CONT	SECT	JOB	HIGHWAY
0914	24	025	VA
DIST	COUNTY		SHEET NO.
AUS	BURNET		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

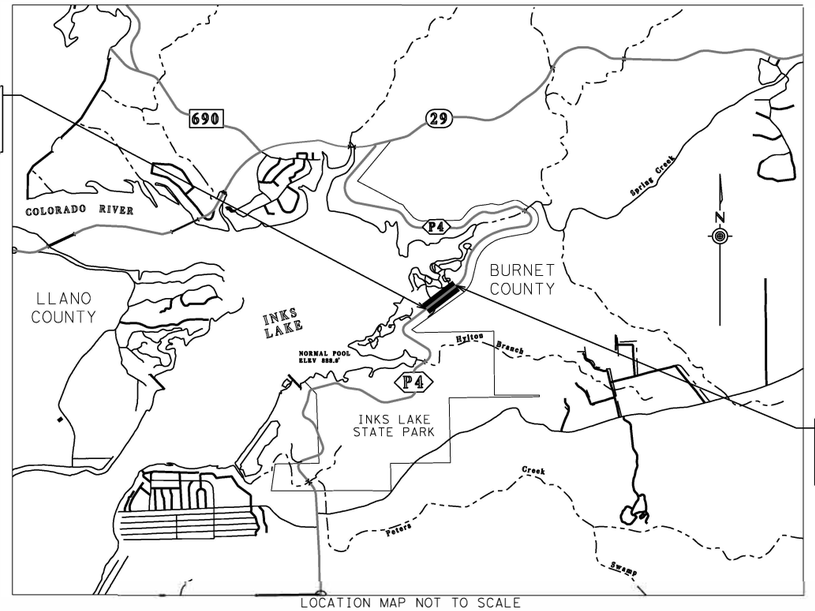
STATE PROJECT NUMBER
C 914-24-25
CSJ 0914-24-025

NET LENGTH OF PROJECT = 1,796.53 FT = 0.340 MILES

VARIOUS
INKS LAKE STATE PARK
BURNET COUNTY

FROM: 1.0 MILES N OF HYLTON BRANCH
TO: 0.4 MILES N OF HYLTON BRANCH

FOR THE CONSTRUCTION OF STATE PARK IMPROVEMENTS CONSISTING OF ROADWAYS, PARKING, DRAINAGE, AND STRUCTURES FOR THE NEW STATE PARK HEADQUARTERS



BEGIN PROJECT
CSJ: 0914-24-025
STA 104+20.00
REF MRKR: 412

END PROJECT
CSJ: 0914-24-025
STA 122+16.53
REF MRKR: 412

LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

DESIGN SPEED
PARK ROAD 4: 40 MPH
INTERIOR ROADS: 15 MPH

A.D.T.
2021: 357 VPD
2041: 621 VPD

FINAL PLANS
DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED AND ACCEPTED: _____
FINAL CONTRACT COST: $_____
CONTRACTOR: _____
LIST OF APPROVED CHANGE ORDERS:

I CERTIFY THAT THIS PROJECT WAS CONSTRUCTED IN SUBSTANTIAL COMPLIANCE WITH THE FINAL AS-BUILT PLANS AND SPECIFICATIONS.

_____ P.E.
AREA ENGINEER

_____
DATE

STATE OF TEXAS · DENNIS K. SEAL · 80287 · LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 2/20/2023 DATE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000---008).

Texas Department of Transportation

2/28/2023
DocuSigned by: DENNIS SEAL 3CB55A3963CA41E...
PAPE-DAWSON ENGINEERS (TBPE FIRM REG. F-470)

CONCURRENCE FOR LETTING: 3/6/2023
DocuSigned by: Scot Smith 42A01427C801487...
TEXAS PARKS AND WILDLIFE ROAD & BRIDGE PROGRAM MANAGER

RECOMMENDED FOR LETTING: 3/1/2023
DocuSigned by: Susana Ceballos P.E. E1816167B5C7414...
DISTRICT DESIGN ENGINEER

SUBMITTED FOR LETTING: 2/28/2023
DocuSigned by: Cathleen A Kratz, P.E. E10D77F9666E43A...
AREA ENGINEER

APPROVED FOR LETTING: 3/2/2023
DocuSigned by: Heather Ashley-Nguyen 8912AF18F45A416...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

FILE: H:\Projects\511\66\00\Design\Civil\General\511660_TITLE.dgn
DATE: 2/20/2023 5:15:39 PM

Plotted on: 3/2/2023

Design Filename: H:\Projects\5116600\Design\Civil\General\5116600_INDEX.DGN

SHEET NO	DESCRIPTION
	GENERAL
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2	INDEX OF SHEETS
3,3A-3F	GENERAL NOTES
4,4A	ESTIMATE AND QUANTITY
5	PROJECT LAYOUT
6-9	HORIZONTAL ALIGNMENT DATA
10	EXISTING TYPICAL SECTION
11-12	PROPOSED TYPICAL SECTIONS
13	SUMMARY OF TCP QUANTITIES
14	SUMMARY OF ROADWAY QUANTITIES
15	SUMMARY OF DRAINAGE QUANTITIES
16	SUMMARY OF PAVEMENT MARKING QUANTITIES
17	SUMMARY OF SW3P QUANTITIES
18	SUMMARY OF SMALL SIGNS
	TCP
19	TRAFFIC CONTROL PLAN GENERAL NOTES
20	TRAFFIC CONTROL PLAN ADVANCE WARNING SIGNS
21	TRAFFIC CONTROL PLAN TYPICAL SECTIONS & SEQUENCE OF WORK
	TCP STANDARDS
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34	* WZ(STPM)-13
35	* WZ(UL)-13
36	* TCP (7-1)-13
37	* TCP (2-1)-18
38	* TCP (2-2)-18
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44-53	PAVING PLAN AND PROFILE
54-57	HEADQUARTERS ROADWAY & PARKING PLAN
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59	AUTOMATIC SWING GATE DETAIL
	ROADWAY STANDARDS
60	* WF(1)-10
	DRAINAGE
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63	HYDRAULIC DATA SHEET PROPOSED CULVERT A
64	HYDRAULIC DATA SHEET EXISTING CULVERT B
65	HYDRAULIC DATA SHEET PROPOSED CULVERT B
66	HYDRAULIC DATA SHEET EXISTING CULVERT C
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75	* PW
76	* SCC-MD
77-78	* SCC-5&6(1-2)
79	* SET-P-PD
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	TRAFFIC STANDARDS
84	* PM (1)-22
85	* PM (2)-22
86	* PM (3)-22

SHEET NO	DESCRIPTION
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88	* SMD(GEN)-08
89-91	* SMD SLIP (1-3)-08
92	* TSR (3)-13
93	* TSR (4)-13
94	* TSR (5)-13
95	* D & OM(1)-20
96	* D & OM(2)-20
97	* D & OM(3)-20
98	* D & OM(4)-20
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99	STORM POLLUTION PREVENTION PLAN (SW3P)
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105	* EC (2)-16
106	* EC (3)-16
107-109	* EC (9)-16
110	* TRB-15(1)

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PREDEDING (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 3/2/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

INDEX OF SHEETS

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	2

GENERAL NOTES: Version: December 20, 2022

Item	Description	**Rate
**204	**Sprinkling**	
	(Dust)	30 GAL/CY
	(Item 132)	30 GAL/CY
	(Item 247)	30 GAL/CY
**210	**Rolling (Flat Wheel)**	
	(Item 247)	1 HR/200 TON
	(Item 316)	1 HR/6000 SY
**210	**Rolling (Tamping and Heavy Tamping)**	1 HR/200 CY
**210	**Rolling (Lt Pneumatic Tire)**	
	(Item 132)	1 HR/500 CY
	(Item 247)	1 HR/200 TON
	(Item 316 - Seal Coat)	1 HR/6000 SY
	(Item 316 - Two Course)	1 HR/3000 SY
247	**Flexible Base (CMP IN PLC)**	132 LB/CF
310	**Prime Coat**	0.20 GAL/SY
3076	**Dense-Graded Hot-Mix Asphalt and Superpave**	110 LB/SY/IN

** For Informational Purposes Only

The following standard detail sheet or sheets have been modified:

CH-PW-0 (MOD)

GENERAL
Contractor questions on this project are to be addressed to the following individual(s):

Burnet Area Joe.Muck@txdot.gov
Burnet Area Cathy.Kratz@txdot.gov

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Workhours can occur from Monday though Saturday between 7 AM to 7 PM.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Contact the supervisor for the passenger facility at Capital Metro and request the relocation of Capital Metro signs. Contact the supervisor at (512) 385-0190.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

ITEM 5 – CONTROL OF THE WORK
Place construction or silt fence 2 ft. inside TxDOT ROW along the Railroad ROW. If work is to be performed inside the Railroad ROW, then the Contractor will coordinate with the Railroad for a Railroad Flagger. This work is subsidiary.

Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

Provide a 72 hour advance email notice to AUS_Locate@TxDOT.gov to request illumination, traffic signal, ITS, or toll equipment utility locates. Provide AUS_Locate@TxDOT.gov an electronic pdf of as-builts within 21 calendar days of illumination, traffic signal, ITS, or toll equipment being placed into operation. As-built shall include GPS coordinates of manholes and junction boxes. Include final version of RFI's and revised plan sheets.

Precast Alternate Proposals.
When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at Alternate Precast Proposal Submission (txdot.gov). Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Alignment and Profile.
Unless shown in the plans, profile and alignment data for roadways being overlaid or widened are for design verification only. Provide survey and construct the roadway in accordance with the typical section. Bid items and data may be provided to adjust cross slope and super elevations.

ITEM 6 - CONTROL OF MATERIALS
Give a minimum of 1 business day notice for materials, which require inspection at the Plant.

For structures with paint containing hazardous materials, provide locations of material removal 60 days prior to begin removal. For metal elements to be removed, mechanical shear or unbolting for removal and disposal does not require paint abatement but requires 60 day advance notice.

For removal, tie, or tap of asbestos concrete (AC) pipe, contact TxDOT and the local utility company 60 days prior to performing the work. Expose the AC pipe to provide a minimum of 1 ft. of clearance around the top and sides. A minimal amount of soil may remain around the AC pipe to avoid disturbance. The local utility company will be responsible for the demo notice to DSHS and removal of the AC pipe. Tie or tap into existing AC pipe may require removing an entire section of pipe from collar to collar and replacement of pipe with new pipe using existing bid items.

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES
TxDOT will coordinate with TDLR regarding pedestrian elements and sidewalks. The contractor will procure and provide all permits, licenses, and inspections; pay all charges, fees, and taxes regarding TDLR rules governing industrialized housing and buildings.

No significant traffic generator events identified.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.
Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL. TxDOT will coordinate with the necessary agencies. Approval of the PSL is not guaranteed. Un approved PSL is not a compensable impact.

Work within a USACE Jurisdictional Area.
Do not initiate activities within a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Obtain written approval from the Engineer for activities not specifically addressed in the plans. Provide a signed sketch and description of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Un approved work is not a compensable impact.

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high-water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

Obtain written approval from the Engineer for temporary fill or crossings not specifically addressed in the plans. Provide a signed sketch of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Unapproved work is not a compensable impact.

DSHS Asbestos and Demolition Notification.
Complete and provide the Texas Department of State Health Services (DSHS) notification form to the Engineer and email to AUS_BRG_Notify@txdot.gov at least 30 calendar days prior to bridge removal or renovation for each phase or step of work. Notify the Engineer via email of any changes to the work start and end dates.

Migratory Birds and Bats.
Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.
Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to TxDOT 30 business days prior to begin work.

No extension of time or compensation will be granted for a delay or suspension due to the above bird, bat and tree/brush requirements.

Law Enforcement Personnel.
Submit charge summary and invoices using the Department forms.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of $70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or "show up" fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation,

minimums, or "show up" time. Payment of actual "show up" time to the event site due to cancellation will be on a case by case basis at a maximum of 2 hours per officer.

Alterations to the cancellation and maximum rate must be approved by the Engineer or pre-determined by official policy of the officers governing authority.

ITEM 100 - PREPARING RIGHT OF WAY
Prep ROW must not begin until accessible trees designated for preservation have been protected, items listed in the EPIC have been addressed, and SW3P controls installed in accessible areas.

Backfill material will be Type B Embankment using ordinary compaction.

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush.

Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas within 30 ft. of edge of pavement under construction. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 14 ft. vertical clearance under all trees. This work is subsidiary.

ITEM 105 – REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT
Existing typical is based on information available. This typical may not account for all maintenance work such as overlays or pavement repairs. A change in material type or thickness does not warrant additional payment. Payment is full compensation for removing all material to the depth specified.

ITEM 110 – EXCAVATION
The Engineer will define unsuitable material.

ITEM 132 – ALL EMBANKMENT
At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation. Embankment placed over the area of MSE backfill must meet the same backfill requirements for the type specified under Item 423.

The Engineer will define unsuitable material. Material which the Contractor might deem to be unsuitable due to moisture content will not be considered unsuitable material.

Prior to begin embankment of existing area, correct or replace unstable material to a depth of 6 in. below existing grade. Embankment areas will be inspected prior to beginning work.

Rock or broken concrete produced by the project is allowed in earth embankments. The size of the rock or broken concrete will not exceed the layer thickness requirements in Section 132.3.4.,

"Compaction Methods." The material will not be placed vertically within 5 ft. of the finished subgrade elevation.

Embankment placed vertically within 5 ft. of the finished subgrade elevation or within the edges of the subgrade and treated with lime, cement, or other calcium based additives must have a sulfate content less than 3000 ppm. Allow 5 business days for testing. Treatment of sulfate material 3000 ppm to 7000 ppm requires 7 days of mellowing and continuous water curing, in accordance TxDOT guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures (9/2005). Material over 7000 ppm is not allowed.

ITEM 160 - TOPSOIL
Off-site topsoil will have a minimum PI of 25.

No Sandy Loam allowed.

Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources.
Construct topsoil stockpiles of no more than five (5) feet in height.
It is permissible to use topsoil dikes for erosion control berms within the right of way, as directed.
Seed or track slopes within 14 days of placement.

Salvage topsoil from sites of excavation and embankment. Maximum salvage depth is 6 inches.

Windrowing of topsoil obtained from the Right of Way (ROW) is not allowed.

ITEM 168 – VEGETATIVE WATERING
Water all areas of project to be seeded or sodded.

Maintain the seedbed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ inch or greater, but will be resumed before the soil dries out. Continue watering until final acceptance.

Vegetative watering rates and quantities are based on ¼ inch of watering per week over a 3-month watering cycle. The actual rates used and paid for will be as directed and will be based on prevailing weather conditions to maintain the seedbed.

Obtain water at a source that is metered (furnish a current certification of the meter being used) or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer, each day that watering takes place, before watering, so that meter readings or truck counts can be verified.

ITEM 169 – SOIL RETENTION BLANKETS
Type A blankets containing straw fibers are not allowed. Type B and D blankets shall be a spray type blanket.

ITEM 204 – SPRINKLING
Apply water for dust control as directed. When dust control is not being maintained, cease operations until dust control is maintained. Consider subsidiary to the pertinent Items.

ITEM 247 - FLEXIBLE BASE
The layer thickness will be 4 in. to 6 in. unless shown on the plans. Placing in a single layer is allowed when total thickness of base is 8 in. or less. When placed in multiple layers, compact the bottom and middle layers to at least 95% and 98% of the maximum dry density, respectively. When placed in a single layer or the final layer, compact to at least 100%.

Correction of subgrade soft spots is subsidiary.

Complete per plans the subgrade, ditches, slopes, and drainage structures prior to the placement of base.

Do not use a vibratory roller to compact base placed directly on top of a drainage structure.

Grade 4 will have the same material requirements as Grade 5 except minimum compressive strength at lateral pressure 3 psi will be **70** psi and at lateral pressure 15 psi will be 150 psi. Grade 4 does not have a minimum compressive strength at lateral pressure 0 psi.

ITEM 300s – SURFACE COURSES AND PAVEMENTS
Asphalt season is May 1 thru September 15. Emulsified Asphalt season is April 1 thru October 15. The latest work start date for asphalt season is August 1.

If an under seal is not provided, furnish a tack coat. Apply tack coat at 0.08 GAL/SY (residual). Apply non-tracking tack coat using manufacturer recommend rates.

ITEM 310 – PRIME COAT
Apply blotter material to all driveways and intersections. This work is subsidiary.

When Multi Option is allowed, provide MC 30, EC 30 or AE-P. MC 30 is not allowed in Travis County.

Rolling to ensure penetration is required.

ITEM 314 - EMULSIFIED ASPHALT TREATMENT
Process the top 1.5 inches of base material. Use 30% of total volume emulsified asphalt in the mixture.

Use emulsified asphalt, AEP or equal, for dust control. This work is subsidiary.

ITEMS 341, 344, & 3076 THRU 348/3082 - HOT-MIX ASPHALT PAVEMENT
Core holes may be filled with an Asphaltic patching material meeting the requirements of DMS-9203 or with SCM meeting requirements of DMS-9202.

Install transverse butt joints with 50 ft. H: 1 in. V transition from the new ACP to the existing surface. Install a butt joint with 24 in. H: 1 in. V transition from the new ACP to a driveway, pullout or intersection. Saw cut the existing pavement at the butt joints. This work is subsidiary.

Use a device to create a maximum 3H:1V notched wedge joint on all longitudinal joints of 2 in. or greater. This work is subsidiary.

Prior to milling, core the existing pavement to verify thickness. This work is subsidiary.

Ensure placement sequence to avoid excess distance of longitudinal joint lap back not to exceed one day's production rates.

Submit any proposed adjustments or changes to a JMF before production of the new JMF.

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar.

Provide a minimum transition of 10' for intersections, 10' for commercial driveways, and 6' for residential driveways unless otherwise shown on the plans.

Irregularities will require the replacement of a full lane width using an asphalt paver. Replace the entire sublot if the irregularities are greater than 40% of the sublot area.

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC "A" requirement.

When using RAP or RAS, include the management methods of processing, stockpiling, and testing the material in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted.

Asphalt content and binder properties of RAP and RAS stockpiles must be documented when recycled asphalt content greater than 20% is utilized.

No RAS is allowed in surface courses.

Department approved warm-mix additives is required for all surface mix application when RAP is used. Dosage rates will be approved during JMF approval.

The Hamburg Wheel Test will have a minimum rut depth of 3mm except for SMA with HPG or PG 76.

ITEMS 3076 - DENSE-GRADED HOT-MIX ASPHALT
Use the SGC for design and production testing of all mixtures. Design all Type D mixtures as a surface mix, maximum 15% RAP and no RAS. Contractor may not use a substitute PG binder for 76-22. When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

The Hamburg Wheel minimum number of passes for PG 64 or lower is reduced to 7,000. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

ITEM 432 - RIPRAP
Mow strip riprap will be 4 in. and all other riprap will be 5 in. unless otherwise shown on the plans. Mow strip for cable barrier may be placed monolithically with the barrier foundations if using concrete in accordance with Item 543. Fiber reinforcement is not allowed except in mow strip for cable barrier if foundation and mow strip are placed monolithically. GFRP is allowed reinforcement for all applications.

Saw-cut existing riprap then epoxy 12 in. long No. 3 or No. 4 bars 6 in. deep at a maximum spacing of 18 in. in each direction to tie new riprap to existing riprap. This work is subsidiary. Provide Type A Grade 3 or 5 flexible base for cement stabilized riprap. Compressive strengths for flexible base are waived.

SGT approach taper, paid for using mow strip item, will be installed using concrete, flexible base coated with SS-1 at a rate of 0.12 GAL/SY, or HMA Type B/C/D. Placement will be ordinary compaction and does not require placement using an asphalt paver.

ITEM 466 - HEADWALLS AND WINGWALLS
Remove all loose formwork and materials from the waterway at the end of each work week or prior to a rain event. Debris that falls into the waterway must be removed at the end of each work day. Upon completion of the structure, stencil the National Bridge Inventory (NBI) number (structure number) using black paint and 4 in. tall numbers at 4 locations designated by TxDOT. This work is subsidiary.

ITEM 467 - SAFETY END TREATMENT
Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all metal field cuts or exposed reinforcement with asphalt paint.

ITEM 496 - REMOVING STRUCTURES
Submit a demolition plan to the Engineer. Have the plan signed and sealed by a licensed professional engineer when the structure will continue to accommodate traffic after removal has begun and the removal impacts any part of the structure below the deck or riding surface. If applicable, the plan must detail requirements for meeting the U.S. Army Corps of Engineers' Section 404 Permit. The demolition plan must detail handling of roadway and waterway traffic. Waterway traffic must be maintained at all times unless a closure is approved by the Engineer.

No debris is allowed to fall into a body of water. Debris that falls into the water must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event.

The existing Stone Veneer will be removed and cataloged. This work is subsidiary.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING
Place standard markings no later than 14 days after surface treatment operations are completed.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify current and future traffic control, if at any time the queue becomes greater than 20 minutes.

Cover, relocate, or remove existing small, large, and overhead signs that conflict with traffic control. Cover large and overhead signs to remain using latest standard TS-CD. This work is subsidiary.

Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Place a 28-inch cone, meeting requirements of BC (10), on top of foundations that have protruding studs. This work is subsidiary.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS
If SW3P plan sheets are not provided, place the control measures as directed.

Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEM 508 – CONSTRUCTING DETOURS
Detour typical section must match the adjacent roadway section, unless shown on the plans.

Flexible base will be Type A Grade 5 placed using ordinary compaction. Base compressive strengths are waived for roadways not listed in Item 502, Table 1.

ITEM 510
Payment for Pilot Car Method includes all necessary flaggers to safely conduct operations. This may involve stationing additional flaggers at public streets and driveways.

ITEM 662 - WORK ZONE PAVEMENT MARKINGS
Notify the Engineer at least 24 hours in advance of work for this item.

Maintain removable and short-term markings daily. Remove within 48 hours after permanent striping has been completed.

Item 668 is not allowed for use as Item 662.

Roadways with existing profile pavement markings or rumble strips must supplement work zone solid lines with traffic buttons spaced at 12 in. Traffic buttons used to supplement the work zone markings will be paid by the each in addition to the work zone item.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS
Notify the Engineer at least 24 hr. before beginning work.

Place longitudinal markings nightly for IH 35 main lanes or roadways with AADT greater than 100,000. Use of temporary flexible reflective roadway marker tabs is subsidiary and at the Contractor’s option. Replace missing or damaged tabs nightly. If using tabs, place longitudinal markings weekly by 5 AM Friday for all weekday work and by 5 AM Monday for all weekend work. Failure to maintain tabs or place longitudinal markings by deadline will require nightly placement of longitudinal markings.

Place longitudinal markings no later than 7 calendar days after placement of the surface for roadways with AADT greater than 20,000.

When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

When using black shadow to cover existing stripe apply a non-retroreflective angular abrasive bead drop. The marking color shall be adjusted to resemble the pavement color. If Item 677 is not used prior to placement of black shadow, scrape the top of the marking with a blade or large piece of equipment unless surface is a seal coat. The scraping of the marking is subsidiary.

ITEM 752 – TREE AND BRUSH REMOVAL
Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush even if Item 752 is not included as a pay item.

Flailing equipment is not allowed. Burning brush is not allowed in urban areas or on ROW. Use hand methods or other means of removal if doing work by mechanical methods is impractical.

Shredded vegetation may be blended, at a rate not to exceed 15 percent by volume, with Item 160 if the maximum dimension is not greater than 2 in.

ITEM 5126 – NATURAL STONE VENEER

Relocated stone headwall to visually match general conditions of existing On-Site historic headwall that will remain in place.

If new wall material is required, match existing stone material, color, and size. Furnished limestone must be pre-approved by Texas Parks and Wildlife Department.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN
Provide 1 PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

Place PCMS 10 calendar days prior to begin work stating “Road Work Begin Soon, Contact 832-7000 For Info”.

