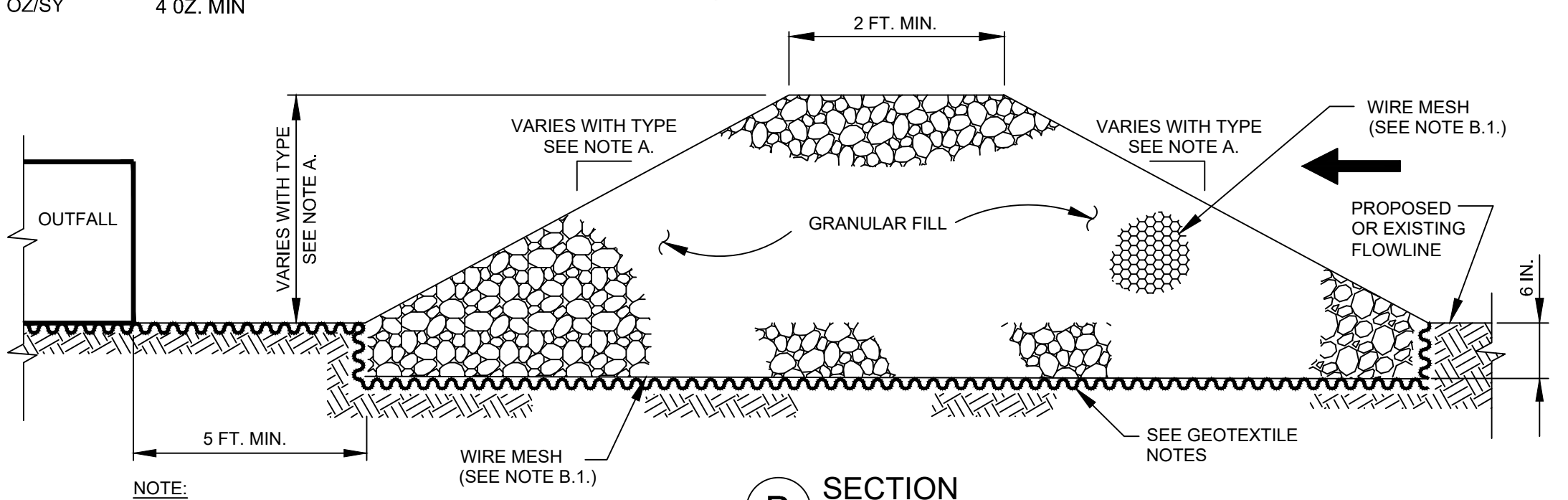
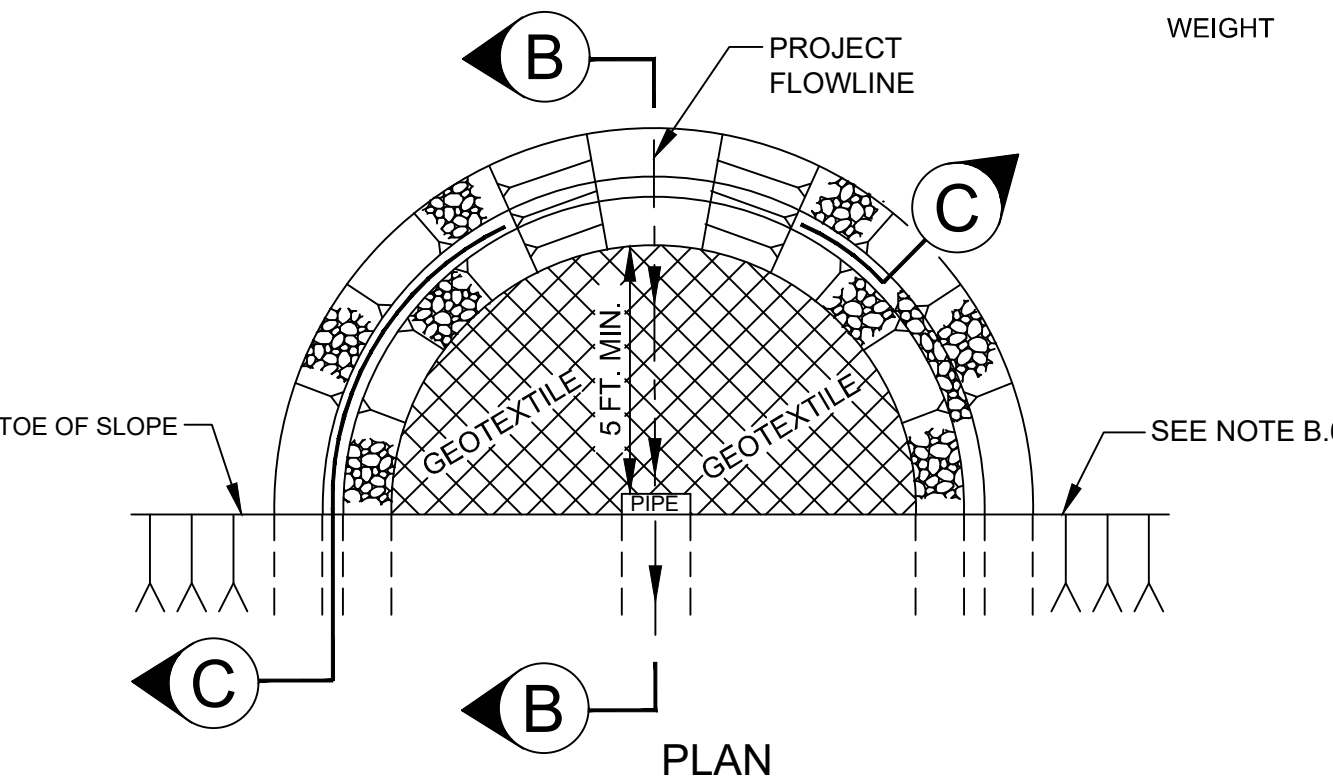
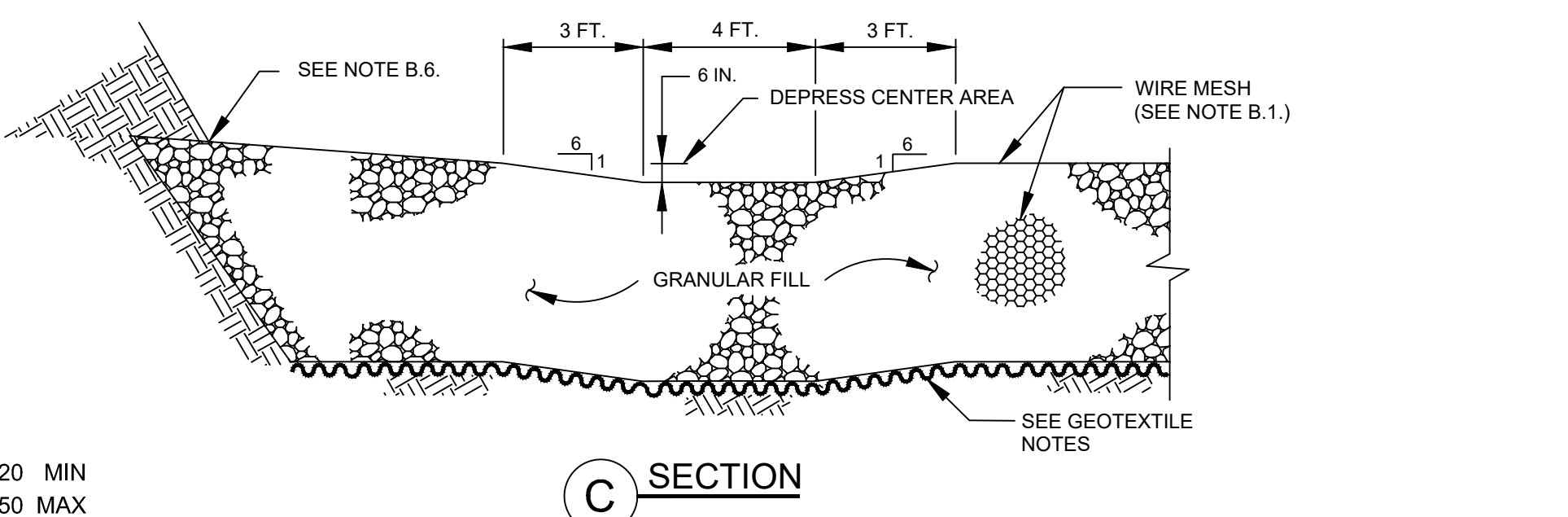