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as “RIGHT LN CLOSED XXX FT”.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR
The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.
TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

Estimate & Quantity Sheet

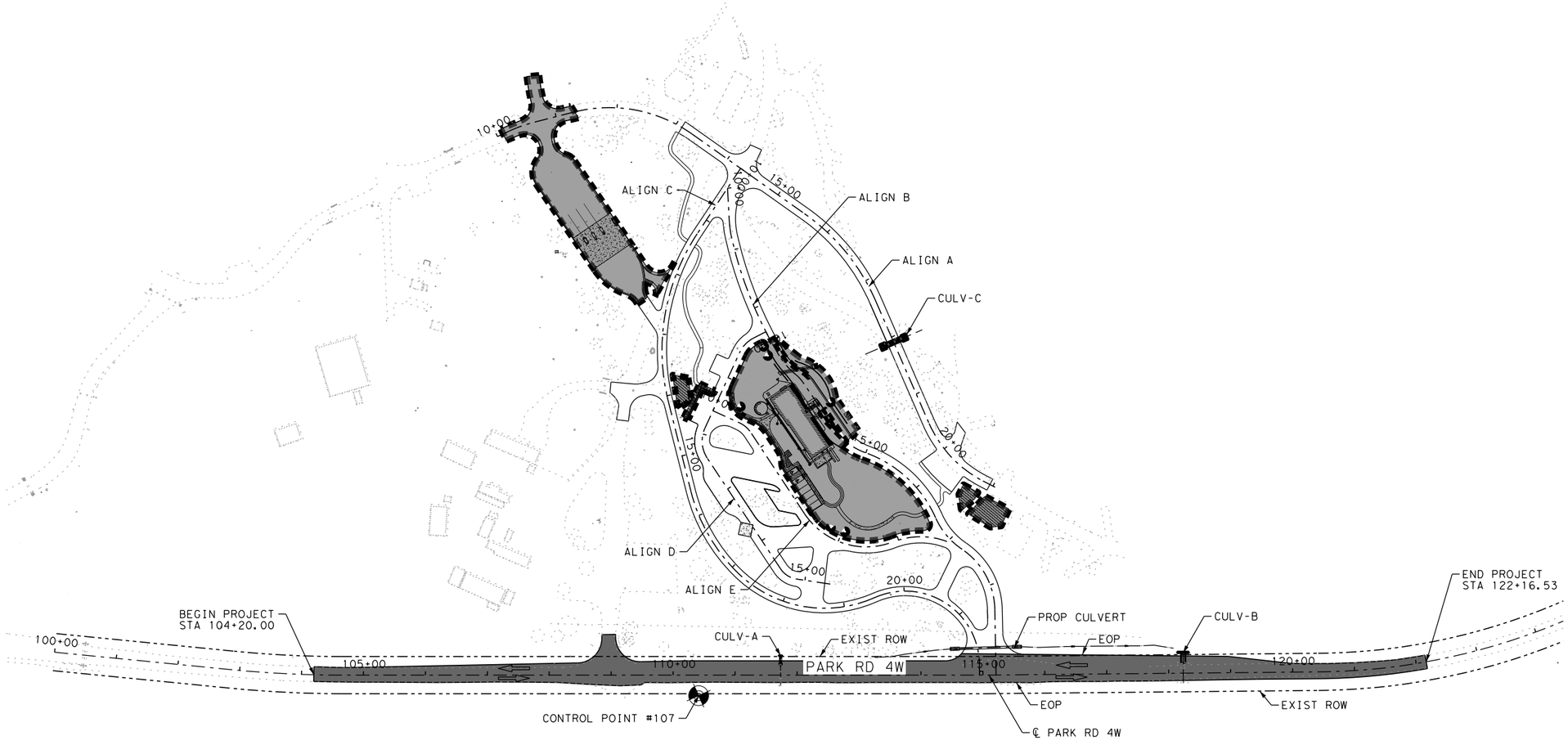
CONTROLLING PROJECT ID 0914-24-025 **DISTRICT** Austin **COUNTY** Burnet
HIGHWAY Various

			CONTROL SECTION JOB		**0914-24-025**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00178264**		
			COUNTY		**Burnet**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6001	PREPARING ROW	AC	8.100		8.100	
	110-6001	EXCAVATION (ROADWAY)	CY	5,478.000		5,478.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	3,385.000		3,385.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	16,279.000		16,279.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	16,279.000		16,279.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	8,140.000		8,140.000	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)	SY	8,140.000		8,140.000	
	168-6001	VEGETATIVE WATERING	MG	254.200		254.200	
	169-6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	172.000		172.000	
	247-6366	FL BS (CMP IN PLC)(TY A GR 5)(FNAL POS)	CY	4,650.000		4,650.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	3,998.000		3,998.000	
	360-6047	CONC PVMT (CONT REINF - CRCP) (6")	SY	45.000		45.000	
	400-6005	CEM STABIL BKFL	CY	107.000		107.000	
	403-6001	TEMPORARY SPL SHORING	SF	240.000		240.000	
	462-6012	CONC BOX CULV (6 FT X 5 FT)	LF	16.000		16.000	
	464-6018	RC PIPE (CL IV)(24 IN)	LF	184.000		184.000	
	466-6097	HEADWALL (CH - PW - 0) (DIA= 24 IN)	EA	1.000		1.000	
	466-6181	WINGWALL (PW - 1) (HW=6 FT)	EA	1.000		1.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	6.000		6.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-6004	REMOV STR (SET)	EA	2.000		2.000	
	496-6006	REMOV STR (HEADWALL)	EA	2.000		2.000	
	496-6007	REMOV STR (PIPE)	LF	34.000		34.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	80.000		80.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	80.000		80.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	222.000		222.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	222.000		222.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	3,399.000		3,399.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	3,399.000		3,399.000	
	531-6001	CONC SIDEWALKS (4")	SY	37.000		37.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	50.000		50.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2.000		2.000	
	644-6070	RELOCATE SM RD SN SUP&AM TY S80	EA	1.000		1.000	
	658-6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	6.000		6.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	755.000		755.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0914-24-025 **DISTRICT** Austin **COUNTY** Burnet
HIGHWAY Various

			CONTROL SECTION JOB		**0914-24-025**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00178264**		
			COUNTY		**Burnet**		
			HIGHWAY		**Various**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	305.000		305.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	31.000		31.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	6.000		6.000	
	666-6099	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)	EA	42.000		42.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	99.000		99.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	9,567.000		9,567.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	6,347.000		6,347.000	
	672-6007	REFL PAV MRKR TY I-C	EA	42.000		42.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	361.000		361.000	
	2000-6001	DECOMPOSED GRANITE	SY	269.000		269.000	
	3076-6040	D-GR HMA TY-D PG70-22	TON	1,922.000		1,922.000	
	5155-6001	AUTOMATIC SWING GATE (SINGLE)	EA	1.000		1.000	
	5155-6002	AUTOMATIC SWING GATE (DOUBLE)	EA	1.000		1.000	
	5156-6001	NATURAL STONE VENEER	SF	819.000		819.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	240.000		240.000	
	6185-6002	TMA (STATIONARY)	DAY	63.000		63.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	10.000		10.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	25,000.000		25,000.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	25,000.000		25,000.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	25,000.000		25,000.000	



N

LEGEND

BOUNDARY LIMITS OF TPWD CONSTRUCTION AND PAYMENT

EXIST ROW

TRAFFIC FLOW

PROPOSED PAVEMENT

CONTROL POINT

NOTE:

1. CONTROL POINT 10 IS LOCATED OUTSIDE THE SHEET.

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
10	10239235.70	2913924.98	906.36	CONCRETE MONUMENT ILSP
107	10238054.66	2914917.84	904.37	SPINDLE FOUND

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 100 200 300
SCALE: 1"= 200'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PROJECT LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	5

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\General\5116600_ALIGN01.dgn

PARK ROAD 4W

Chain PR_4W contains:
190 CUR PR_4W_3 238 239 CUR PR_4W_10

Beginning chain PR_4W description
Feature: Geom_Centerline

Point 190 N 10,237,443.4214 E 2,914,073.7628 Sta 100+00.00

Course from 190 to PC PR_4W_3 N 55° 51′ 52.68" E Dist 288.1984

Curve Data

Curve PR_4W_3					
P.I. Station	103+76.60	N	10,237,654.7523	E	2,914,385.4827
Delta =	5° 37′ 24.65" (LT)				
Degree =	3° 10′ 59.16"				
Tangent =	88.4049				
Length =	176.6679				
Radius =	1,800.0000				
External =	2.1696				
Long Chord =	176.5970				
Mid. Ord. =	2.1670				
P.C. Station	102+88.20	N	10,237,605.1439	E	2,914,312.3087
P.T. Station	104+64.87	N	10,237,711.2924	E	2,914,453.4433
C.C.		N	10,239,095.0293	E	2,913,302.2386
Back = N	55° 51′ 52.68" E				
Ahead = N	50° 14′ 28.04" E				
Chord Bear = N	53° 03′ 10.36" E				

Course from PT PR_4W_3 to 238 N 50° 14′ 28.04" E Dist 519.9058

Point 238 N 10,238,043.8024 E 2,914,853.1171 Sta 109+84.77

Course from 238 to 239 N 50° 14′ 28.04" E Dist 519.9058

Point 239 N 10,238,376.3123 E 2,915,252.7908 Sta 115+04.68

Course from 239 to PC PR_4W_10 N 49° 41′ 43.11" E Dist 537.1008

Curve Data

Curve PR_4W_10					
P.I. Station	124+07.12	N	10,238,960.0594	E	2,915,941.0075
Delta =	38° 42′ 42.36" (LT)				
Degree =	5° 30′ 33.15"				
Tangent =	365.3420				
Length =	702.6737				
Radius =	1,040.0000				
External =	62.3043				
Long Chord =	689.3843				
Mid. Ord. =	58.7827				
P.C. Station	120+41.78	N	10,238,723.7372	E	2,915,662.3921
P.T. Station	127+44.45	N	10,239,318.7091	E	2,916,010.6150
C.C.		N	10,239,516.8571	E	2,914,989.6658
Back = N	49° 41′ 43.11" E				
Ahead = N	10° 59′ 00.75" E				
Chord Bear = N	30° 20′ 21.93" E				

Ending chain PR_4W description

ALIGN A

Chain ALIGNA contains:
A100 CUR ALIGNA1 CUR ALIGNA2 A101 CUR ALIGNA3 CUR ALIGNA4 A102

Beginning chain ALIGNA description

Point A100 N 10,238,540.5856 E 2,914,091.0316 Sta 10+00.00

Course from A100 to PC ALIGNA1 N 25° 06′ 54.84" E Dist 20.4813

Curve Data

Curve ALIGNA1					
P.I. Station	10+42.54	N	10,238,579.1071	E	2,914,109.0889
Delta =	10° 57′ 30.58" (RT)				
Degree =	24° 54′ 40.35"				
Tangent =	22.0624				
Length =	43.9902				
Radius =	230.0000				
External =	1.0557				
Long Chord =	43.9232				
Mid. Ord. =	1.0509				
P.C. Station	10+20.48	N	10,238,559.1305	E	2,914,099.7247
P.T. Station	10+64.47	N	10,238,596.9392	E	2,914,122.0798
C.C.		N	10,238,461.5093	E	2,914,307.9796
Back = N	25° 06′ 54.84" E				
Ahead = N	36° 04′ 25.42" E				
Chord Bear = N	30° 35′ 40.13" E				

Course from PT ALIGNA1 to PC ALIGNA2 N 36° 04′ 25.42" E Dist 66.2625

Curve Data

Curve ALIGNA2					
P.I. Station	12+36.60	N	10,238,736.0662	E	2,914,223.4352
Delta =	49° 25′ 59.55" (RT)				
Degree =	24° 54′ 40.35"				
Tangent =	105.8689				
Length =	198.4376				
Radius =	230.0000				
External =	23.1960				
Long Chord =	192.3400				
Mid. Ord. =	21.0710				
P.C. Station	11+30.73	N	10,238,650.4966	E	2,914,161.0969
P.T. Station	13+29.17	N	10,238,744.3598	E	2,914,328.9788
C.C.		N	10,238,515.0667	E	2,914,346.9967
Back = N	36° 04′ 25.42" E				
Ahead = N	85° 30′ 24.97" E				
Chord Bear = N	60° 47′ 25.19" E				

Course from PT ALIGNA2 to A101 N 85° 30′ 24.97" E Dist 109.2487

Point A101 N 10,238,752.9182 E 2,914,437.8918 Sta 14+38.42

Course from A101 to PC ALIGNA3 N 85° 30′ 24.97" E Dist 113.7955

Curve Data

Curve ALIGNA3					
P.I. Station	16+47.11	N	10,238,769.2666	E	2,914,645.9397
Delta =	31° 11′ 19.38" (RT)				
Degree =	16° 51′ 06.12"				
Tangent =	94.8936				
Length =	185.0776				
Radius =	340.0000				
External =	12.9940				
Long Chord =	182.8010				
Mid. Ord. =	12.5157				
P.C. Station	15+52.22	N	10,238,761.8328	E	2,914,551.3377
P.T. Station	17+37.29	N	10,238,726.6355	E	2,914,730.7181
C.C.		N	10,238,422.8777	E	2,914,577.9727
Back = N	85° 30′ 24.97" E				
Ahead = S	63° 18′ 15.65" E				
Chord Bear = S	78° 53′ 55.34" E				

Course from PT ALIGNA3 to PC ALIGNA4 S 63° 18′ 15.65" E Dist 214.9428

Curve Data

Curve ALIGNA4					
P.I. Station	20+19.67	N	10,238,599.7770	E	2,914,982.9960
Delta =	39° 04′ 54.10" (LT)				
Degree =	30° 09′ 20.42"				
Tangent =	67.4350				
Length =	129.5998				
Radius =	190.0000				
External =	11.6122				
Long Chord =	127.1019				
Mid. Ord. =	10.9434				
P.C. Station	19+52.24	N	10,238,630.0722	E	2,914,922.7492
P.T. Station	20+81.84	N	10,238,614.2416	E	2,915,048.8614
C.C.		N	10,238,799.8193	E	2,915,008.1069
Back = S	63° 18′ 15.65" E				
Ahead = N	77° 36′ 50.25" E				
Chord Bear = S	82° 50′ 42.70" E				

Course from PT ALIGNA4 to A102 N 77° 36′ 50.25" E Dist 22.5445

Point A102 N 10,238,619.0773 E 2,915,070.8812 Sta 21+04.38

Ending chain ALIGNA description

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

ALIGNMENT DATA

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	6

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\General\5116600_ALIGN02.dgn

ALIGN B

Beginning chain ALIGNB description

Point B100 N 10,238,714.00 E 2,914,429.52 Sta 10+00.00

Course from B100 to PC ALIGNB1 S 42° 55′ 39" E Dist 56.02

Curve Data

Curve ALIGNB1						
P.I. Station		10+66.26	N	10,238,665.48	E	2,914,474.65
Delta	=	9° 39′ 35"	(LT)			
Degree	=	47° 15′ 20"				
Tangent	=	10.24				
Length	=	20.44				
Radius	=	121.25				
External	=	0.43				
Long Chord	=	20.42				
Mid. Ord.	=	0.43				
P.C. Station		10+56.02	N	10,238,672.98	E	2,914,467.67
P.T. Station		10+76.46	N	10,238,659.26	E	2,914,482.79
C.C.			N	10,238,755.56	E	2,914,556.45
Back	= S	42° 55′ 39" E				
Ahead	= S	52° 35′ 14" E				
Chord Bear	= S	47° 45′ 27" E				

Curve Data

Curve ALIGNB2						
P.I. Station		11+68.32	N	10,238,602.84	E	2,914,555.29
Delta	=	16° 20′ 10"	(LT)			
Degree	=	8° 57′ 09"				
Tangent	=	91.86				
Length	=	182.47				
Radius	=	640.00				
External	=	6.56				
Long Chord	=	181.86				
Mid. Ord.	=	6.49				
P.C. Station		10+76.46	N	10,238,659.26	E	2,914,482.79
P.T. Station		12+58.93	N	10,238,569.10	E	2,914,640.72
C.C.			N	10,239,164.35	E	2,914,875.83
Back	= S	52° 06′ 40" E				
Ahead	= S	68° 26′ 50" E				
Chord Bear	= S	60° 16′ 45" E				

Curve Data

Curve ALIGNB3						
P.I. Station		12+72.90	N	10,238,563.97	E	2,914,653.71
Delta	=	2° 30′ 00"	(LT)			
Degree	=	8° 57′ 09"				
Tangent	=	13.97				
Length	=	27.93				
Radius	=	640.00				
External	=	0.15				
Long Chord	=	27.92				
Mid. Ord.	=	0.15				
P.C. Station		12+58.93	N	10,238,569.10	E	2,914,640.72
P.T. Station		12+86.86	N	10,238,559.41	E	2,914,666.91
C.C.			N	10,239,164.35	E	2,914,875.83
Back	= S	68° 26′ 50" E				
Ahead	= S	70° 56′ 50" E				
Chord Bear	= S	69° 41′ 50" E				

Curve Data

Curve ALIGNB4						
P.I. Station		13+07.67	N	10,238,552.61	E	2,914,686.58
Delta	=	20° 10′ 22"	(LT)			
Degree	=	48° 58′ 15"				
Tangent	=	20.81				
Length	=	41.19				
Radius	=	117.00				
External	=	1.84				
Long Chord	=	40.98				
Mid. Ord.	=	1.81				
P.C. Station		12+86.86	N	10,238,559.41	E	2,914,666.91
P.T. Station		13+28.05	N	10,238,553.02	E	2,914,707.39
C.C.			N	10,238,670.00	E	2,914,705.11
Back	= S	70° 56′ 50" E				
Ahead	= N	88° 52′ 49" E				
Chord Bear	= S	81° 02′ 01" E				

Curve Data

Curve ALIGNB5						
P.I. Station		13+35.81	N	10,238,553.17	E	2,914,715.15
Delta	=	16° 57′ 53"	(RT)			
Degree	=	110° 11′ 03"				
Tangent	=	7.76				
Length	=	15.40				
Radius	=	52.00				
External	=	0.58				
Long Chord	=	15.34				
Mid. Ord.	=	0.57				
P.C. Station		13+28.05	N	10,238,553.02	E	2,914,707.39
P.T. Station		13+43.45	N	10,238,551.06	E	2,914,722.61
C.C.			N	10,238,501.03	E	2,914,708.41
Back	= N	88° 52′ 49" E				
Ahead	= S	74° 09′ 19" E				
Chord Bear	= S	82° 38′ 15" E				

Course from PT ALIGNB5 to PC ALIGNB6 S 74° 09′ 19" E Dist 93.07

ALIGN B CONT.

Curve Data

Curve ALIGNB6						
P.I. Station		14+69.07	N	10,238,516.76	E	2,914,843.45
Delta	=	36° 03′ 29"	(LT)			
Degree	=	57° 17′ 45"				
Tangent	=	32.55				
Length	=	62.93				
Radius	=	100.00				
External	=	5.16				
Long Chord	=	61.90				
Mid. Ord.	=	4.91				
P.C. Station		14+36.52	N	10,238,525.64	E	2,914,812.14
P.T. Station		14+99.45	N	10,238,528.00	E	2,914,873.99
C.C.			N	10,238,621.85	E	2,914,839.44
Back	= S	74° 09′ 19" E				
Ahead	= N	69° 47′ 12" E				
Chord Bear	= N	87° 48′ 57" E				

Curve Data

Curve ALIGNB7						
P.I. Station		15+83.41	N	10,238,557.01	E	2,914,952.78
Delta	=	46° 35′ 29"	(RT)			
Degree	=	29° 22′ 57"				
Tangent	=	83.96				
Length	=	158.57				
Radius	=	195.00				
External	=	17.31				
Long Chord	=	154.24				
Mid. Ord.	=	15.90				
P.C. Station		14+99.45	N	10,238,528.00	E	2,914,873.99
P.T. Station		16+58.02	N	10,238,519.71	E	2,915,028.01
C.C.			N	10,238,345.01	E	2,914,941.37
Back	= N	69° 47′ 12" E				
Ahead	= S	63° 37′ 19" E				
Chord Bear	= S	86° 55′ 03" E				

Curve Data

Curve ALIGNB8						
P.I. Station		16+92.66	N	10,238,504.32	E	2,915,059.04
Delta	=	32° 12′ 14"	(LT)			
Degree	=	47° 44′ 47"				
Tangent	=	34.64				
Length	=	67.45				
Radius	=	120.00				
External	=	4.90				
Long Chord	=	66.56				
Mid. Ord.	=	4.71				
P.C. Station		16+58.02	N	10,238,519.71	E	2,915,028.01
P.T. Station		17+25.47	N	10,238,507.84	E	2,915,093.50
C.C.			N	10,238,627.22	E	2,915,081.32
Back	= S	63° 37′ 19" E				
Ahead	= N	84° 10′ 27" E				
Chord Bear	= S	79° 43′ 26" E				

Curve Data

Curve ALIGNB9						
P.I. Station		17+88.10	N	10,238,514.19	E	2,915,155.81
Delta	=	55° 07′ 13"	(RT)			
Degree	=	47° 44′ 47"				
Tangent	=	62.63				
Length	=	115.44				
Radius	=	120.00				
External	=	15.36				
Long Chord	=	111.04				
Mid. Ord.	=	13.62				
P.C. Station		17+25.47	N	10,238,507.84	E	2,915,093.50
P.T. Station		18+40.91	N	10,238,466.72	E	2,915,196.65
C.C.			N	10,238,388.46	E	2,915,105.68
Back	= N	84° 10′ 27" E				
Ahead	= S	40° 42′ 19" E				
Chord Bear	= S	68° 15′ 56" E				

Course from PT ALIGNB9 to B101 S 40° 42′ 19" E Dist 105.26

Point B101 N 10,238,386.92 E 2,915,265.30 Sta 19+46.17

Ending chain ALIGNB description

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

ALIGNMENT DATA

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	7

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\General\5116600_ALIGN03.dgn

ALIGN C

Beginning chain ALIGNC description

Point C100 N 10,238,751.94 E 2,914,425.42 Sta 10+00.00

Course from C100 to PC ALIGNC1 S 6° 10′ 11" E Dist 126.76

	Curve Data				
Curve ALIGNC1					
P.I. Station	12+77.35	N	10,238,476.19	E	2,914,455.23
Delta =	47° 46′ 41"	(LT)			
Degree =	16° 51′ 06"				
Tangent =	150.59				
Length =	283.52				
Radius =	340.00				
External =	31.86				
Long Chord =	275.38				
Mid. Ord. =	29.13				
P.C. Station	11+26.76	N	10,238,625.91	E	2,914,439.04
P.T. Station	14+10.28	N	10,238,387.57	E	2,914,576.98
C.C.		N	10,238,662.45	E	2,914,777.07

Back = S 6° 10′ 11" E
Ahead = S 53° 56′ 52" E
Chord Bear = S 30° 03′ 31" E

Course from PT ALIGNC1 to PC ALIGNC2 S 53° 56′ 52" E Dist 149.22

	Curve Data				
Curve ALIGNC2					
P.I. Station	16+37.49	N	10,238,253.85	E	2,914,760.67
Delta =	31° 07′ 48"	(LT)			
Degree =	20° 27′ 46"				
Tangent =	77.99				
Length =	152.13				
Radius =	280.00				
External =	10.66				
Long Chord =	150.27				
Mid. Ord. =	10.27				
P.C. Station	15+59.50	N	10,238,299.75	E	2,914,697.62
P.T. Station	17+11.63	N	10,238,247.16	E	2,914,838.38
C.C.		N	10,238,526.13	E	2,914,862.40

Back = S 53° 56′ 52" E
Ahead = S 85° 04′ 39" E
Chord Bear = S 69° 30′ 45" E

	Curve Data				
Curve ALIGNC3					
P.I. Station	18+43.08	N	10,238,235.88	E	2,914,969.35
Delta =	66° 37′ 56"	(LT)			
Degree =	28° 38′ 52"				
Tangent =	131.46				
Length =	232.59				
Radius =	200.00				
External =	39.33				
Long Chord =	219.70				
Mid. Ord. =	32.87				
P.C. Station	17+11.63	N	10,238,247.16	E	2,914,838.38
P.T. Station	19+44.22	N	10,238,351.63	E	2,915,031.65
C.C.		N	10,238,446.42	E	2,914,855.54

Back = S 85° 04′ 39" E
Ahead = N 28° 17′ 25" E
Chord Bear = N 61° 36′ 23" E

Course from PT ALIGNC3 to PC ALIGNC4 N 28° 17′ 25" E Dist 11.70

	Curve Data				
Curve ALIGNC4					
P.I. Station	21+33.66	N	10,238,518.44	E	2,915,121.43
Delta =	111° 57′ 03"	(RT)			
Degree =	47° 44′ 47"				
Tangent =	177.74				
Length =	234.47				
Radius =	120.00				
External =	94.46				
Long Chord =	198.91				
Mid. Ord. =	52.85				
P.C. Station	19+55.91	N	10,238,361.93	E	2,915,037.19
P.T. Station	21+90.38	N	10,238,381.81	E	2,915,235.11
C.C.		N	10,238,305.06	E	2,915,142.86

Back = N 28° 17′ 25" E
Ahead = S 39° 45′ 32" E
Chord Bear = N 84° 15′ 57" E

Course from PT ALIGNC4 to C101 S 39° 45′ 32" E Dist 15.53

Point C101 N 10,238,369.87 E 2,915,245.04 Sta 22+05.92

Ending chain ALIGNC description

ALIGN D

Beginning chain ALIGND description

Point D100 N 10,238,575.40 E 2,914,625.35 Sta 10+00.00

Course from D100 to PC ALIGND1 S 23° 02′ 24" W Dist 22.41

	Curve Data				
Curve ALIGND1					
P.I. Station	10+39.71	N	10,238,538.86	E	2,914,609.81
Delta =	38° 10′ 17"	(LT)			
Degree =	114° 35′ 30"				
Tangent =	17.30				
Length =	33.31				
Radius =	50.00				
External =	2.91				
Long Chord =	32.70				
Mid. Ord. =	2.75				
P.C. Station	10+22.41	N	10,238,554.78	E	2,914,616.58
P.T. Station	10+55.72	N	10,238,522.16	E	2,914,614.33
C.C.		N	10,238,535.21	E	2,914,662.59

Back = S 23° 02′ 24" W
Ahead = S 15° 07′ 53" E
Chord Bear = S 3° 57′ 16" W

Course from PT ALIGND1 to PC ALIGND2 S 15° 07′ 53" E Dist 133.99

	Curve Data				
Curve ALIGND2					
P.I. Station	12+17.51	N	10,238,365.97	E	2,914,656.56
Delta =	58° 08′ 58"	(LT)			
Degree =	114° 35′ 30"				
Tangent =	27.80				
Length =	50.75				
Radius =	50.00				
External =	7.21				
Long Chord =	48.60				
Mid. Ord. =	6.30				
P.C. Station	11+89.71	N	10,238,392.81	E	2,914,649.30
P.T. Station	12+40.46	N	10,238,357.98	E	2,914,683.19
C.C.		N	10,238,405.86	E	2,914,697.57

Back = S 15° 07′ 53" E
Ahead = S 73° 16′ 51" E
Chord Bear = S 44° 12′ 22" E

Course from PT ALIGND2 to PC ALIGND3 S 73° 16′ 51" E Dist 214.15

	Curve Data				
Curve ALIGND3					
P.I. Station	14+71.47	N	10,238,291.52	E	2,914,904.43
Delta =	47° 52′ 24"	(LT)			
Degree =	150° 46′ 42"				
Tangent =	16.87				
Length =	31.75				
Radius =	38.00				
External =	3.58				
Long Chord =	30.84				
Mid. Ord. =	3.27				
P.C. Station	14+54.60	N	10,238,296.37	E	2,914,888.28
P.T. Station	14+86.35	N	10,238,300.25	E	2,914,918.87
C.C.		N	10,238,332.77	E	2,914,899.21

Back = S 73° 16′ 51" E
Ahead = N 58° 50′ 45" E
Chord Bear = N 82° 46′ 57" E

Course from PT ALIGND3 to D101 N 58° 50′ 45" E Dist 54.79

Point D101 N 10,238,328.59 E 2,914,965.76 Sta 15+41.14

Ending chain ALIGND description

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

ALIGNMENT DATA

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	8

ALIGN E

Beginning chain ALIGNE description

Point E100 N 10,238,422.76 E 2,914,641.20 Sta 10+00.00

Course from E100 to PC ALIGNE1 N 74° 52′ 07" E Dist 46.94

		Curve Data				
Curve ALIGNE1						
P.I. Station		10+59.49	N	10,238,438.29	E	2,914,698.63
Delta	=	31° 51′ 02"	(RT)			
Degree	=	130° 13′ 04"				
Tangent	=	12.55				
Length	=	24.46				
Radius	=	44.00				
External	=	1.76				
Long Chord	=	24.15				
Mid. Ord.	=	1.69				
P.C. Station		10+46.94	N	10,238,435.01	E	2,914,686.51
P.T. Station		10+71.39	N	10,238,434.68	E	2,914,710.66
C.C.			N	10,238,392.54	E	2,914,698.00

Back = N 74° 52′ 07" E
Ahead = S 73° 16′ 51" E
Chord Bear = S 89° 12′ 22" E

Course from PT ALIGNE1 to PC ALIGNE2 S 73° 16′ 51" E Dist 157.03

		Curve Data				
Curve ALIGNE2						
P.I. Station		13+25.29	N	10,238,361.64	E	2,914,953.81
Delta	=	77° 49′ 18"	(LT)			
Degree	=	47° 44′ 47"				
Tangent	=	96.87				
Length	=	162.99				
Radius	=	120.00				
External	=	34.22				
Long Chord	=	150.75				
Mid. Ord.	=	26.62				
P.C. Station		12+28.42	N	10,238,389.51	E	2,914,861.04
P.T. Station		13+91.41	N	10,238,446.45	E	2,915,000.62
C.C.			N	10,238,504.43	E	2,914,895.56

Back = S 73° 16′ 51" E
Ahead = N 28° 53′ 51" E
Chord Bear = N 67° 48′ 30" E

		Curve Data				
Curve ALIGNE3						
P.I. Station		14+37.74	N	10,238,487.01	E	2,915,023.01
Delta	=	42° 13′ 24"	(RT)			
Degree	=	47° 44′ 47"				
Tangent	=	46.33				
Length	=	88.43				
Radius	=	120.00				
External	=	8.63				
Long Chord	=	86.44				
Mid. Ord.	=	8.05				
P.C. Station		13+91.41	N	10,238,446.45	E	2,915,000.62
P.T. Station		14+79.84	N	10,238,502.00	E	2,915,066.85
C.C.			N	10,238,388.46	E	2,915,105.68

Back = N 28° 53′ 51" E
Ahead = N 71° 07′ 15" E
Chord Bear = N 50° 00′ 33" E

Ending chain ALIGNE description

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

Texas Department of Transportation

INKS LAKE

ALIGNMENT DATA

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	9

Plotted on: 1/27/2023

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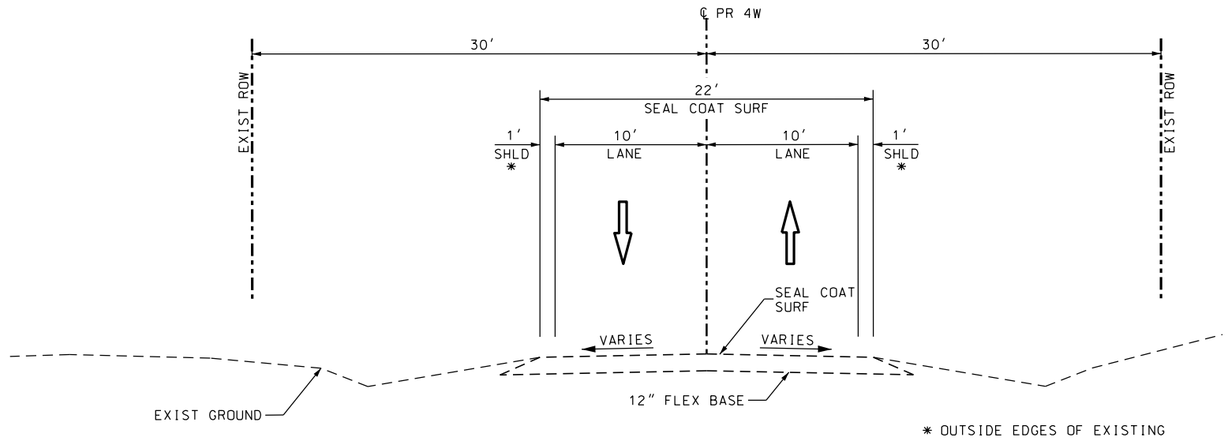


* OUTSIDE EDGES OF EXISTING TRAVEL LANES ARE NOT STRIPED

PARK RD 4W
EXISTING TYPICAL SECTION
NOT TO SCALE

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

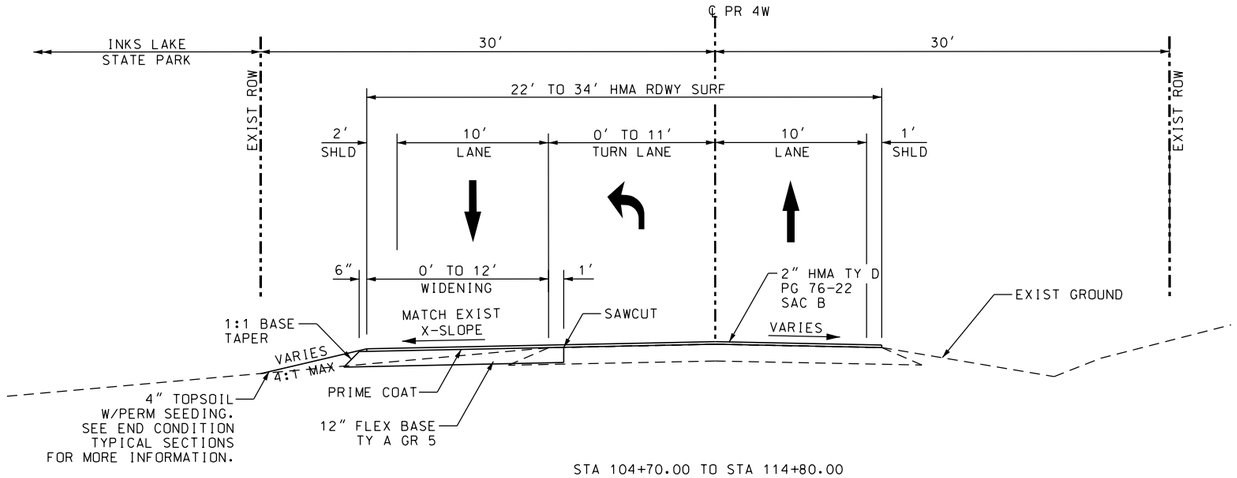
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	10

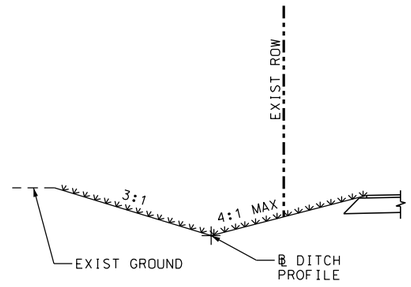


NOTE:
SAWCUT IS 1' FROM EXISTING PAVEMENT EDGES.
SEE "ROADWAY PLAN" SHEETS FOR MORE INFORMATION.

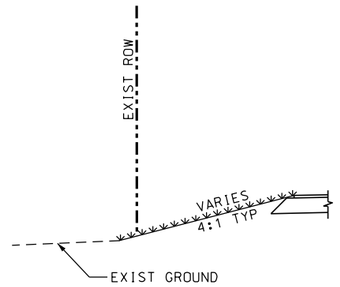
STA 104+70.00 TO STA 114+80.00

PARK RD 4W
PROPOSED TYPICAL SECTION

NOT TO SCALE



STA 113+25.00 TO STA 114+80.00



STA 118+08.00 TO STA 122+16.53

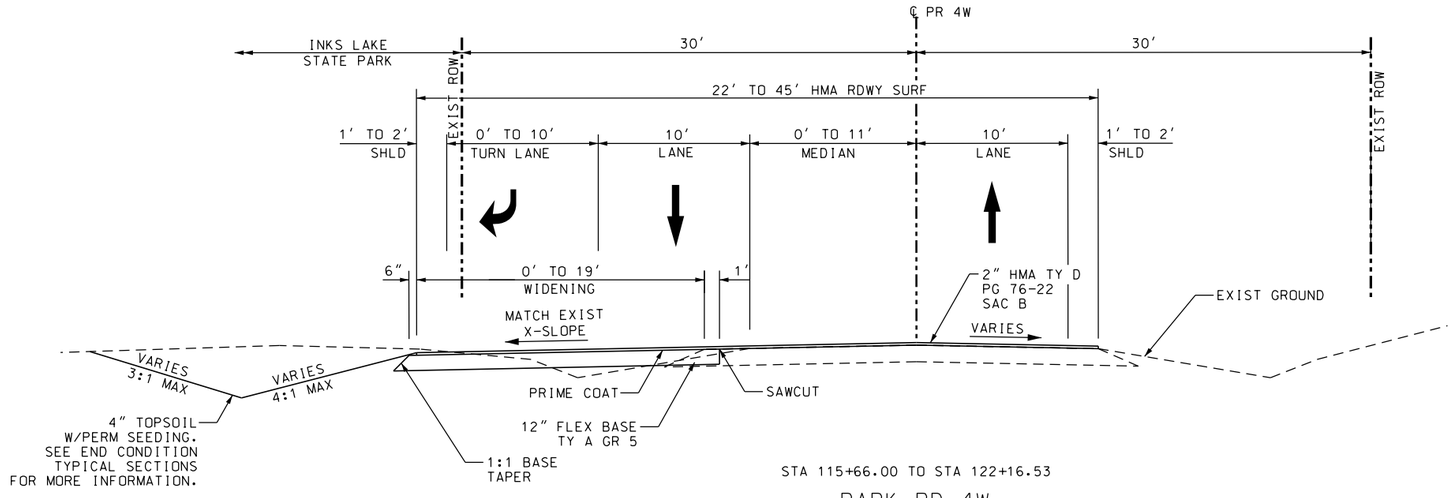
END CONDITION
TYPICAL SECTIONS

NOT TO SCALE

NOTES:

1) SAWCUTS ARE 1' FROM EXISTING PAVEMENT EDGES. SEE "ROADWAY PLAN" SHEETS FOR MORE INFORMATION.
2) SEE GENERAL NOTES FOR PAVEMENT MATERIAL APPLICATION RATES.
3) SAWCUTS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4) CONTRACTOR TO MATCH EXISTING CROSS SLOPES FOR ALL WIDENING UNLESS OTHERWISE NOTED.

DENNIS K. SEAL, P.E. — 1/27/2023 DATE



NOTE:
SAWCUT IS 1' FROM EXISTING PAVEMENT EDGES.
SEE "ROADWAY PLAN" SHEETS FOR MORE INFORMATION.

STA 115+66.00 TO STA 122+16.53

PARK RD 4W
PROPOSED TYPICAL SECTION

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 2

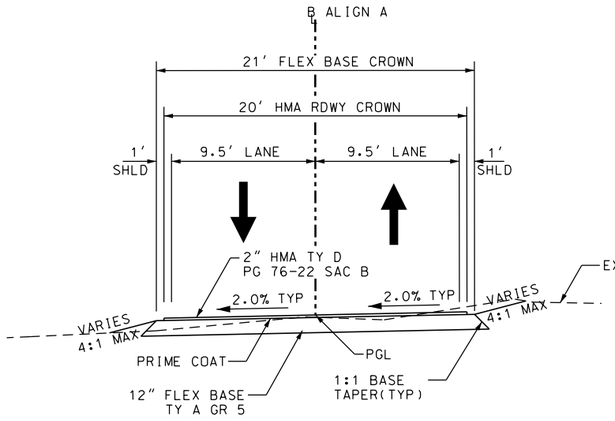
DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	11

Plotted on: 2/22/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\General\5116600_TYP03.dgn

NOTE:

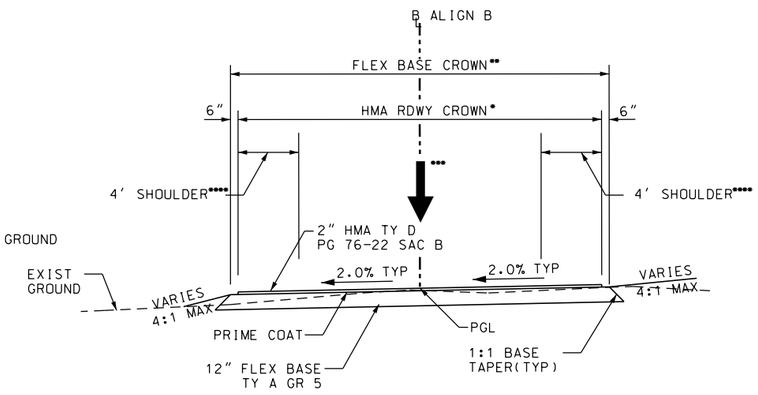
1) SEE GENERAL NOTES FOR PAVEMENT MATERIAL APPLICATION RATES.



ALIGN A STA 13+10 TO 20+95

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

NOT TO SCALE

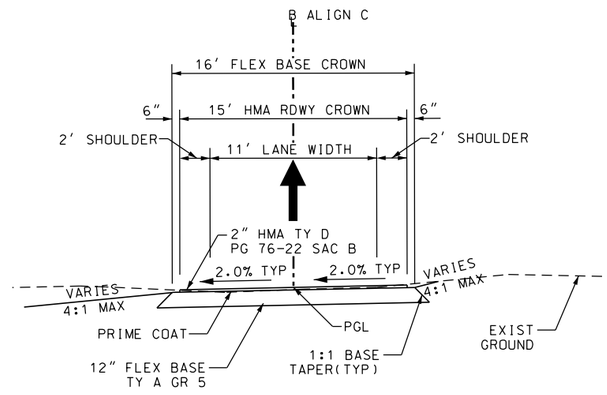


ALIGN B STA 10+00 TO 19+13

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

NOT TO SCALE

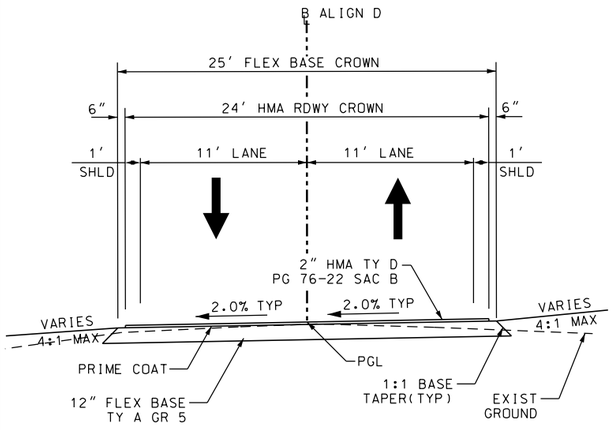
* 20' HMA RDWY CROWN AT STA 10+00 TO 12+59
24' HMA RDWY CROWN AT STA 14+64 TO 19+13
** 21' FLEXBASE CROWN AT STA 10+00 TO 12+59
25' FLEX BASE CROWN AT STA 14+64 TO 19+13
*** ONE WAY ONE LANE AT STA 10+00 TO 12+59
ONE WAY TWO LANE AT STA 14+64 TO 19+13
**** 4' SHOULDER AT STA 10+00 TO 12+59



ALIGN C STA 10+00 TO 21+72

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

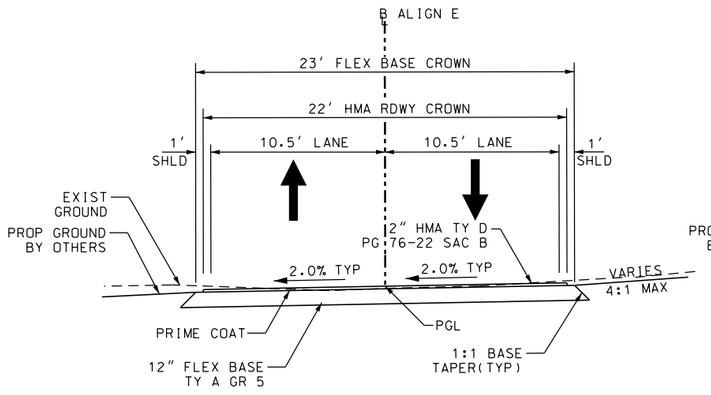
NOT TO SCALE



ALIGN D STA 10+00 TO 15+33

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

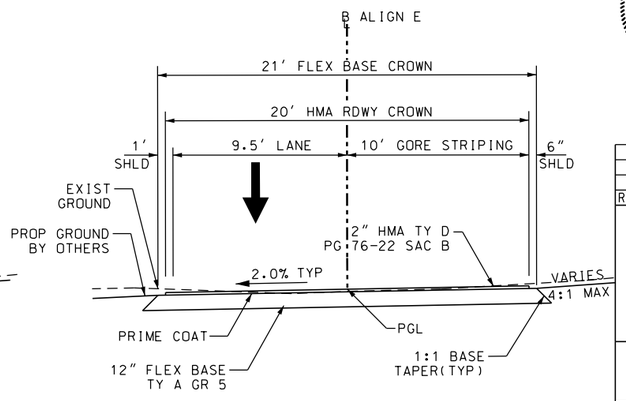
NOT TO SCALE



ALIGN E STA 10+00 TO 12+83

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

NOT TO SCALE



ALIGN E STA 12+83 TO 14+80

INTERIOR PARK ROADS PROPOSED TYPICAL SECTION

NOT TO SCALE

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 2/22/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	12

	ITEM	0500-6001	0502-6001	6001-6001	6185-6002	6185-6005
	TCP	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
SHT NO		LS	MO	DAY	DAY	DAY
21	TRAFFIC CONTROL PLAN TYPICAL SECTIONS	1.0	4	240	63	10
	TOTALS	1.0	4	240	63	10

REV. NO.	DATE	DESCRIPTION	BY

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TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SUMMARY OF TCP QUANTITIES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	13

Plotted on: 3/15/2023
Design Filename: H:\Projects\511\66\00\Design\Civil\Summaries\1225503_SUM_TCP01.dgn

	ITEM	0100-6001	0110-6001	0132-6003	0247-6366	0310-6001	0360-6047	0400-6005	0464-6018
	ROADWAY	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	FL BS (CMP IN PLC) (TY A GR 5) (FNAL POS)	PRIME COAT (MULTI OPTION)	CONC PVMT (CONT REINF - CRCP) (6")	CEM STABIL BKFL	RC PIPE (CL IV) (24 IN)
SHT NO		AC	CY	CY	CY	GAL	SY	CY	LF
40	ROADWAY PLAN & PROFILE	0.600	115.0	2.0	66.0	54.00			
41	ROADWAY PLAN & PROFILE	0.800	345.0	72.0	288.0	250.00			
42	ROADWAY PLAN & PROFILE	0.900	1129.0	98.0	336.0	295.00		58.0	86
43	ROADWAY PLAN & PROFILE	0.700	1821.0	173.0	129.0	110.00			
54	HEADQUARTERS ROADWAY & PARKING PLAN	1.600	612.0	168.0	848.0	701.00			
55	HEADQUARTERS ROADWAY & PARKING PLAN	3.500	1456.0	2872.0	2983.0	2588.00	45		
	TOTALS	8.100	5478.0	3385.0	4650.0	3998.00	45	58.0	86

	ITEM	0467-6395	0531-6001	2000-6001	3076-6040	5155-6001	5155-6002
	ROADWAY	SET (TY II) (24 IN) (RCP) (6: 1) (P)	CONC SIDEWALKS (4")	DECOMPOSED GRANITE	D-GR HMA TY-D PG70-22	AUTO SWING GATE (SINGLE)	AUTO SWING GATE (DOUBLE)
SHT NO		EA	SY	SY	TON	EA	EA
40	ROADWAY PLAN & PROFILE				124.0		
41	ROADWAY PLAN & PROFILE				234.0		
42	ROADWAY PLAN & PROFILE	2			251.0		
43	ROADWAY PLAN & PROFILE				148.0		
54	HEADQUARTERS ROADWAY & PARKING PLAN		1	212	246.0		1
55	HEADQUARTERS ROADWAY & PARKING PLAN		36	57	919.0	1	
	TOTALS	2	37	269	1922.0	1	1

REV. NO.	DATE	DESCRIPTION	BY

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AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	14

Plotted on: 2/24/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Summaries\1225503_SUM_RDWY01.dgn

	ITEM	0400-6005	0403-6001	0462-6012	0464-6018	0466-6097	0466-6181	0467-6390	0496-6004	0496-6006
	DRAINAGE	CEM STABIL BKFL	TEMPORARY SPL SHORING	CONC BOX CULV (6 FT X 5 FT)	RC PIPE (CL IV) (24 IN)	HEADWALL (CH - PW - 0) (DIA= 24 IN)	WINGWALL (PW - 1) (HW=6 FT)	SET (TY II) (24 IN) (RCP) (4: 1) (C)	REMOV STR (SET)	REMOV STR (HEADWALL)
SHT NO		CY	SF	LF	LF	EA	EA	EA	EA	EA
68	CULVERT A LAYOUT	7.0			14	1				1
69	CULVERT B LAYOUT	9.0	240	16			1			1
70	CULVERT C LAYOUT	33.0			84			6	2	
	TOTALS	49.0	240	16	98	1	1	6	2	2

	ITEM	0496-6007			5156-6001
	DRAINAGE	REMOV STR (PIPE)	NATURAL STONE VENEER (ON-SITE) *	NATURAL STONE VENEER (FURNISH) *	NATURAL STONE VENEER
SHT NO		LF	SF	SF	SF
68	CULVERT A LAYOUT		53	8	61
69	CULVERT B LAYOUT		306	46	352
70	CULVERT C LAYOUT	34			
	TOTALS	34	359	54	413

* FOR CONTRACTORS INFORMATION ONLY

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SUMMARY OF DRAINAGE QUANTITIES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	15

	ITEM	0644-6001	0644-6068	0644-6070	0658-6047	0666-6036	0666-6048	0666-6054	0666-6078
	SIGNING AND PAVEMENT MARKINGS	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	INSTL OM ASSM (OM-2Y)(WC)GND	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)
SHT NO		EA	EA	EA	EA	LF	LF	EA	EA
80	SIGNING AND PAVEMENT MARKINGS		1		1	206		1	1
81	SIGNING AND PAVEMENT MARKINGS	6	1	1	3	510	20	3	3
82	SIGNING AND PAVEMENT MARKINGS	13					102	6	
83	SIGNING AND PAVEMENT MARKINGS	31			2	39	183	21	2
	TOTALS	50	2	1	6	755	305	31	6

	ITEM	0666-6099	0666-6141	0666-6309	0666-6321	0672-6007	0672-6009
	SIGNING AND PAVEMENT MARKINGS	REF PAV MRK TY I(W)18"(YLD TRI)(100MIL)	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
SHT NO		EA	LF	LF	LF	EA	EA
80	SIGNING AND PAVEMENT MARKINGS			1659	3012	12	152
81	SIGNING AND PAVEMENT MARKINGS		57	1759	3043	27	154
82	SIGNING AND PAVEMENT MARKINGS	7	42	1030	292		24
83	SIGNING AND PAVEMENT MARKINGS	35		5119		3	31
	TOTALS	42	99	9567	6347	42	361

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SUMMARY OF PAVEMENT MARKING QUANTITIES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	16

	ITEM	0160-6003	0164-6023	0164-6029	0164-6031	0168-6001	0169-6006	0506-6001	0506-6011
	SW3P	FURNISHING AND PLACING TOPSOIL (4")	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	CELL FBR MLCH SEED(TEMP)(WARM)	CELL FBR MLCH SEED(TEMP)(COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 2) (TY F)	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)
SHT NO		SY	SY	SY	SY	MG	SY	LF	LF
101	SW3P LAYOUT	1180	1180	590	590	18.50			
102	SW3P LAYOUT	2098	2098	1049	1049	32.80		30	30
103	SW3P LAYOUT	5047	5047	2524	2524	78.80			
104	SW3P LAYOUT	7954	7954	3977	3977	124.10	172	50	50
	TOTALS	16279	16279	8140	8140	254.20	172	80	80

	ITEM	0506-6020	0506-6024	0506-6041	0506-6043
	SW3P	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
SHT NO		SY	SY	LF	LF
101	SW3P LAYOUT	111	111	831	831
102	SW3P LAYOUT	111	111	443	443
103	SW3P LAYOUT			1038	1038
104	SW3P LAYOUT			1087	1087
	TOTALS	222	222	3399	3399

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SUMMARY OF SW3P QUANTITIES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	17

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
2	2-1	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
2	2-2	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
2	2-3	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
2	2-4	R4-7	KEEP RIGHT	18" X 24"	X		10BWG	1	SA	P		
2	2-5	R3-5R	MANDATORY MOVEMENT LANE CONTROL (RIGHT TURN ONLY)	30" X 36"	X		10BWG	1	SA	P		
2	2-8	R3-7R	MANDATORY MOVEMENT LANE CONTROL (RIGHT LANE MUST TURN RIGHT)	30" X 30"	X		10BWG	1	SA	P		
3	3-1	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
3	3-2	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
3	3-3	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-4	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-5	R1-5L	YIELD HERE TO PEDS	36" X 36"	X		10BWG	1	SA	P		
3	3-6	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-7	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-8	R6-1R	ONE WAY (RIGHT)	36" X 12"	X		10BWG	1	SA	P		
3	3-9	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
3	3-10	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-11	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-12	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
3	3-13	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-1	R6-1L	ONE WAY (LEFT)	36" X 12"	X		10BWG	1	SA	P		
4	4-2	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-3	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-4	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-5	R1-5L	YIELD HERE TO PEDS	36" X 36"	X		10BWG	1	SA	P		
4	4-6	R6-1R	ONE WAY (RIGHT)	36" X 12"	X		10BWG	1	SA	P		
4	4-7	R1-1 R5-1	STOP SIGN DO NOT ENTER } B-B	30" X 30" 30" X 30"	X		10BWG	1	SA	P		
4	4-8	R1-5L	YIELD HERE TO PEDS	36" X 36"	X		10BWG	1	SA	P		
4	4-9	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-10	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-11	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-12	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-13	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-14	R6-1L	ONE WAY (LEFT)	36" X 12"	X		10BWG	1	SA	P		
4	4-15	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-16	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-17	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-18	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-19	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-20	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-21	R6-1L	ONE WAY (LEFT)	36" X 12"	X		10BWG	1	SA	P		
4	4-22	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-23	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-24	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-25	R2-1	SPEED LIMIT	18" X 24"	X		10BWG	1	SA	P		
4	4-26	R6-1L	ONE WAY (LEFT)	36" X 12"	X		10BWG	1	SA	P		
4	4-27	R1-5L	YIELD HERE TO PEDS	36" X 36"	X		10BWG	1	SA	P		
4	4-28	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		
4	4-29	R5-1	DO NOT ENTER	30" X 30"	X		10BWG	1	SA	P		
4	4-30	R6-1L	ONE WAY (LEFT)	36" X 12"	X		10BWG	1	SA	P		
4	4-31	R1-1	STOP SIGN	30" X 30"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: 2/20/2023 4:10:26 PM
FILE: H:\Projects\511\66\00\Design\Civil\Summaries\sums16.dgn

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
4-16	DIST	COUNTY		SHEET NO.
8-16	AUS	BURNET		18

TCP GENERAL NOTES

THE CONTRACTOR'S PARTICULAR ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES" OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2014.