- NOTES:
1. FOR SOD ROLLS, 24 INCHES WIDE, PLACE STAPLES ON 24 INCH CENTERS NEAR THE EDGES. STAGGER STAPLES ON OPPOSING SIDES. PLACE ADDITIONAL STAPLES IN CORNERS AT ENDS OF ROLL AND ONE IN MIDDLE AT BOTH ENDS OF ROLL.
 2. PROVIDE STAPLES PER SPECIFICATION SECTION NO. 02922-SOD.
 3. SOD ROLL AS SHOWN IN DETAIL "C" EQUIVALENT TO TWO ROWS OF SOD PANELS.
 4. PLACE TWO ROWS OF SOD PANELS ALONG EDGES OF CONCRETE PAVING AND STRUCTURES WHERE SOIL IS DISTURBED EXCEPT BELOW THE NORMAL WATER SURFACE.

- FILTER DAM NOTES:
1. TYPES OF FILTER DAMS
 1. TYPE 1 - NOT USED BY HCFCD
 2. TYPE 2 (REINFORCED)
 - a. HEIGHT - 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. SLOPES - 2:1 (MAXIMUM).
 3. TYPE 3 - NOT USED BY HCFCD
 4. TYPE 4 (GABION)
 - a. HEIGHT - 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. TYPE 5. AS SHOWN ON THE PLANS.
 2. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.
 1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
 2. GRANULAR FILL:
 - a. PLACE ON MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
 - b. 3-5 INCHES FOR ROCK FILTER DAM TYPES 2, AND 4. REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378-RIPRAP AND GRANULAR FILL.
 3. WIRE MESH: FOLD AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURE TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
 4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
 5. SEE SPECIFICATION SECTION NO. 02364-FILTER DAMS.
 6. EMBED ONE FOOT MINIMUM INTO SLOPE AND AT SLOPE RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA.



GEOTEXTILE NOTES:
MIN. AOS SIEVE NO. 120 MIN
MAX. AOS SIEVE NO. 50 MAX
WEIGHT OZ/SY 4 OZ. MIN



FILTER DAM AT DETENTION BASIN OUTFALL PIPE

FILTER DAM

HAS FILED: EDGE ENGINEERING\PROJECTS - 16-CAD SHEETS\HAS_001_SHEET SWPPP.DWG

HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT / HOUSTON, TX

EDGE ENGINEERING

10351 STELLA LINK RD
HOUSTON, TEXAS 77025
512-767-1009
TBPE FIRM No. 20690

NO.	DESCRIPTION	DATE	BY

ELLINGTON AIRPORT (EFD)
**SOUTH CULVERT RECONSTRUCTION
EROSION CONTROL DETAILS**

PROJECT MGR:	HSC
DESIGNER:	HSC
DRAWN BY:	HSC
CHECK BY:	NRP
SCALE:	---
DATE:	8/28/2023

APPROVED BY:

8/28/2023

PROJECT NO.	100082467
A.I.P. NO.	
C.I.P. NO.	
H.A.S. NO.	954
SHEET NO.	

CE202