REFER TO ITEM 8 "PROSECUTION AND PROGRESS" AND PROJECT GENERAL NOTES FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.

1. THIS IS A SUGGESTED TRAFFIC CONTROL PLAN (TCP). THE CONTRACTOR MAY SUBMIT AN ALTERNATE TCP SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN TEXAS FOR APPROVAL BY THE ENGINEER. THE CONTRACTOR SHALL NOT IMPLEMENT ANY SUCH ALTERNATE TCP WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

2. THIS TRAFFIC CONTROL PLAN DOES NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED OR COULD BE ENCOUNTERED DURING EACH PHASE OF CONSTRUCTION. THIS DOES NOT, HOWEVER, RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY OF CONSTRUCTING THE PROPOSED IMPROVEMENTS AND PROVIDING FOR THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION.

3. THE SUGGESTED TRAFFIC CONTROL PLAN HAS 2 PHASES OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE REQUIRED CHANNELIZING DEVICES WITH APPROPRIATE CONSTRUCTION PAVEMENT MARKINGS AS SHOWN ON THE TRAFFIC CONTROL PLAN TYPICAL SECTION SHEETS.

4. ADVISORY SPEED SIGNS IN SUFFICIENT NUMBER AS DETERMINED BY THE ENGINEER SHALL BE FURNISHED IN ALL AREAS OF THE PROJECT.

5. ALTHOUGH NOT SPECIFICALLY IDENTIFIED IN EACH CONSTRUCTION PHASE/STAGE, STORM WATER POLLUTION PREVENTION (SW3P) ITEMS ARE TO BE INSTALLED IN EACH PHASE/STAGE AS REQUIRED AND AS DETAILED IN THE SW3P PLAN SHEETS.

6. THE CONTRACTOR SHALL COORDINATE THE TRAFFIC CONTROL PLAN AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.

7. THE CONTRACTOR SHALL NOTIFY THE PROPER CITY OR COUNTY AND TXDOT OFFICIALS A MINIMUM OF THREE (3) DAYS PRIOR TO ANY MAJOR TRAFFIC CHANGE. IN ADDITION, THE CONTRACTOR SHALL PROVIDE A WRITTEN WORK PLAN TO THE ENGINEER FOR APPROVAL.

8. PLACE ALL STOCKPILED MATERIAL, WASTE MATERIAL, SIGNS, BARRICADES, CHANNELIZING DEVICES AND WORK VEHICLES NOT IN USE, AT A MINIMUM OF 16 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE.

9. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMAL INCONVENIENCE TO THE TRAVELING PUBLIC. AT THE TIMES WHEN IT IS NECESSARY FOR TRUCKS TO STOP, UNLOAD OR CROSS ROADWAYS UNDER TRAFFIC, PROVIDE WARNING SIGNS AND FLAGGERS AS NEEDED TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.

10. CONSTRUCTION IN ANY AREA THAT IS ADVERSELY AFFECTING TRAFFIC FLOW, OR SAFETY MUST BE PURSUED DILIGENTLY. IF, IN THE OPINION OF THE ENGINEER, CONSTRUCTION IS NOT PROCEEDING TOWARDS COMPLETION IN THESE AREAS, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO ALTER THE WORK SCHEDULE TO EXPEDITE COMPLETION IN THE AREAS OF CONCERN.

11. MOVING AN EXISTING SIGN TO A TEMPORARY LOCATION IS SUBSIDIARY TO ITEM 502. INSTALLATIONS WITH PERMANENT SUPPORTS AT PERMANENT LOCATIONS WILL BE PAID FOR UNDER THE APPLICABLE BID ITEM(S).

12. DURING DAYLIGHT HOURS, WHEN CONSTRUCTION EXCAVATION OPERATIONS RESULT IN A DROP-OFF OF MORE THAN 2" NEXT TO THE TRAVEL WAY, CHANNELIZING DEVICES SHALL BE USED TO CREATE A 2' MINIMUM BUFFER ZONE BETWEEN TRAFFIC AND CONSTRUCTION. SEE "TXDOT GUIDELINES FOR WARNING AND PROTECTIVE DEVICES FOR PAVEMENT DROP-OFFS". NECESSARY FLAGGERS AND APPROPRIATE SIGNING TO SAFELY GUIDE TRAFFIC THROUGH THE WORK AREA WILL BE REQUIRED AS DIRECTED BY THE ENGINEER.

13. CONDUCT CONSTRUCTION OPERATIONS SO AS TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AND TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES OR AS PERMITTED BY THE SEQUENCE OF CONSTRUCTION. PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ABUTTING PROPERTY, HIGHWAYS, PUBLIC ROADS, AND STREET CROSSINGS EXCEPT AS OTHERWISE SHOWN ON THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR WILL MAINTAIN TWO-WAY TRAFFIC AT ALL TIMES DURING NON-WORK HOURS. DURING WORK HOURS CONTRACTOR WILL ESTABLISH A MINIMUM OF ONE LANE USING A PILOT VEHICLE AND FLAGGERS PER TXDOT STANDARD TCP (2-2)-18.

14. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS AND ELEMENTS NOT SET UP FOR RECONSTRUCTION TO THEIR ORIGINAL CONDITION. THE SITE SHALL BE THOROUGHLY CLEANED OF ALL CONSTRUCTION MATERIALS, AND ALL STOCKPILE LOCATIONS SHALL BE ADEQUATELY CLEANED TO FINAL ACCEPTANCE BEFORE BARRICADES MAY BE REMOVED FROM THE PROJECT.

15. DURING NON-WORK HOURS CONTRACTOR TO USE STEEL PLATES TO COVER OPEN TRENCHES WITHIN THE CLEAR ZONE.

16. CONTRACTOR TO MAINTAIN 3:1 SAFETY SLOPES PER TXDOT STANDARDS DURING NON-WORK HOURS.

17. TCP WILL BE CONDUCTED IN SEGMENTS OF LOGICAL TERMINI BUT MAY BE CHANGED BY CONTRACTOR AS APPROVED BY THE ENGINEER.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

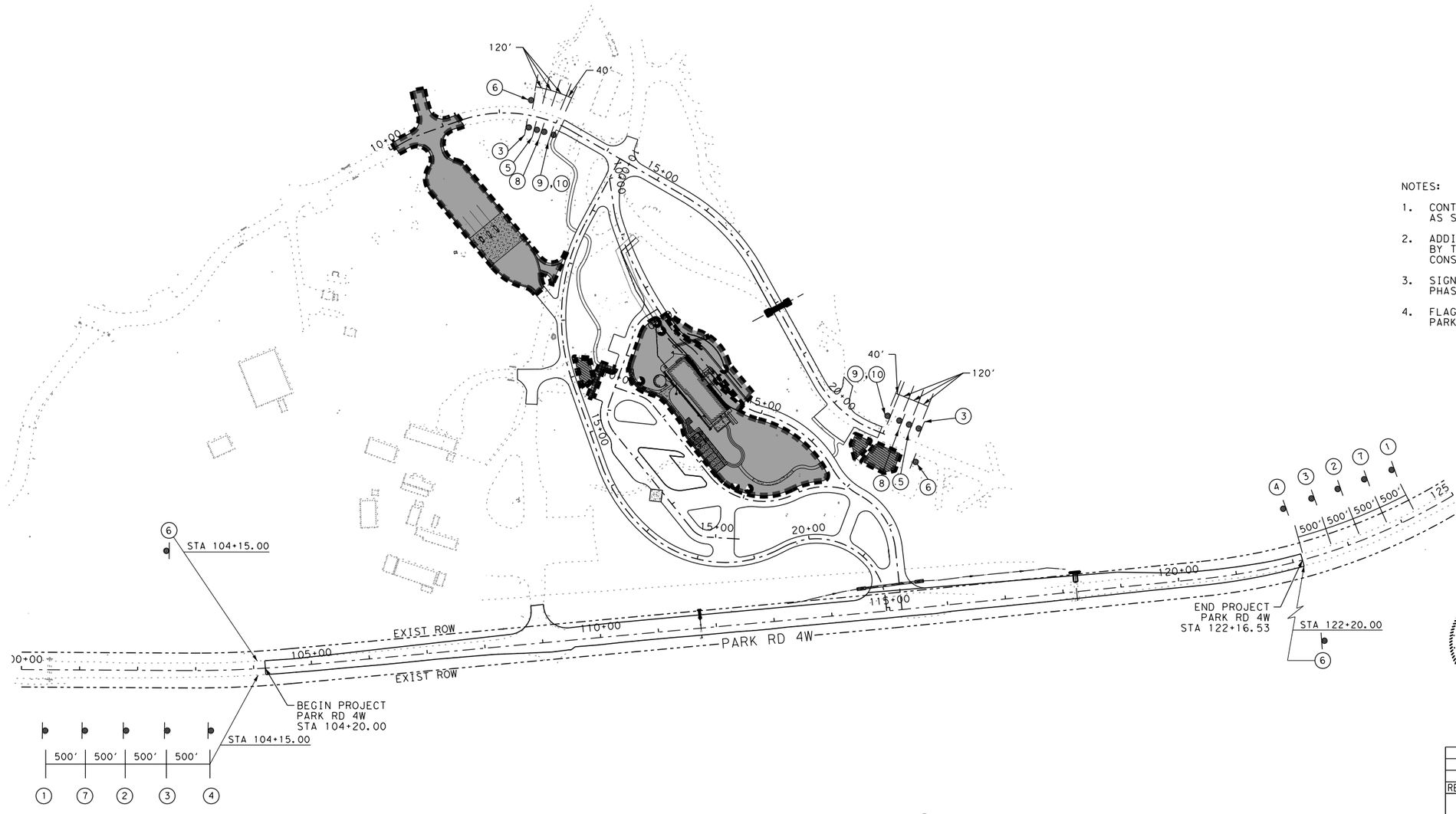
PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

TRAFFIC CONTROL PLAN GENERAL NOTES

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	19



NOTES:

1. CONTRACTOR SHALL PLACE ADVANCE WARNING SIGNS AS SHOWN ON BC(2)-21.
2. ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE ADDED BY THE ENGINEER. ANY SUCH DEVICES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
3. SIGNS TO REMAIN IN PLACE UNTIL CLEAN-UP FOR PHASE II AND III OPERATIONS ARE COMPLETE.
4. FLAGS ARE REQUIRED ON CW20-1D SIGNS FOR INTERIOR PARK ROADS.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 100 200 300
SCALE: 1"= 200'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

TRAFFIC CONTROL PLAN ADVANCE WARNING SIGNS

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	20

(1) OBEY WARNING SIGNS STATE LAW — R20-3T 48X42

(2) BEGIN WORK ZONE — G20-9TP 24X24
TRAFFIC FINES DOUBLE — R20-5T 24X30
WHEN WORKERS ARE PRESENT — R20-5aTP PLAQUE 24X12

(3) ROAD WORK AHEAD — CW20-1D 48X48

(4) BEGIN ROAD WORK NEXT MILES — G20-5T 48x24
NAME ADDRESS CITY STATE CONTRACTOR — G20-6T 48X30

(5) ONE LANE ROAD AHEAD — CW20-4D 36X36

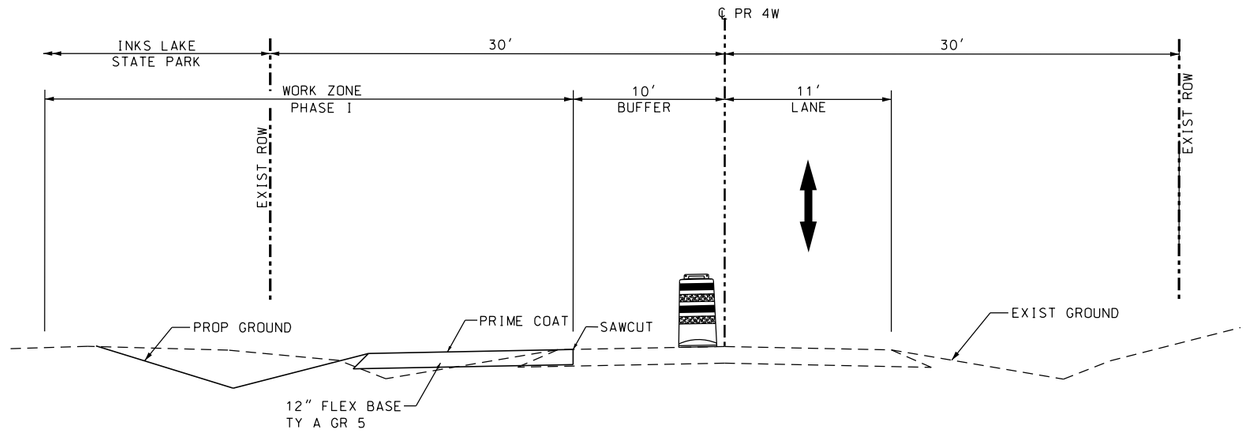
(6) END ROAD WORK — G20-2a 36X18

(7) STAY ALERT — TALK OR TEXT LATER — G20-10T 60X48

(8) W3-2 48X48

(9) YIELD — R1-2 42x42x42

(10) TO ONCOMING TRAFFIC — R1-2aP 48X36



PHASE I

PROPOSED TCP TYPICAL SECTION

NOT TO SCALE

TCP SEQUENCE OF WORK

PHASE I

STATE PARK RD 4 SUMMARY: CONSTRUCT CULVERTS AND PAVEMENT WIDENING.

LIMITATIONS: TCP WILL BE CONDUCTED IN SEGMENTS OF LOGICAL TERMINI (BUT MAY BE CHANGED BY CONTRACTOR AS APPROVED BY THE ENGINEER). 3:1 (MIN) SIDE SLOPES ARE REQUIRED AT THE CONCLUSION OF EACH WORKDAY.

PHASE I NOTES:

1. INSTALL ADVANCE WARNING SIGNS ALONG APPROACH ROADWAY ON BOTH ENDS OF THE PROJECT AS SHOWN ON THE ADVANCE WARNING SIGN AND BC STANDARD SHEETS. SIGNS TO REMAIN FOR DURATION OF PROJECT.
2. INSTALL SW3P EROSION CONTROL MEASURES AS SHOWN IN THE PLANS.
3. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TCP (2-2)-18 DURING WORKING HOURS. ONE-LANE TWO-WAY CONTROL TO BE USED ON PARK RD 4W DURING WORKING HOURS. ALL LANES MUST BE OPEN DURING NON-WORKING HOURS.
4. CONSTRUCT PROPOSED CULVERTS AND CULVERT EXTENSIONS AS SHOWN IN THE PLANS. USE TXDOT TCP(2-1)-18 FOR SHOULDER WORK.
5. CONSTRUCT PAVEMENT WIDENING THROUGH PLACEMENT OF FLEX BASE WITH PRIME COAT. ONE-LANE TWO-WAY TRAFFIC CONTROL WITH A FLAGGER TO BE USED DURING WORKING HOURS. THE CONTRACTOR SHALL ESTABLISH TWO-WAY TRAFFIC FOR ALL NON-WORKING HOURS.
6. A MINIMUM 3:1 (H:V) TEMPORARY SAFETY SLOPE OF STABLE COMPACTED MATERIAL WILL BE REQUIRED TO BE PLACED ADJACENT TO THE HIGHWAY EDGE OF PAVEMENT ALONG ALL DROP OFFS GREATER THAN 2" AT ALL TIMES DURING NON-WORKING HOURS.

PHASE II

STATE PARK RD 4 SUMMARY: FINISH PAVEMENT SURFACE AND PLACE PAVEMENT MARKING.

LIMITATIONS: TCP WILL BE CONDUCTED IN SEGMENTS OF LOGICAL TERMINI (BUT MAY BE CHANGED BY CONTRACTOR AS APPROVED BY THE ENGINEER). 3:1 (MIN) SIDE SLOPES ARE REQUIRED AT THE CONCLUSION OF EACH WORKDAY.

PHASE II NOTES:

1. CONSTRUCT HMA SURFACE FULL WIDTH OF PR 4W PAVEMENT. USE TXDOT TCP(7-1)-13 FOR SURFACING OPERATIONS.
2. PLACE FINAL PAVEMENT MARKINGS AND SIGNS ALONG ROADWAY. USE TXDOT TCP(3-1)-13 FOR PAVEMENT MARKING OPERATIONS.
3. FINAL PROJECT CLEAN UP.

PHASE III

INTERIOR PARK ROADS SUMMARY: CONSTRUCT CULVERT C AND INTERIOR PARK ROADS.

LIMITATIONS: TCP WILL BE CONDUCTED IN SEGMENTS OF LOGICAL TERMINI (BUT MAY BE CHANGED BY CONTRACTOR AS APPROVED BY THE ENGINEER). 3:1 (MIN) SIDE SLOPES ARE REQUIRED AT THE CONCLUSION OF EACH WORKDAY. THE CONTRACTOR SHALL MAINTAIN A 12' DRIVABLE SURFACE FOR PARK ROAD TRAFFIC WHEN CONSTRUCTING EXISTING INTERIOR PARK ROADS TO PROPOSED TYPICAL SECTION.
OPERATIONAL ACCESS TO THE DUMP STATION MUST BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.

PHASE III NOTES:

1. INSTALL ADVANCE WARNING SIGNS ALONG APPROACH ROADWAY ON BOTH ENDS OF THE PROJECT AS SHOWN ON THE ADVANCE WARNING SIGN AND BC STANDARD SHEETS. SIGNS TO REMAIN FOR DURATION OF PROJECT.
2. INSTALL SW3P EROSION CONTROL MEASURES AS SHOWN IN THE PLANS.
3. INSTALL TEMPORARY TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH TCP (2-2)-18 DURING WORKING HOURS. ONE-LANE TWO-WAY CONTROL TO BE USED ON PARK RD 4W DURING WORKING HOURS. ALL LANES MUST BE OPEN DURING NON-WORKING HOURS.
4. CONSTRUCT PROPOSED CULVERT AS SHOWN IN THE PLANS. USE TXDOT TCP(2-1)-18 FOR SHOULDER WORK.
5. CONSTRUCT PAVEMENT THROUGH PLACEMENT OF FLEX BASE WITH PRIME COAT. TO BE USED DURING WORKING HOURS.
6. A MINIMUM 3:1 (H:V) TEMPORARY SAFETY SLOPE OF STABLE COMPACTED MATERIAL WILL BE REQUIRED TO BE PLACED ADJACENT TO THE HIGHWAY EDGE OF PAVEMENT ALONG ALL DROP OFFS GREATER THAN 2" AT ALL TIMES DURING NON-WORKING HOURS.
7. CONSTRUCT HMA SURFACE FULL WIDTH OF INTERIOR PARK ROAD PAVEMENT. USE TXDOT TCP(7-1)-13 FOR SURFACING OPERATIONS.
8. PLACE FINAL PAVEMENT MARKINGS AND SIGNS ALONG ROADWAY. USE TXDOT TCP(3-1)-13 FOR PAVEMENT MARKING OPERATIONS.
9. FINAL PROJECT CLEAN UP.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

TRAFFIC CONTROL PLAN TYPICAL SECTION & SEQUENCE OF WORK

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	21

DATE: 1/27/2023 17:44:57
FILE: H:\Projects\511\66\00\Design\Civil\Standards\TCP\bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

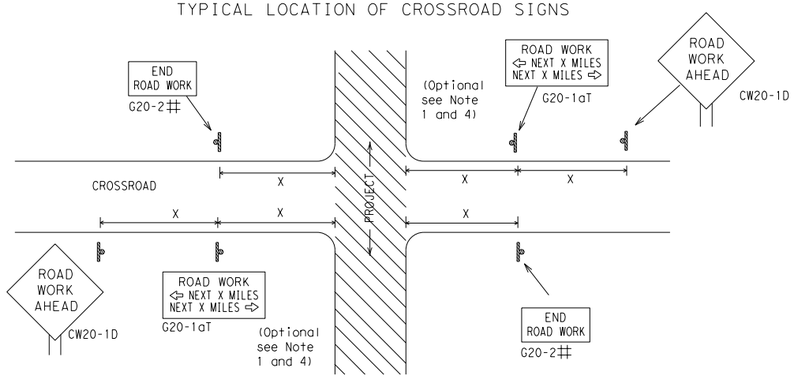
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0914	24	025	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	AUS	BURNET		22

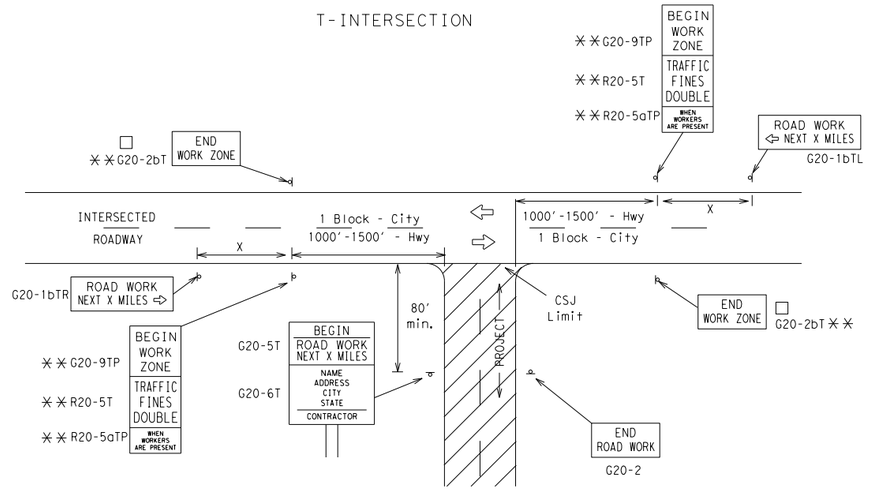
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

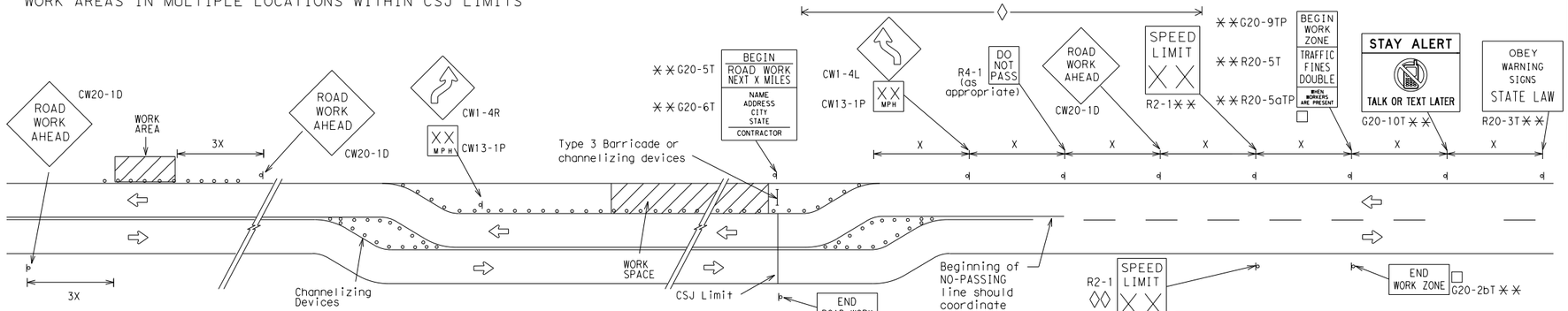
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

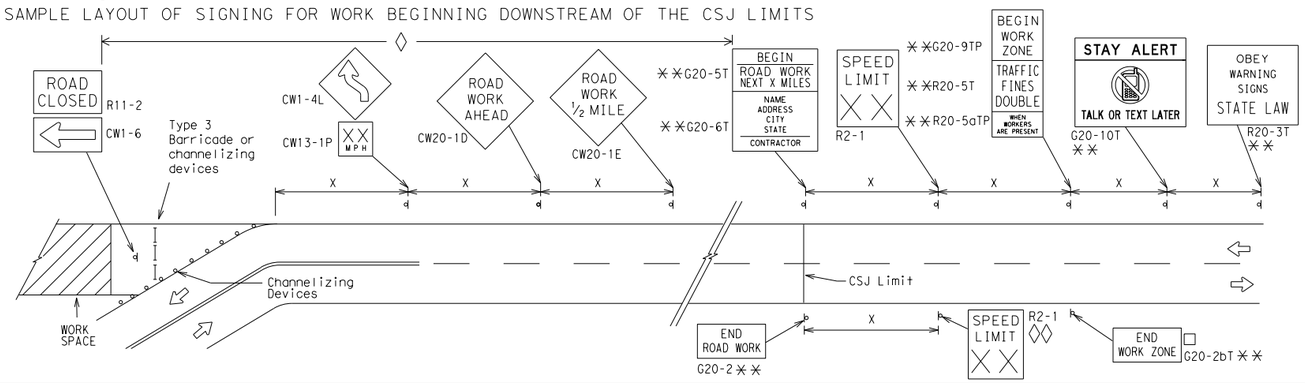
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	BURNET		23

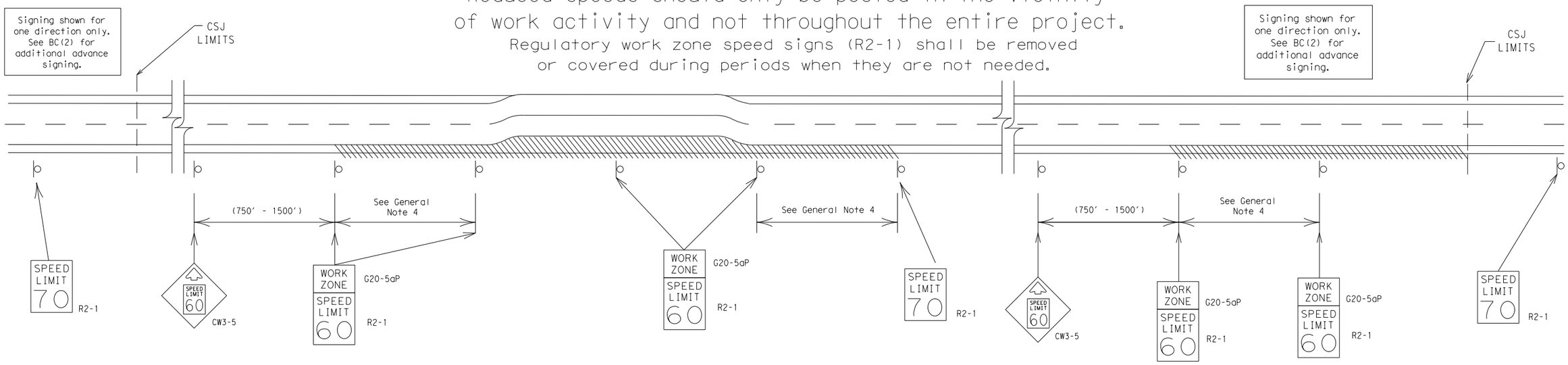
DATE: 1/27/2023 17:44:58
FILE: H:\Projects\Sil\66100\Design\Civil\Standards\TCP\bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		24

DATE: 1/27/2023 17:44:58
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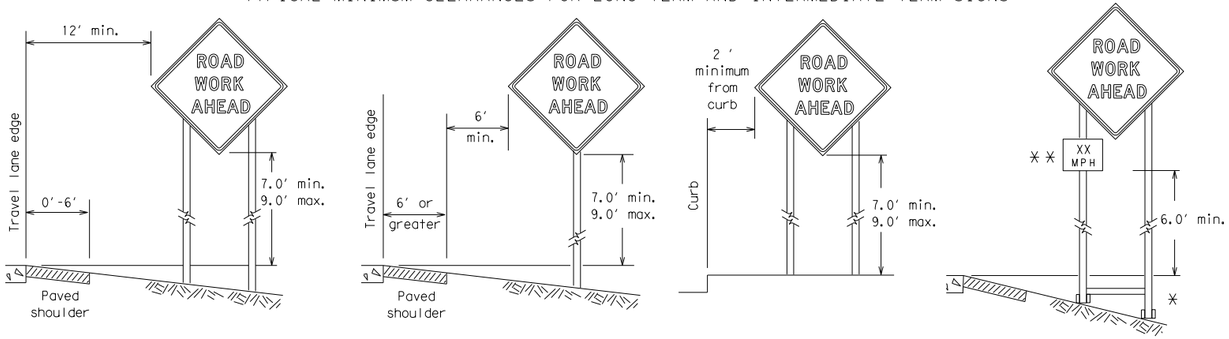
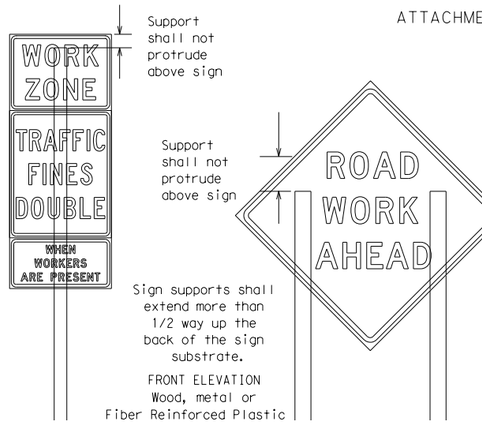
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

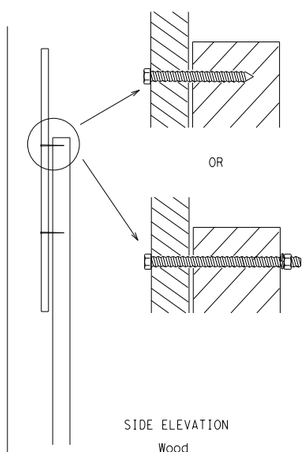


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





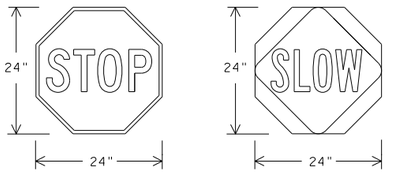
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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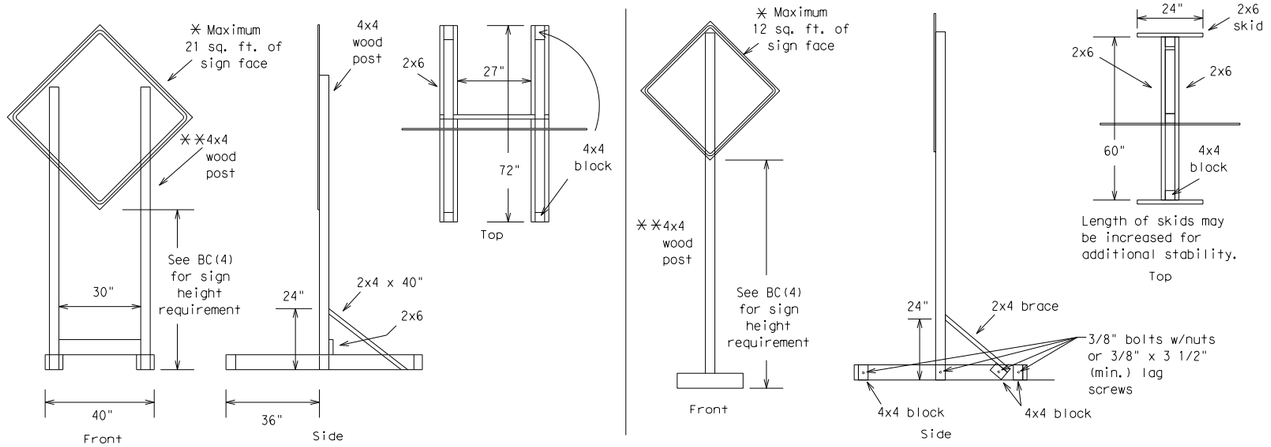
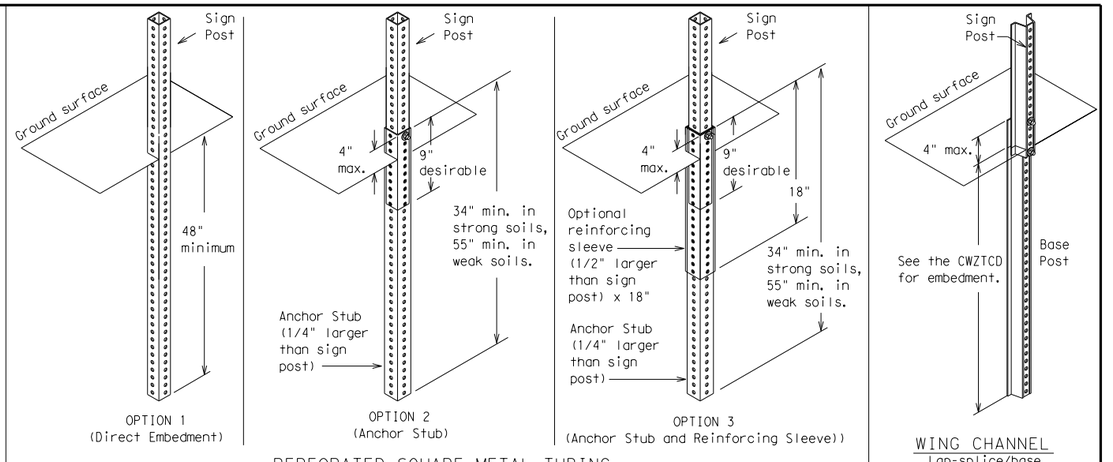


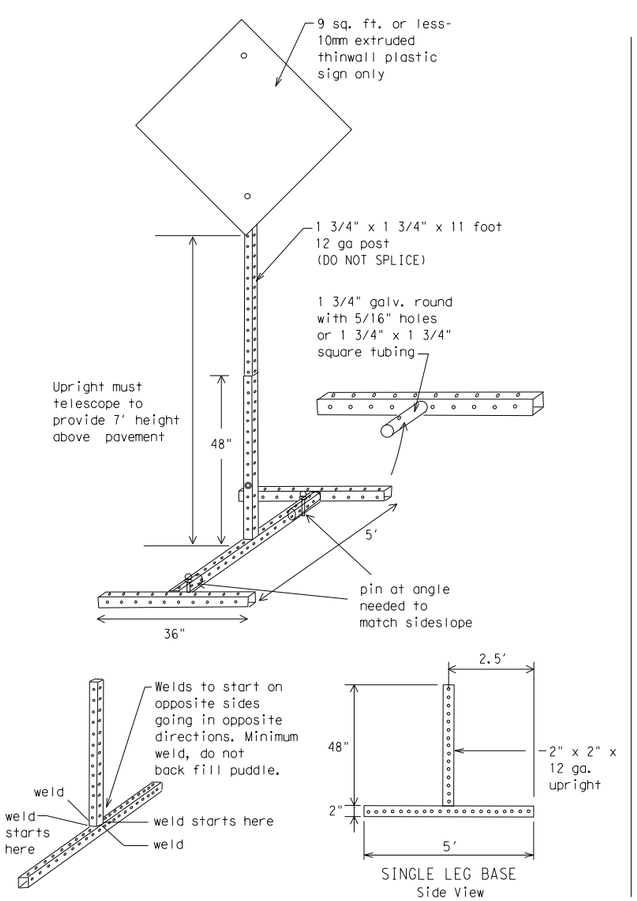
SKID MOUNTED WOOD SIGN SUPPORTS

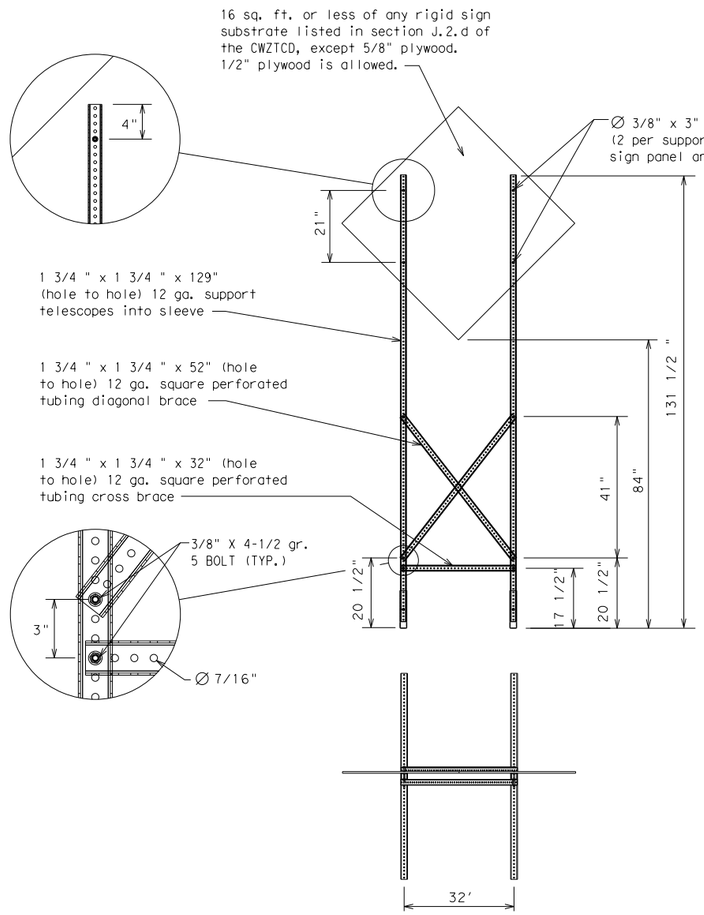
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

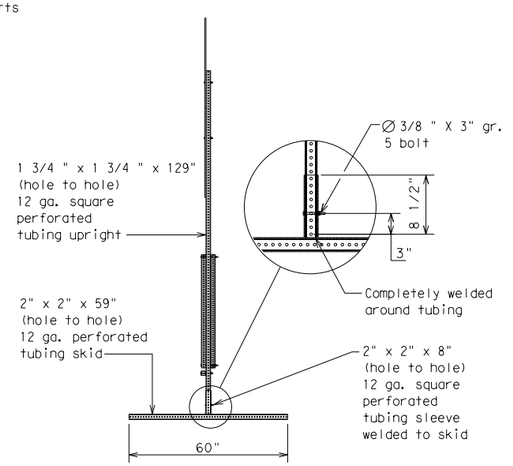


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	BURNET		26

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT ⁂

⁂ LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE ⁂

⁂ LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

⁑ Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

⁑ See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0914	24	025	VA
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		AUS	BURNET		27

100

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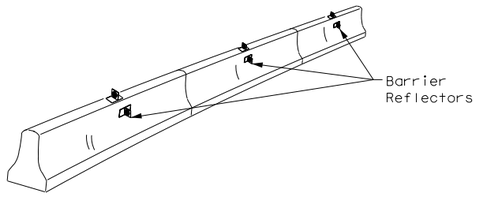
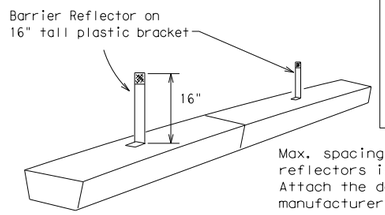
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

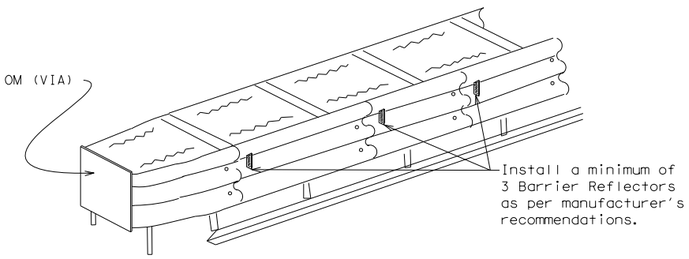


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

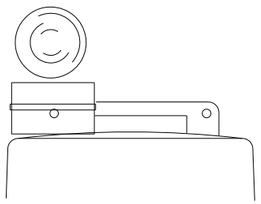


DELINEATION OF END TREATMENTS

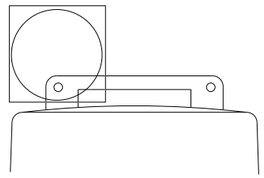
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

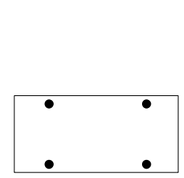
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

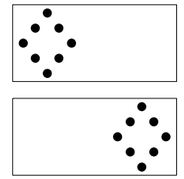
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:

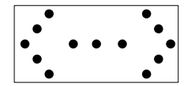


4 CORNER CAUTION

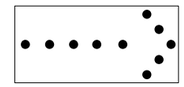
OR



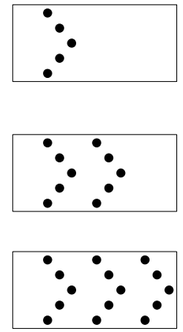
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	BURNET		28

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

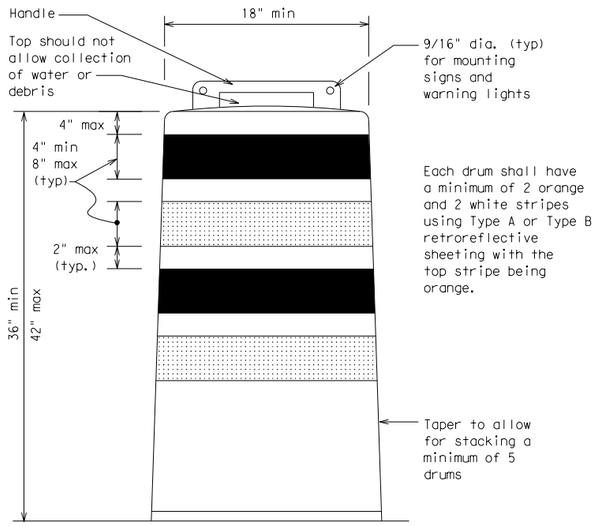
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

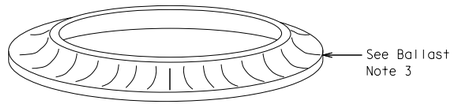
RETROREFLECTIVE SHEETING

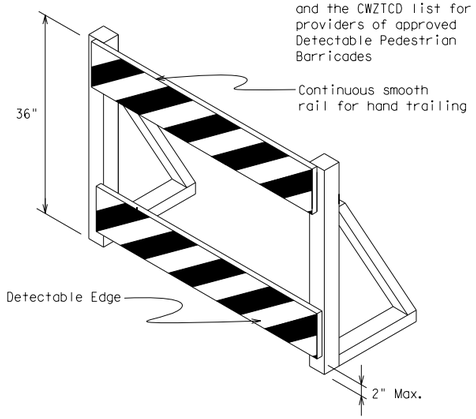
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

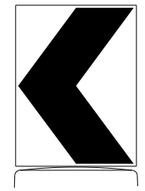




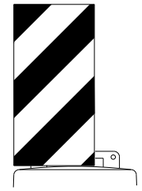


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 5-21	AUS	BURNET		29
7-13				

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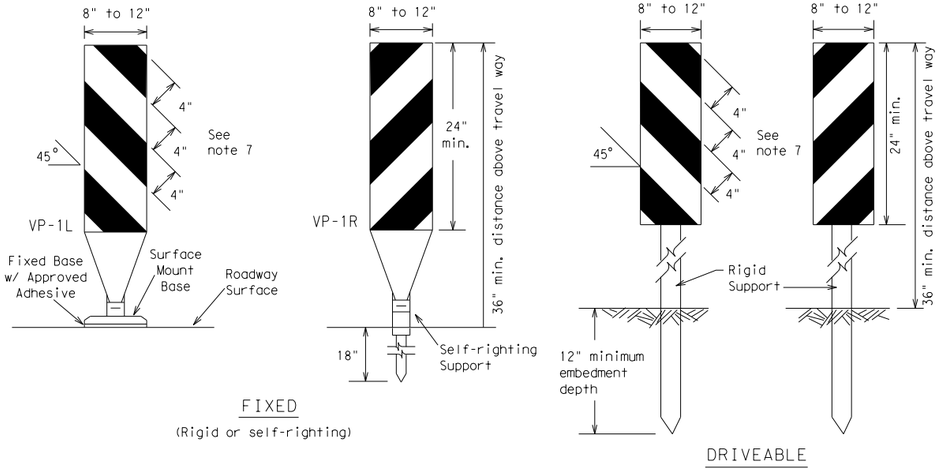
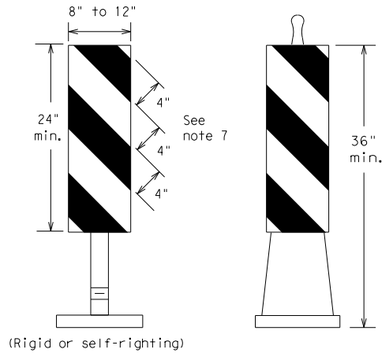


FIXED

(Rigid or self-righting)

DRIVEABLE

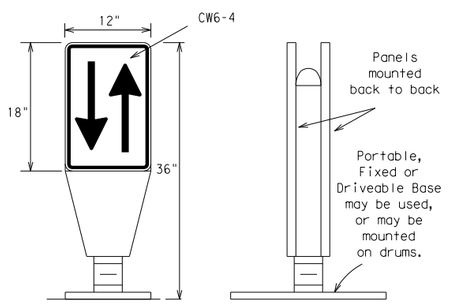


(Rigid or self-righting)

PORTABLE

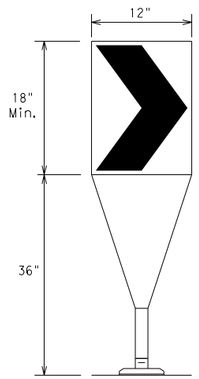
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



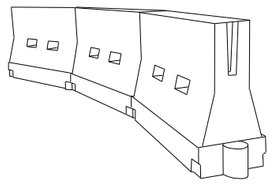
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳			Suggested Maximum Spacing of Channelizing Devices	
		10′ Offset	11′ Offset	12′ Offset	On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′
35		205′	225′	245′	35′	70′
40		265′	295′	320′	40′	80′
45	L = WS	450′	495′	540′	45′	90′
50		500′	550′	600′	50′	100′
55		550′	605′	660′	55′	110′
60		600′	660′	720′	60′	120′
65		650′	715′	780′	65′	130′
70		700′	770′	840′	70′	140′
75		750′	825′	900′	75′	150′
80		800′	880′	960′	80′	160′

✳✳Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0914	24	025	VA
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7-13 5-21	AUS	BURNET		30

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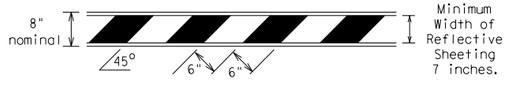
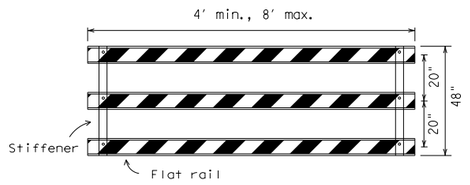
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



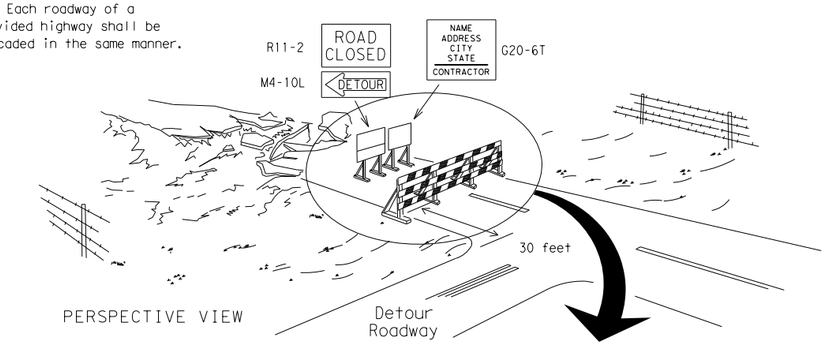
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

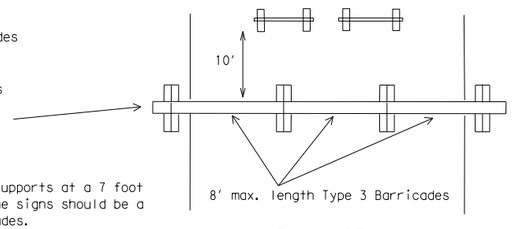
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

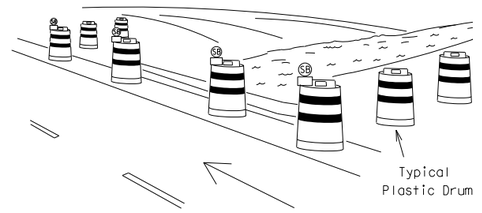
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

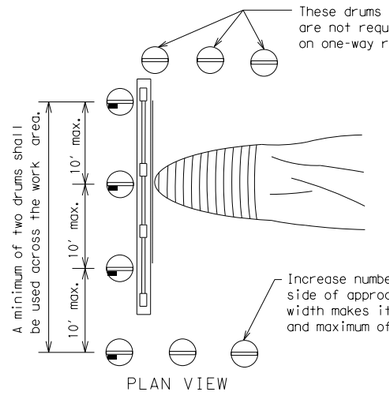
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

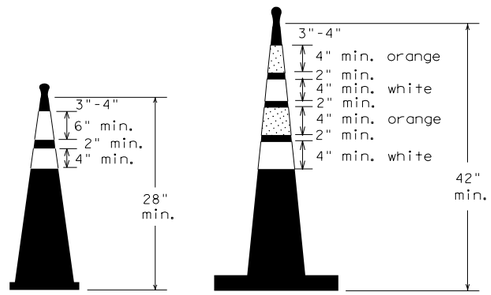
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



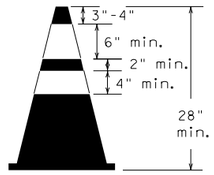
PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

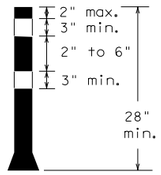
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

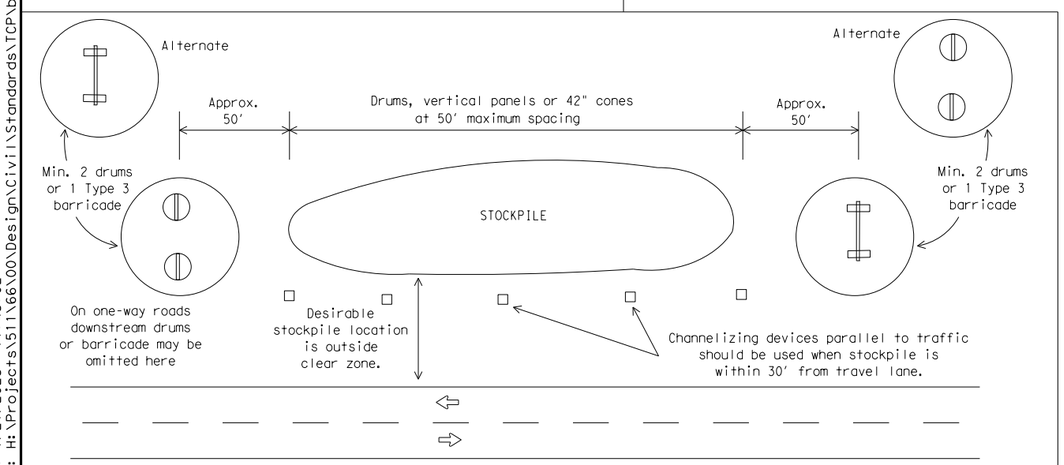


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

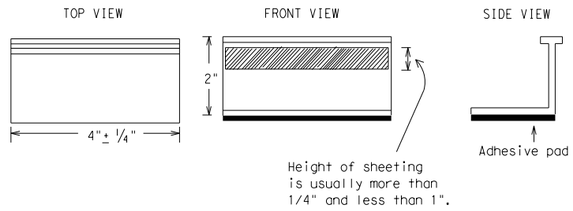
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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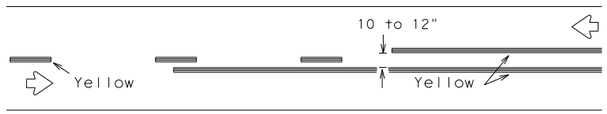
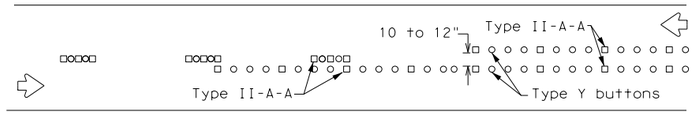
11-02 8-14	AUS	BURNET		32

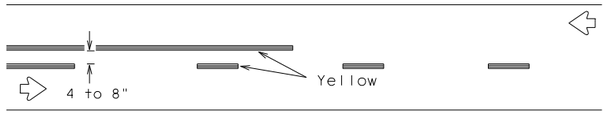
PAVEMENT MARKING PATTERNS



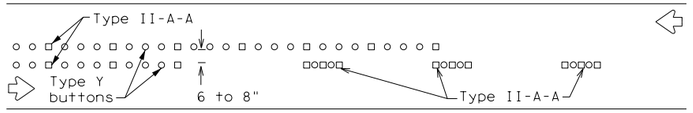
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



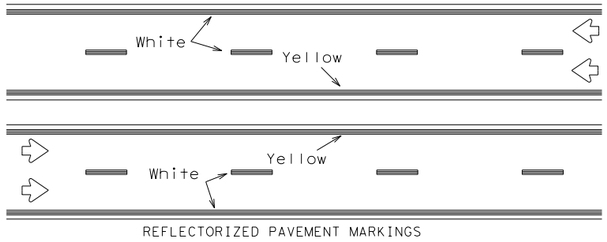
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



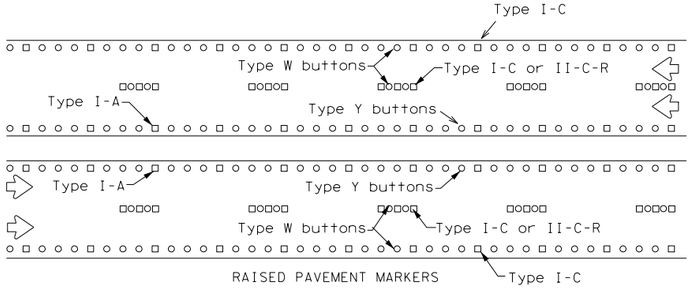
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



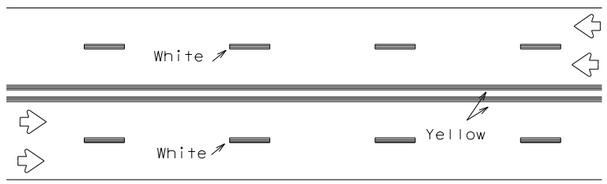
REFLECTORIZED PAVEMENT MARKINGS



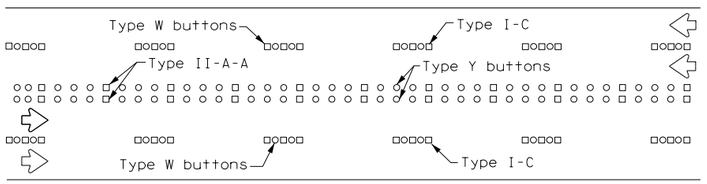
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



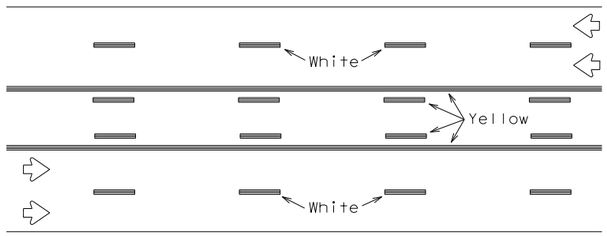
REFLECTORIZED PAVEMENT MARKINGS



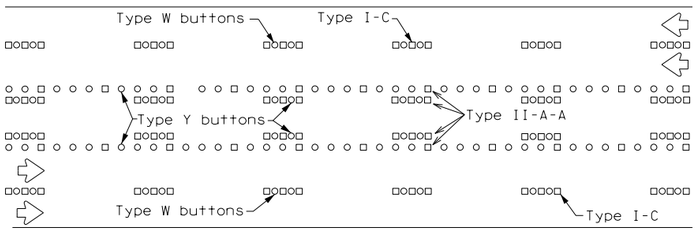
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

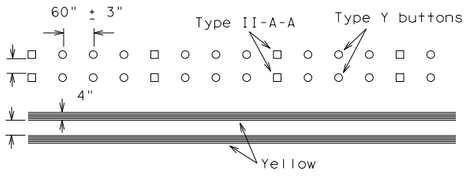
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

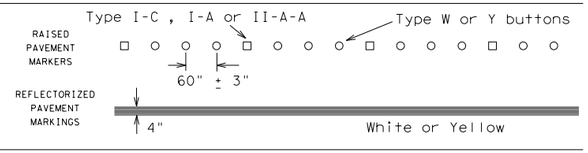
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

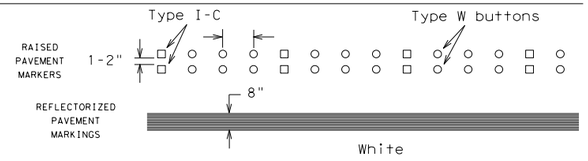


EDGE LINE OR SINGLE NO-PASSING LINE



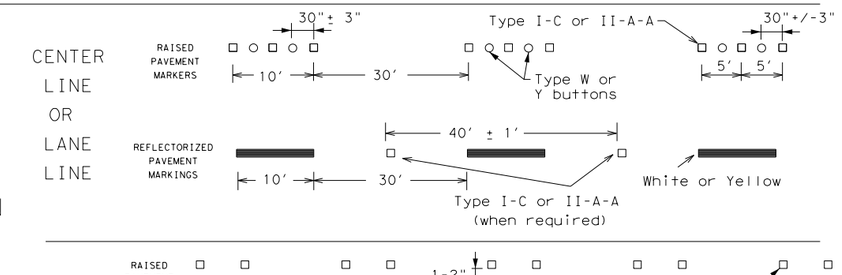
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

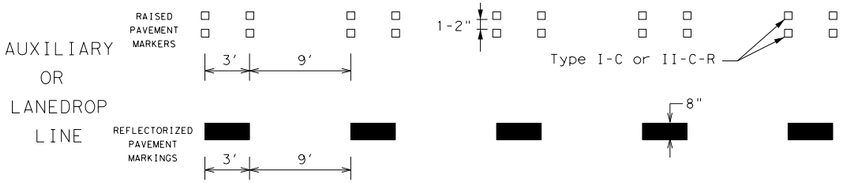


BROKEN LINES

CENTER LINE OR LANE LINE

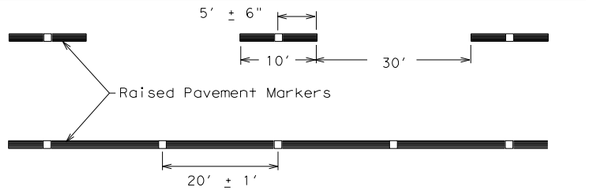


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	0914	24	025	VA
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	AUS	BURNET		33

106

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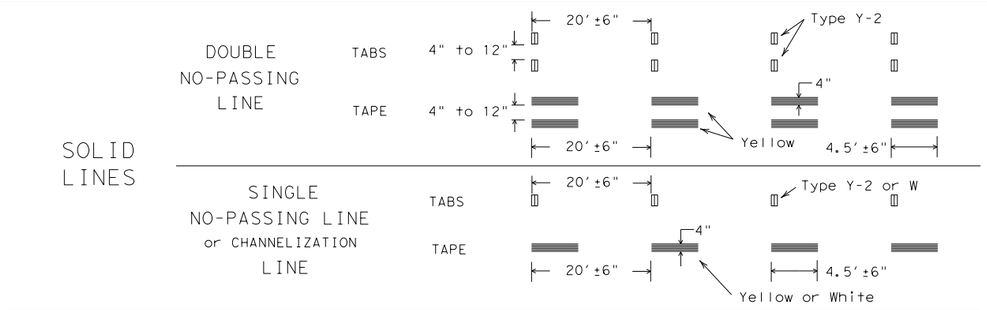
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



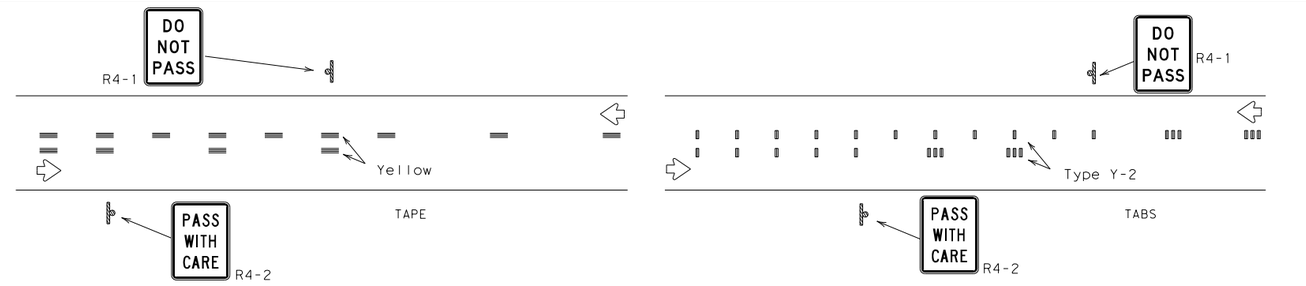
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

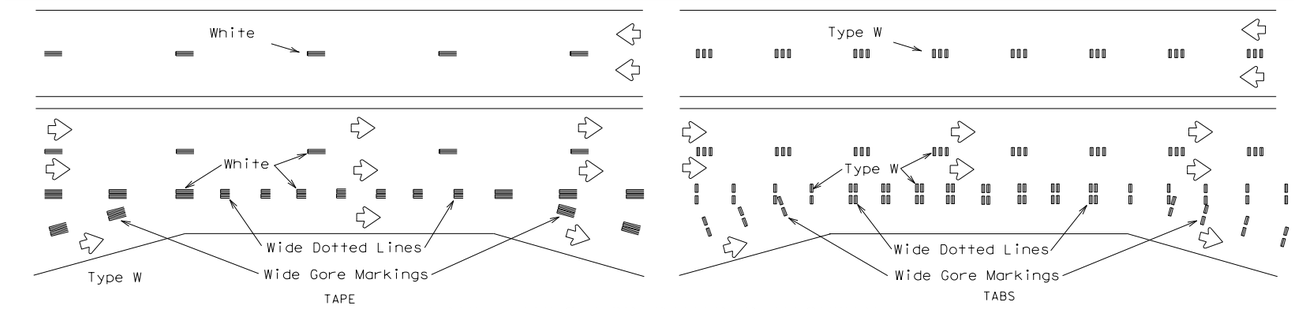
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

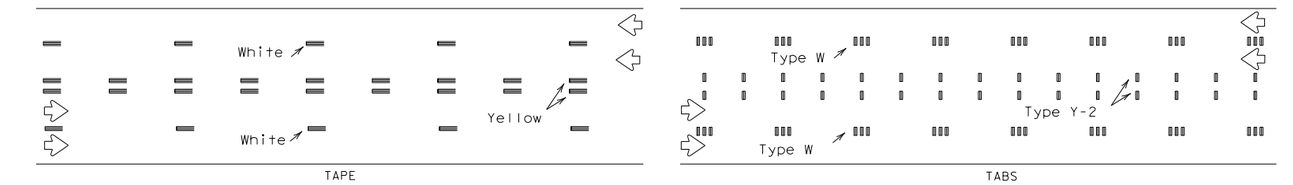
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



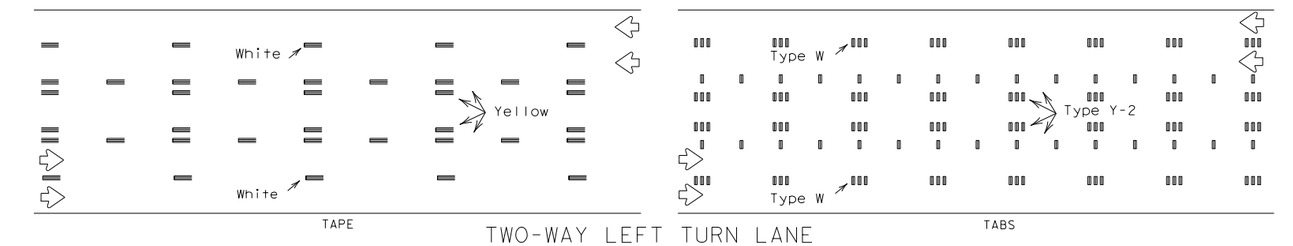
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



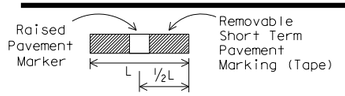
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0914	24	025	VA
1-97		DIST	COUNTY		SHEET NO.
3-03		AUS	BURNET		34
7-13					

111

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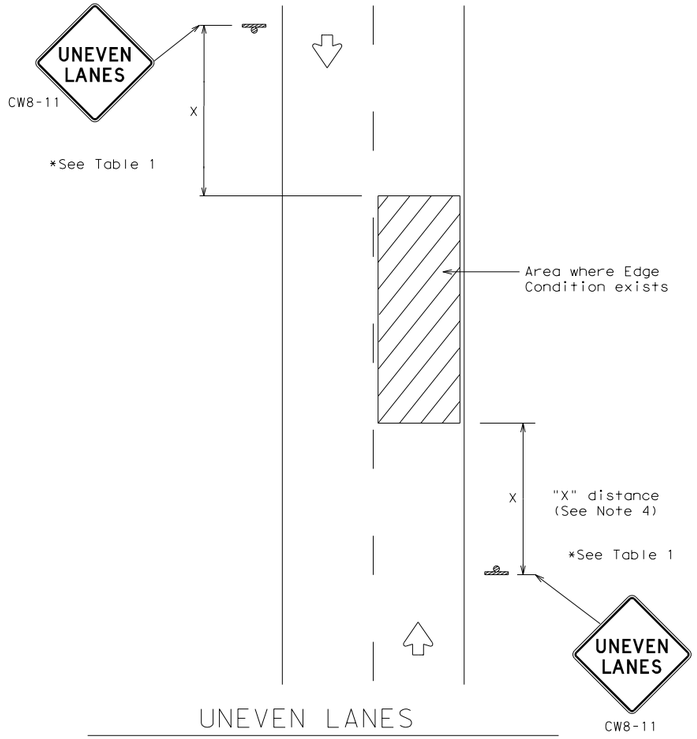
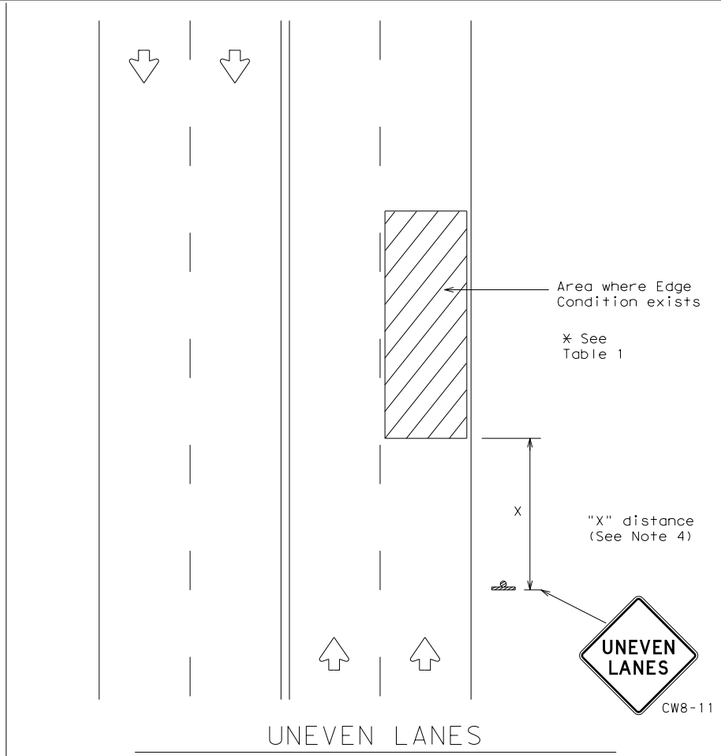
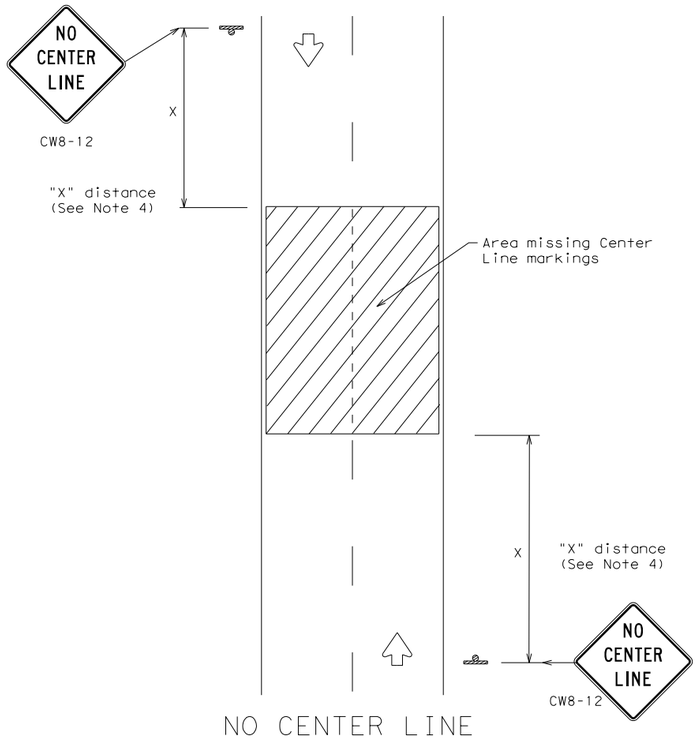


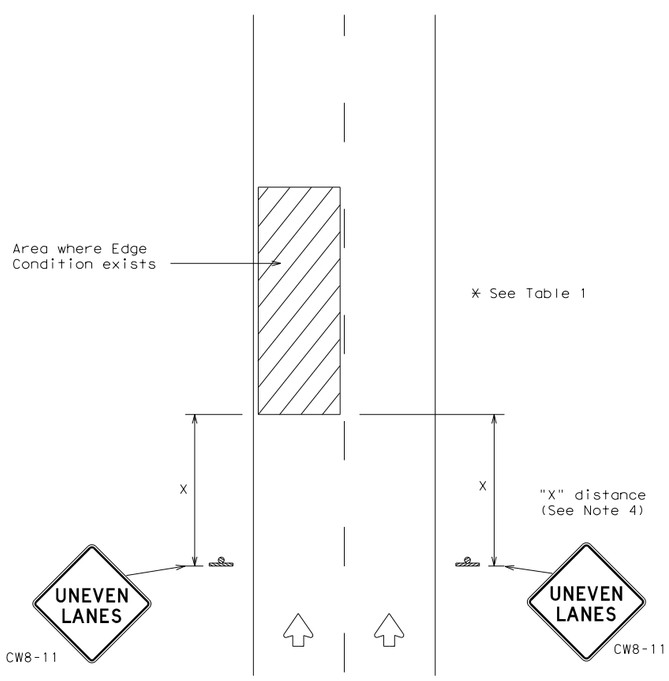
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

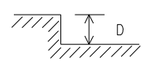
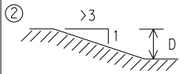
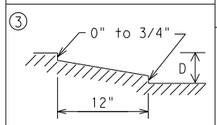
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	AUS	BURNET		35

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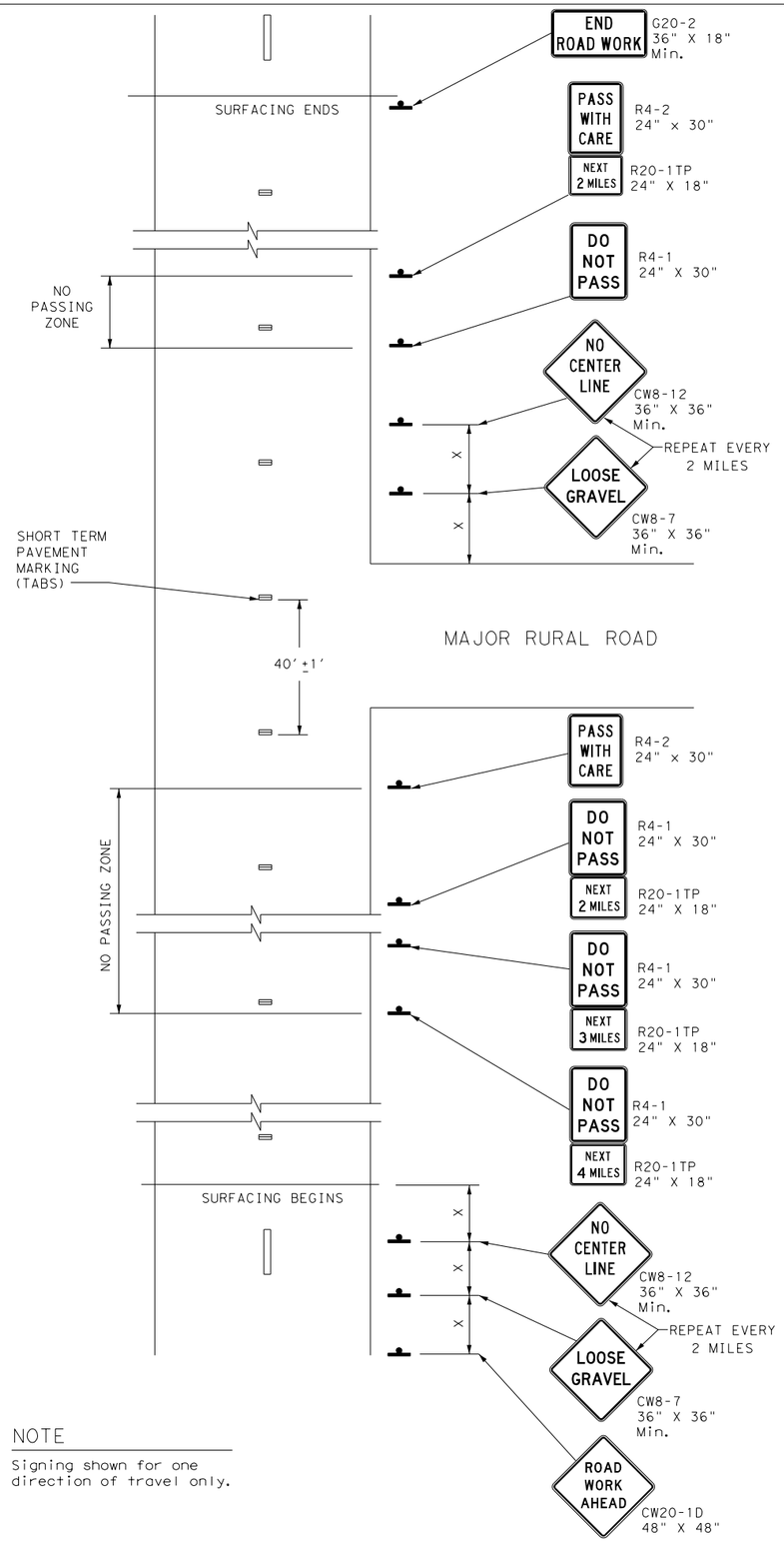
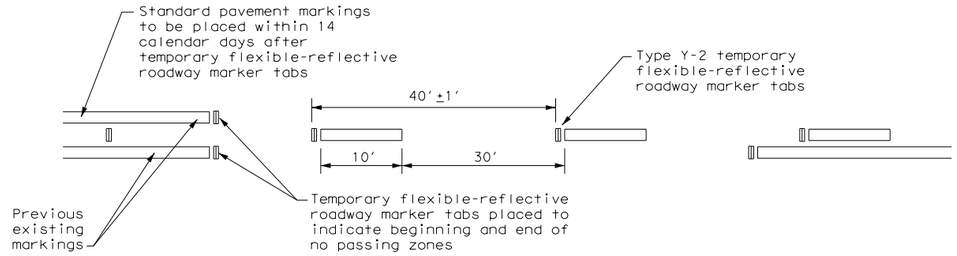


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120′
35	160′
40	240′
45	320′
50	400′
55	500′
60	600′
65	700′
70	800′
75	900′

* Conventional Roads Only

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	AUS	BURNET		36

210

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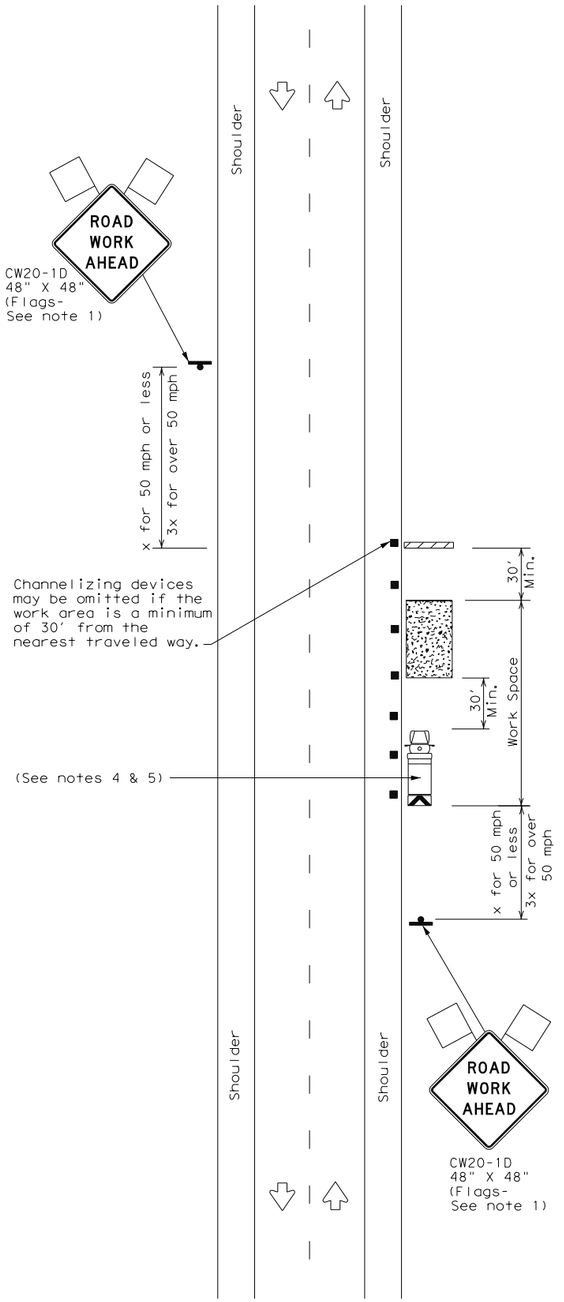
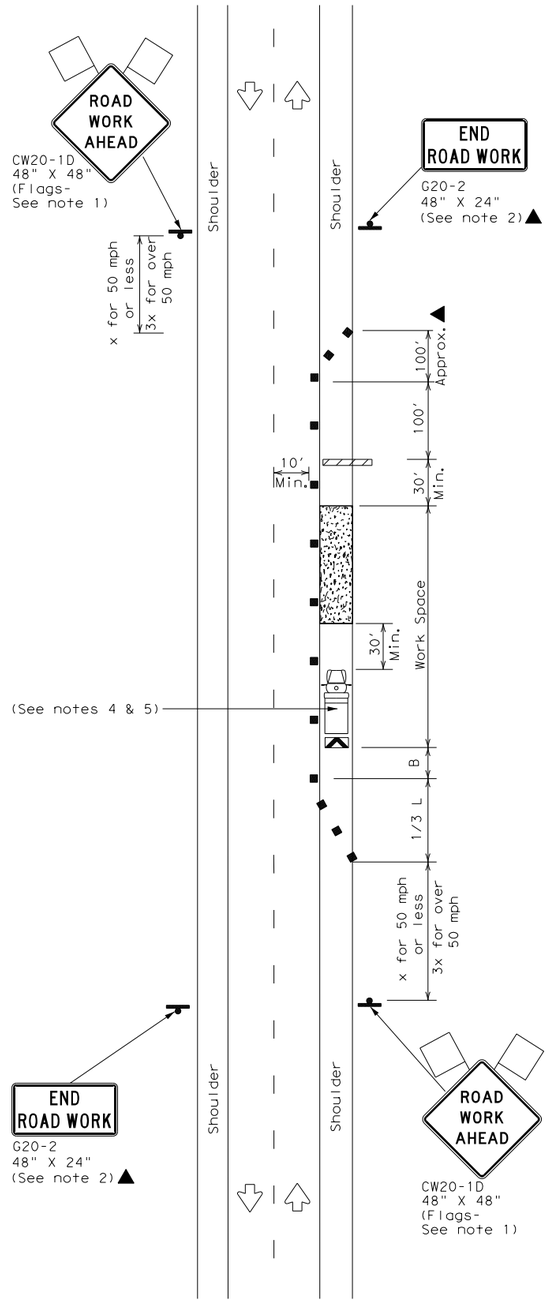


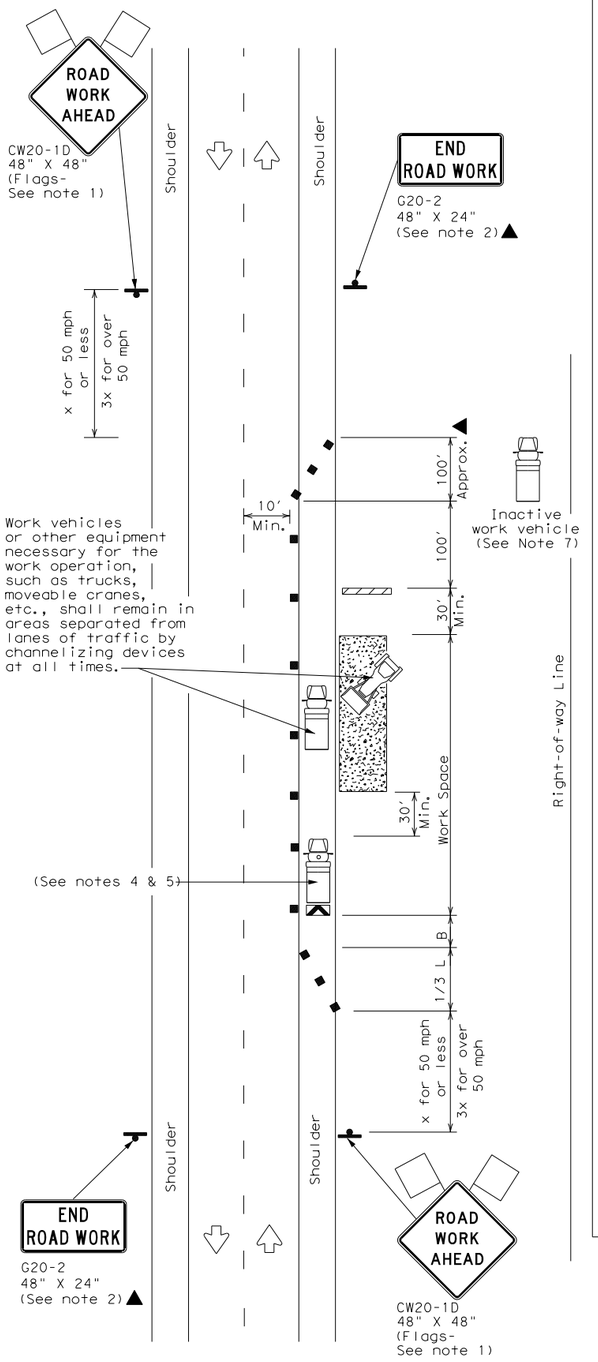
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		37

DATE: 1/27/2023 17:45:07
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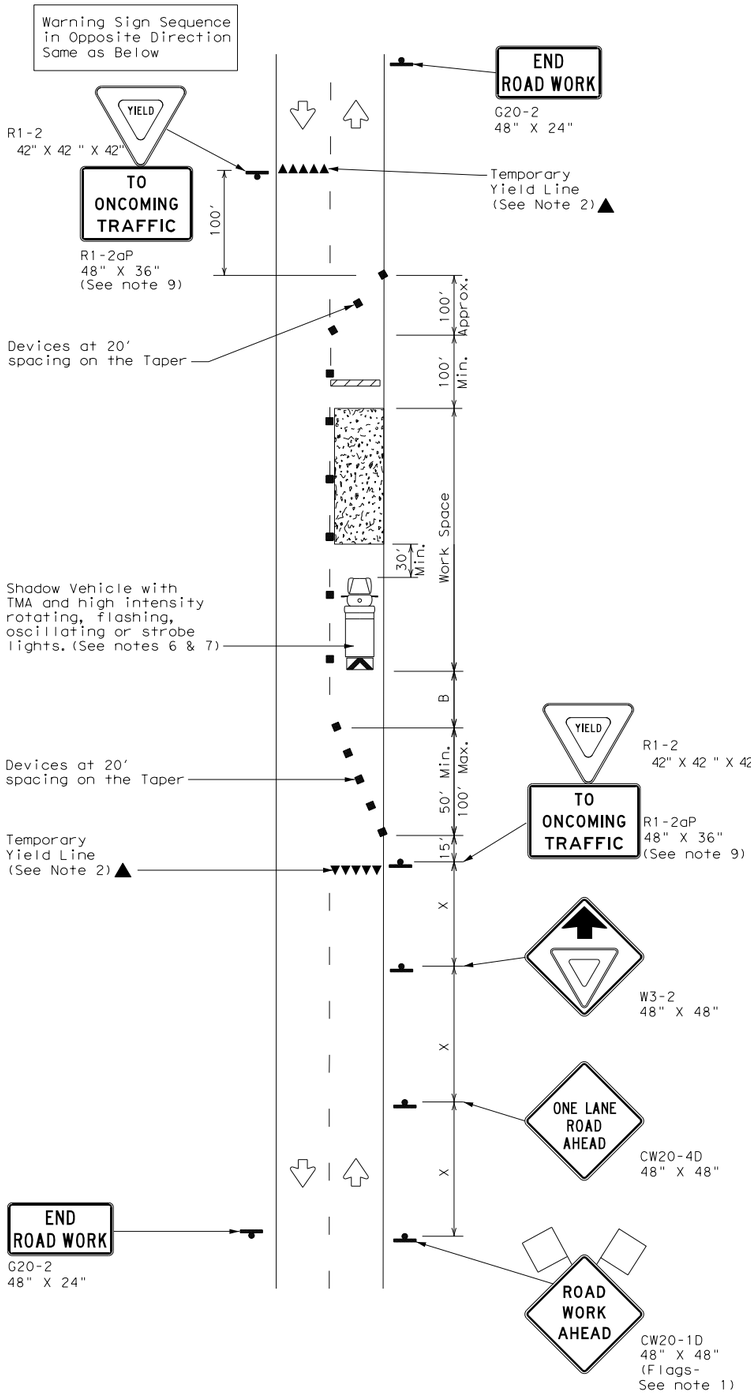
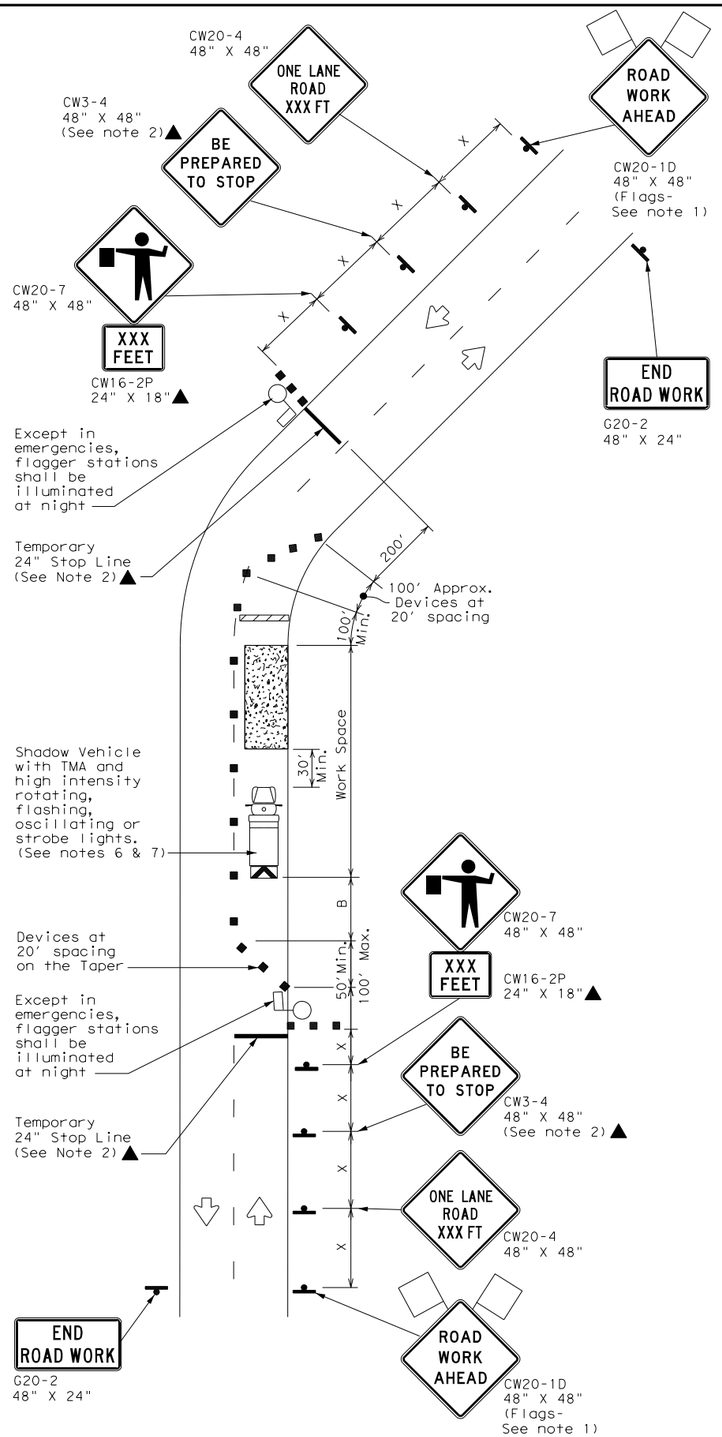


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

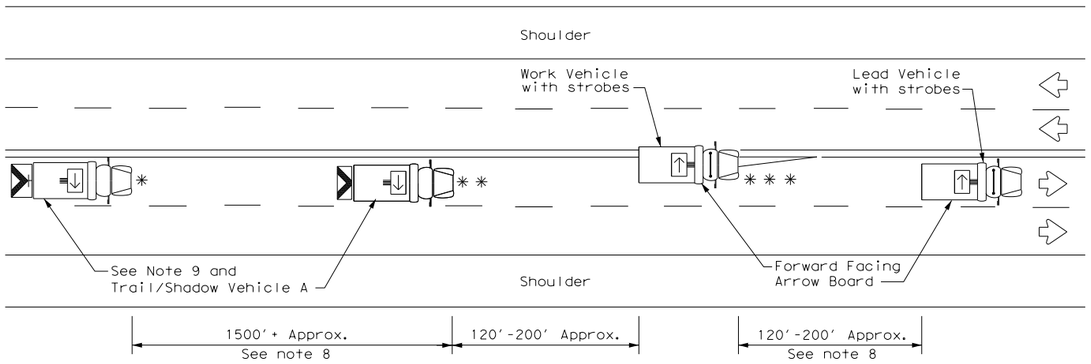
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

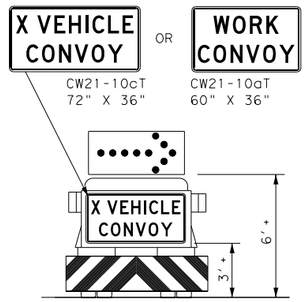
TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		38



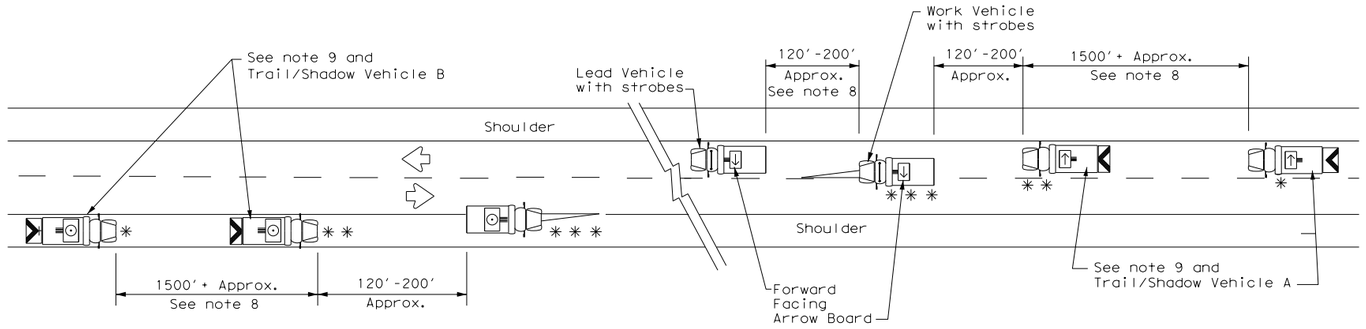
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

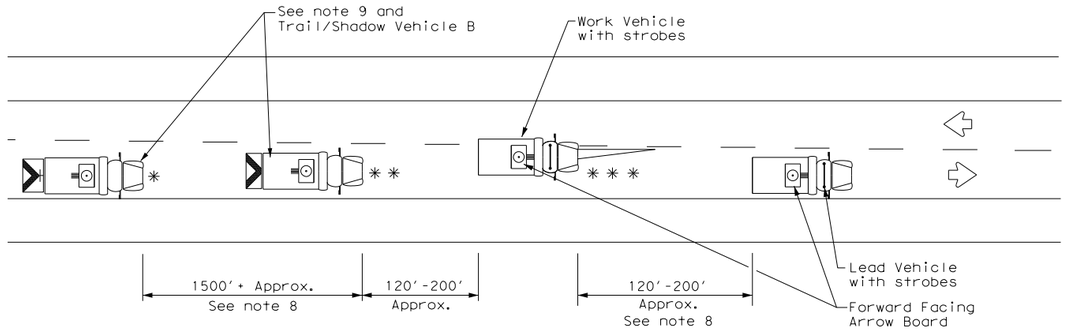


WORK ON SHOULDER

WORK ON TRAVEL LANE

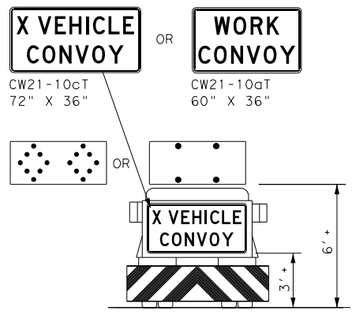
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

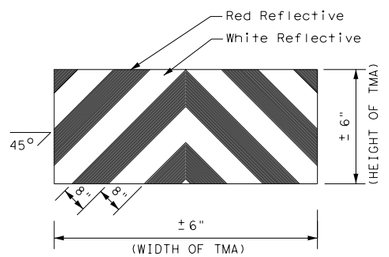
with Flashing Arrow Board in CAUTION display

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
* *	Shadow Vehicle		
* * *	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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	DIST	COUNTY		SHEET NO.
	AUS	BURNET		39

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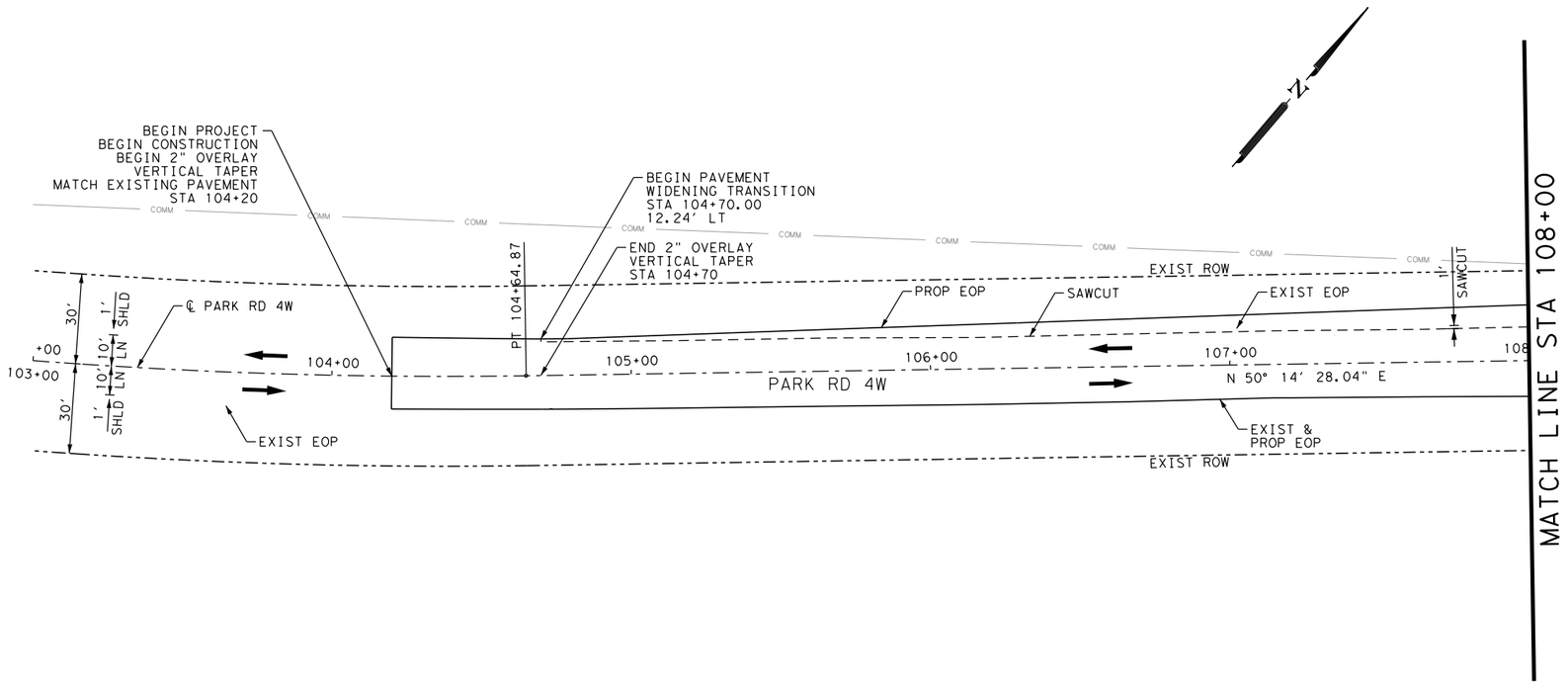
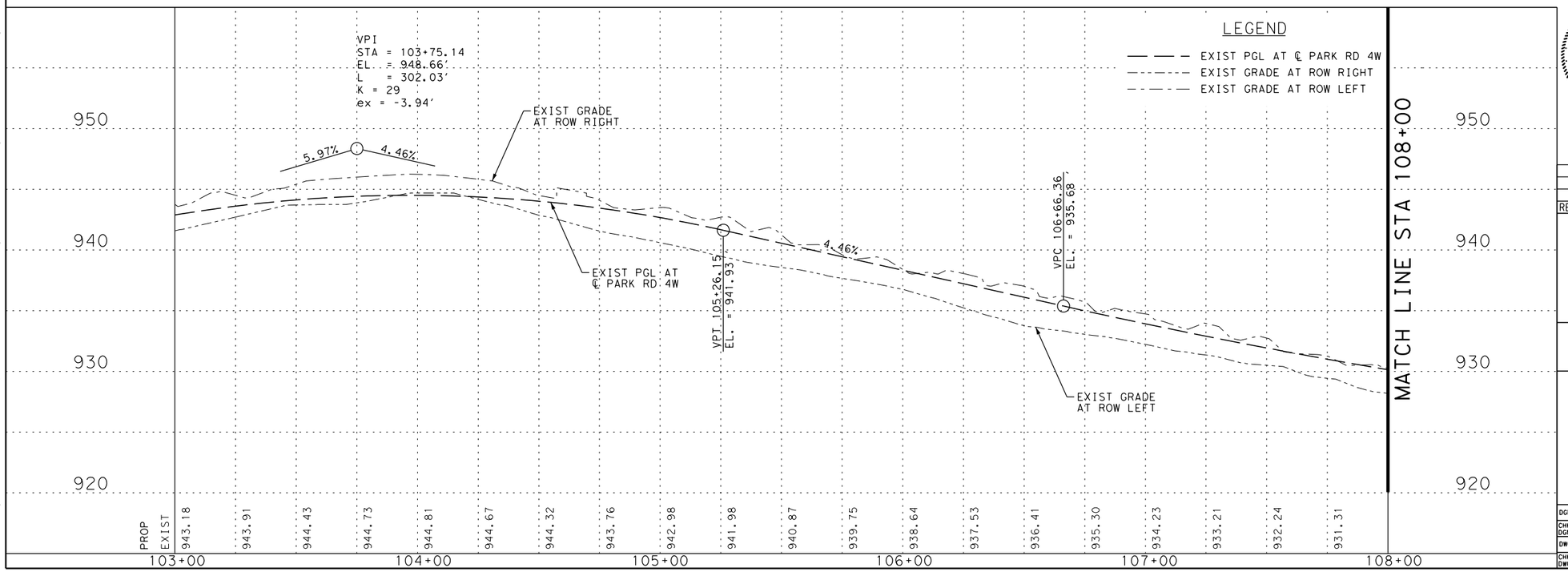


LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- UG E — EXISTING UG ELECTRIC
- WL — EXISTING WATER LINE
- WWL — EXISTING WASTEWATER LINE
- FM — EXISTING WASTEWATER FORCE MAIN
- COMM — EXISTING COMMUNICATION LINE
- UE — PROP UG ELECTRIC BY OTHERS
- W — PROP WATER LINE BY OTHERS
- WW — PROP WASTEWATER LINE BY OTHERS
- FM — PROP WASTEWATER FORCE MAIN BY OTHERS
- T — PROP COMMUNICATION LINE BY OTHERS

NOTES

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE "DRIVEWAY DETAILS" SHEETS FOR INTERSECTION DETAILS.
3. ALL TREES WITHIN THE EXISTING STATE RIGHT-OF-WAY IN CONFLICT WITH THE PROPOSED ROADWAY AND DITCH SHALL BE REMOVED UNLESS OTHERWISE NOTED.
4. PROPOSED PAVEMENT SLOPES OF ALL WIDENINGS SHALL MATCH THE ADJACENT EXISTING CROSS SLOPES UNLESS OTHERWISE NOTED.
5. ANY EXISTING CONFLICTING FEATURES WILL BE REMOVED USING ITEM 100: PREP ROW.
6. EXISTING FENCE WILL BE REMOVED FOR ENTRY SUBSIDIARY TO ITEM 100: PREP ROW.



STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 3/6/2023 DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

ROADWAY PLAN AND PROFILE

BEGIN PROJECT TO STA 108+00

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	40

Plotted on: 3/6/2023

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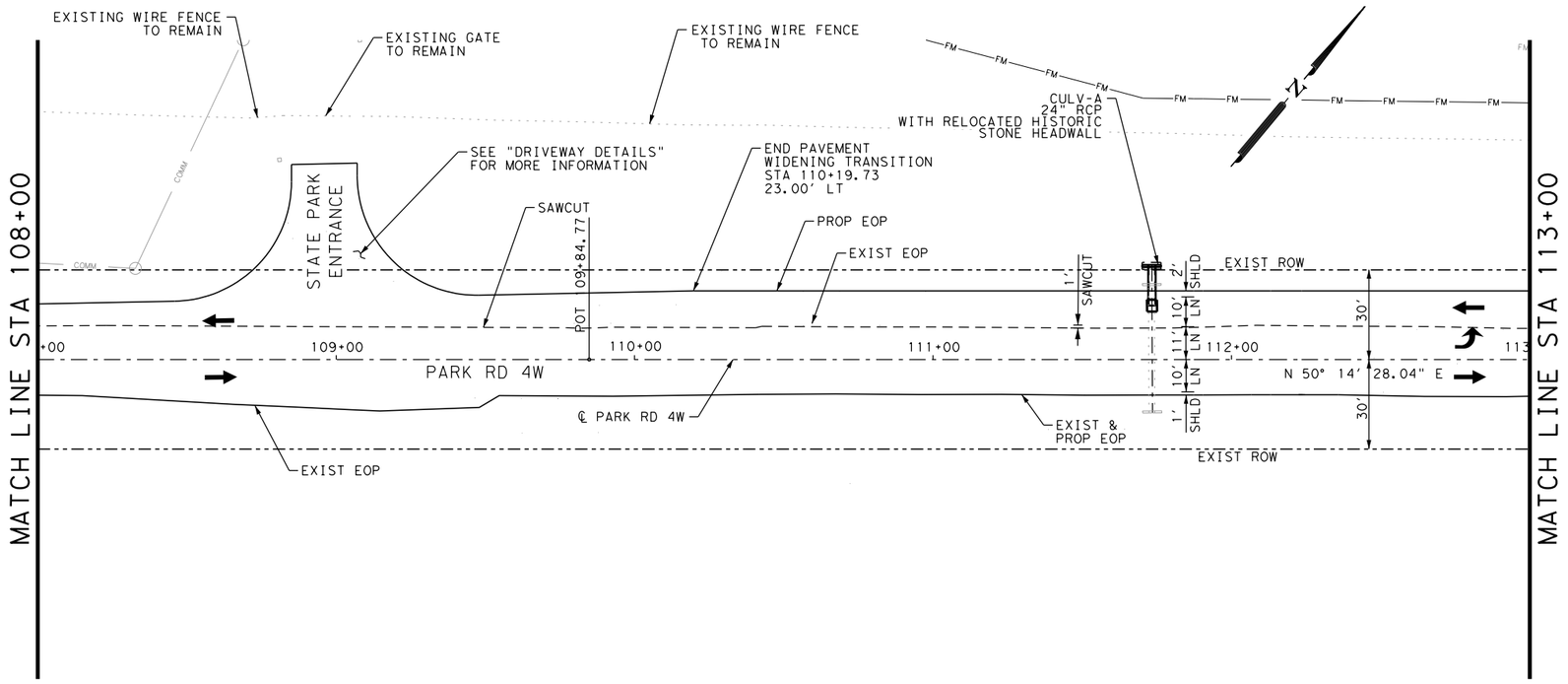

LEGEND

- TRAFFIC FLOW ARROW
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NOTES

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT DATA.
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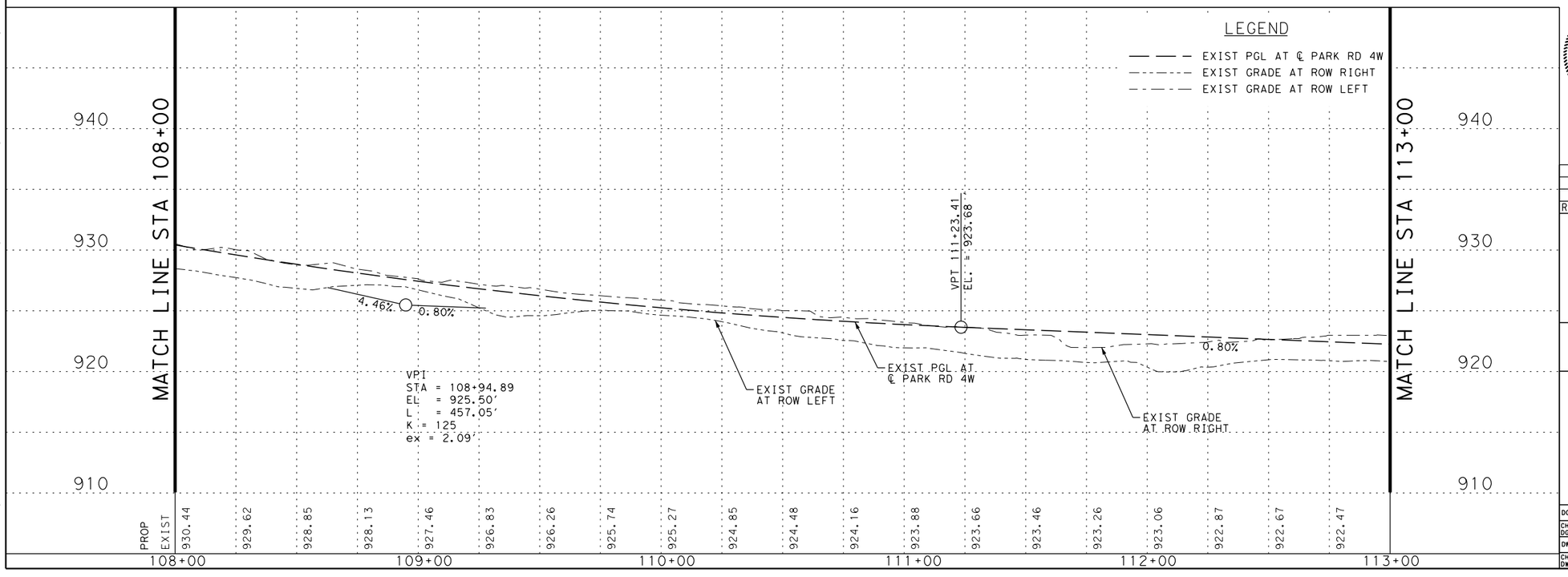

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 3/6/2023 DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

ROADWAY PLAN AND PROFILE

STA 108+00 TO STA 113+00

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	41

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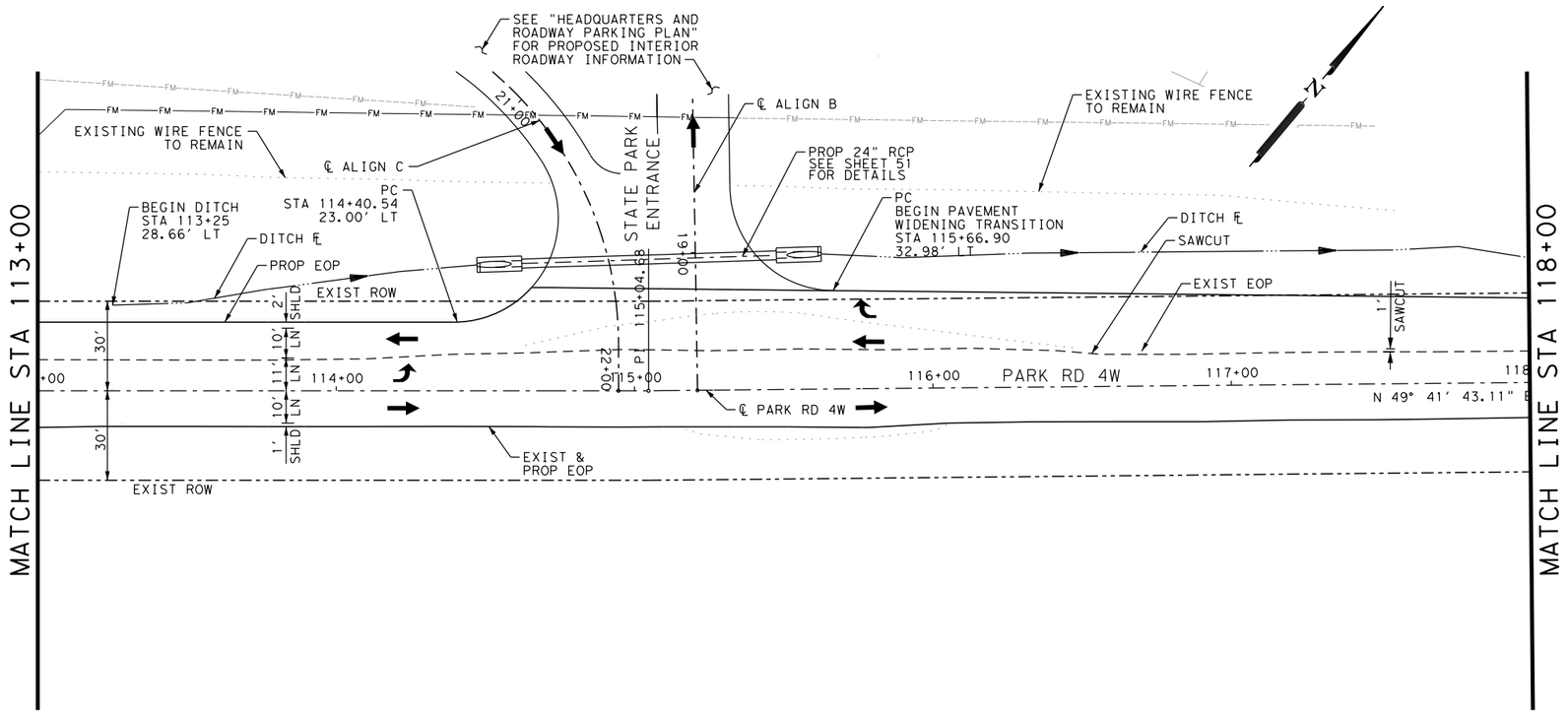

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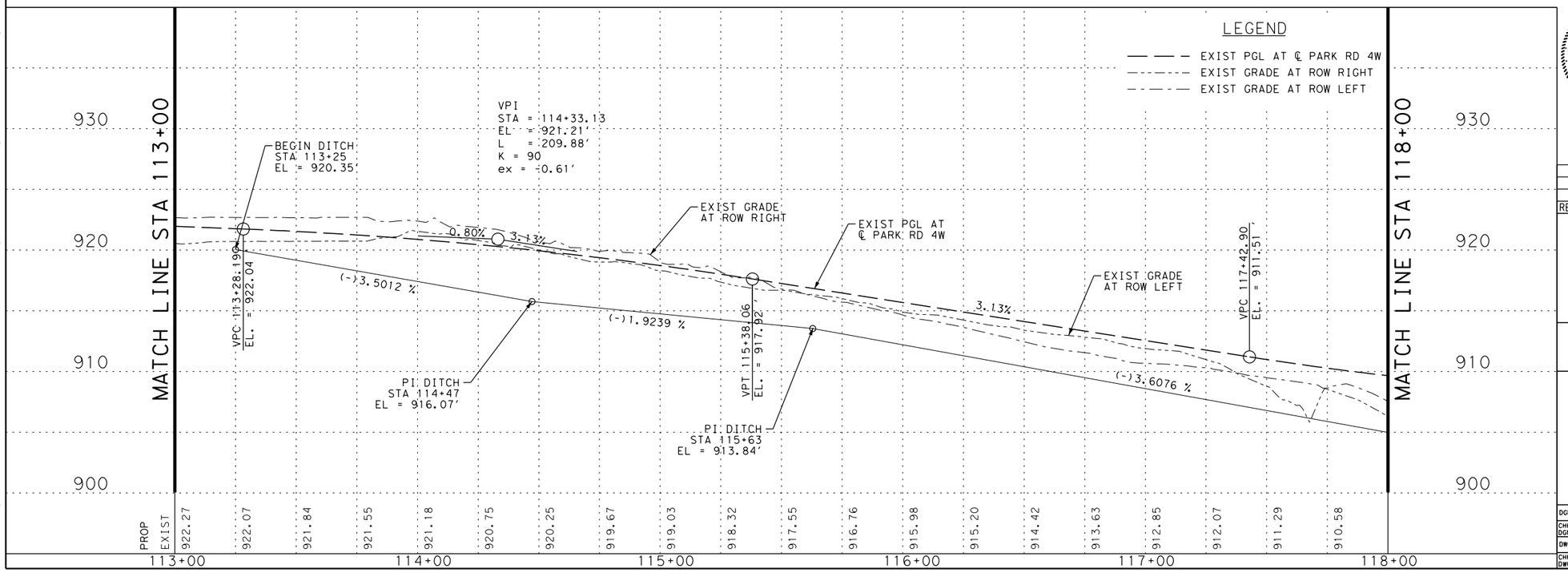

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DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

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SCALE: PLAN 1"= 50' PROFILE 1"= 10'

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10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

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ROADWAY PLAN AND PROFILE

STA 113+00 TO STA 118+00

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
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Plotted on: 3/6/2023

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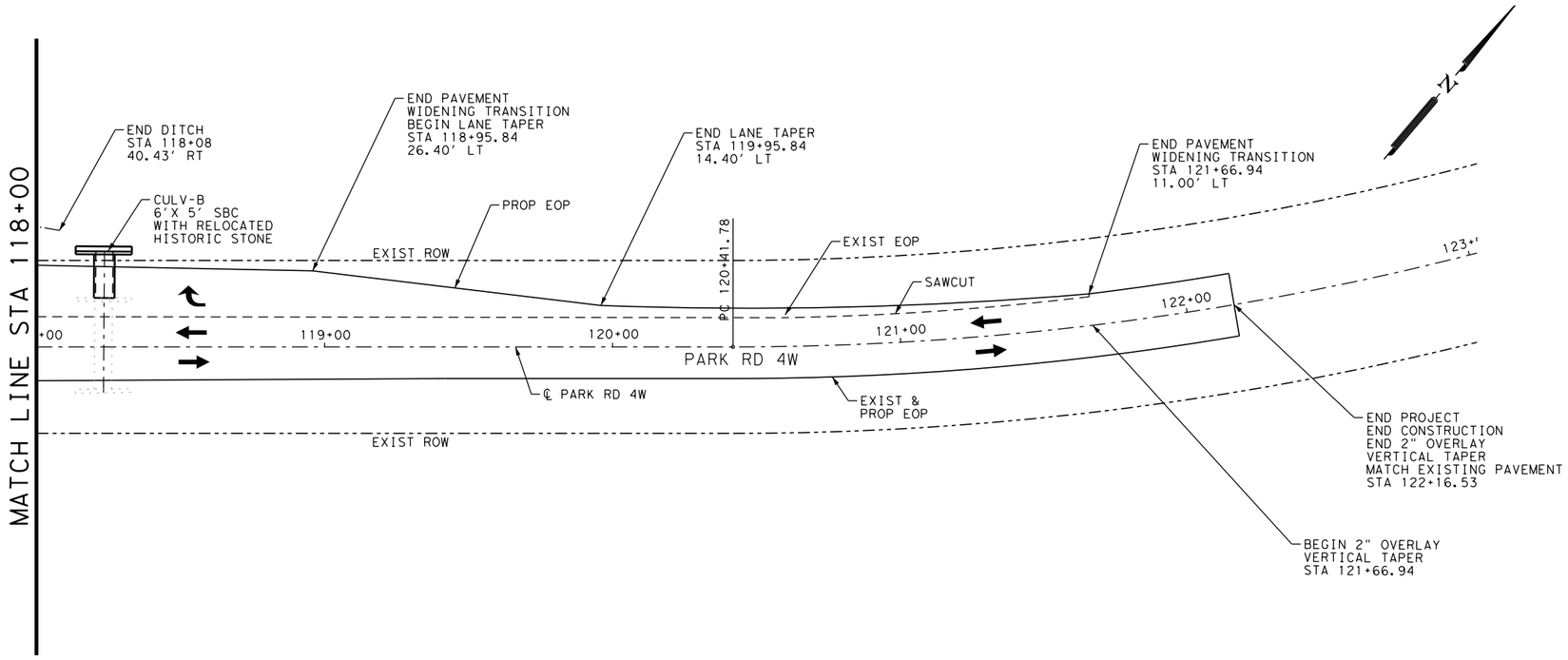

LEGEND

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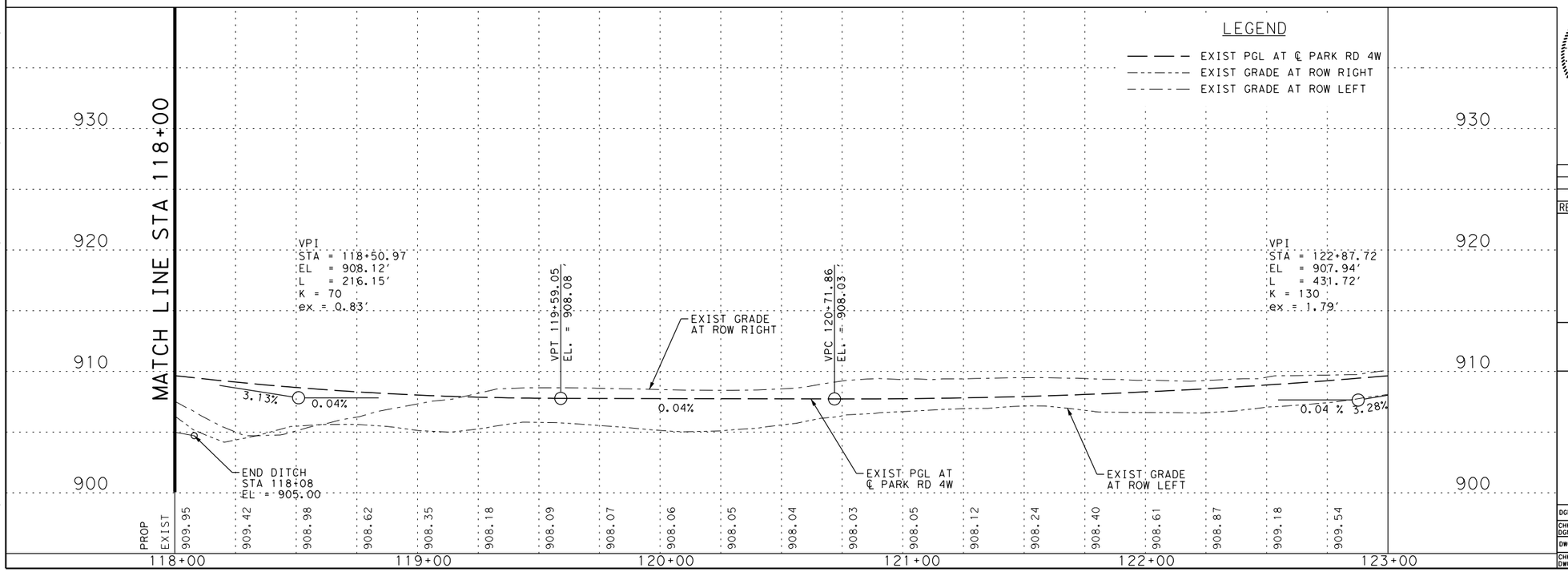

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LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

DENNIS K. SEAL, P.E. — 3/6/2023 DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
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10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

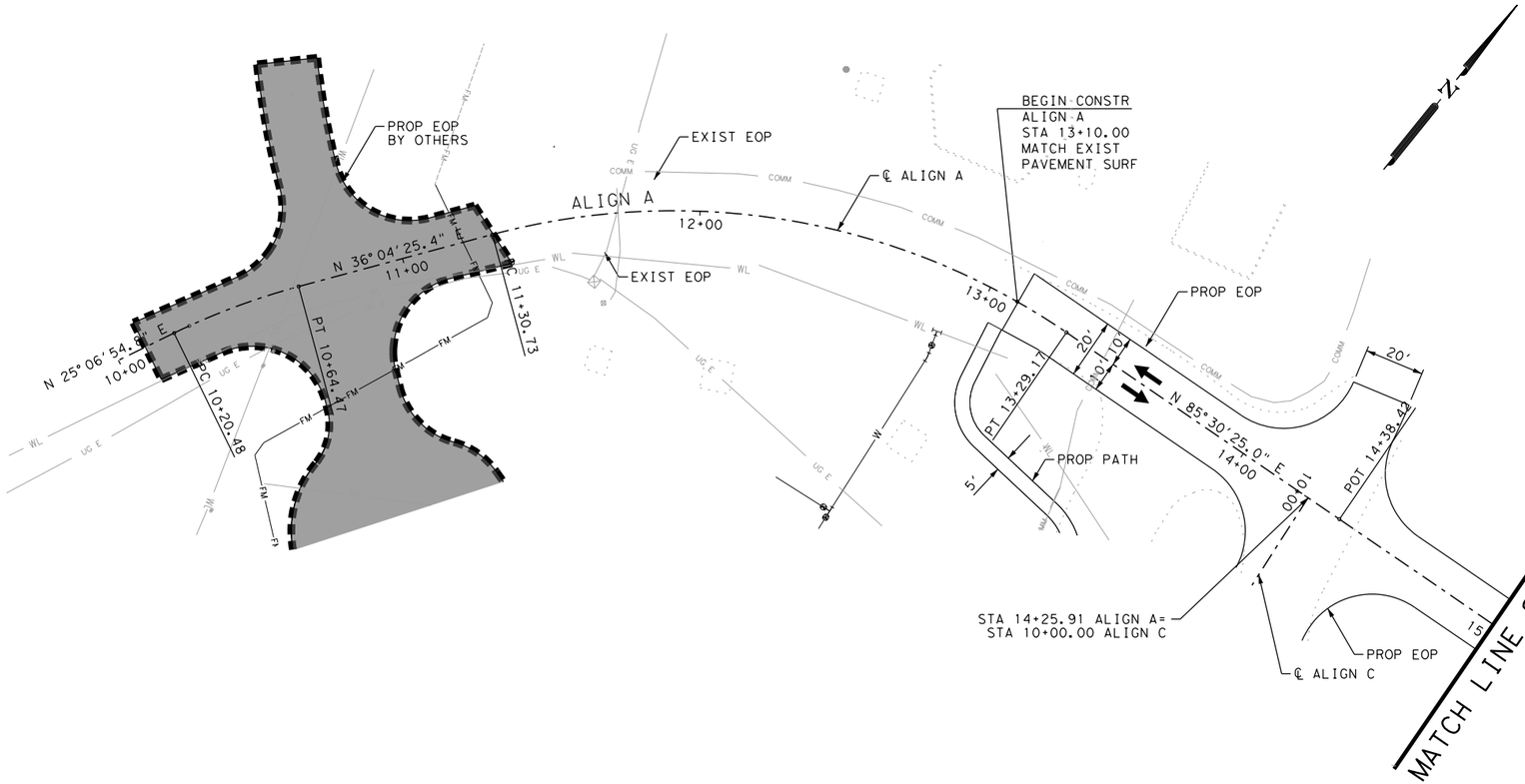
ROADWAY PLAN AND PROFILE

STA 118+00 TO END PROJECT

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	43

Plotted on: 1/27/2023



LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- UG E — EXISTING UG ELECTRIC
- WL — EXISTING WATER LINE
- WWL — EXISTING WASTEWATER LINE
- FM — EXISTING WASTEWATER FORCE MAIN
- COMM — EXISTING COMMUNICATION LINE
- UE — PROP UG ELECTRIC BY OTHERS
- W — PROP WATER LINE BY OTHERS
- WW — PROP WASTEWATER LINE BY OTHERS
- FM — PROP WASTEWATER FORCE MAIN BY OTHERS
- T — PROP COMMUNICATION LINE BY OTHERS

NOTES

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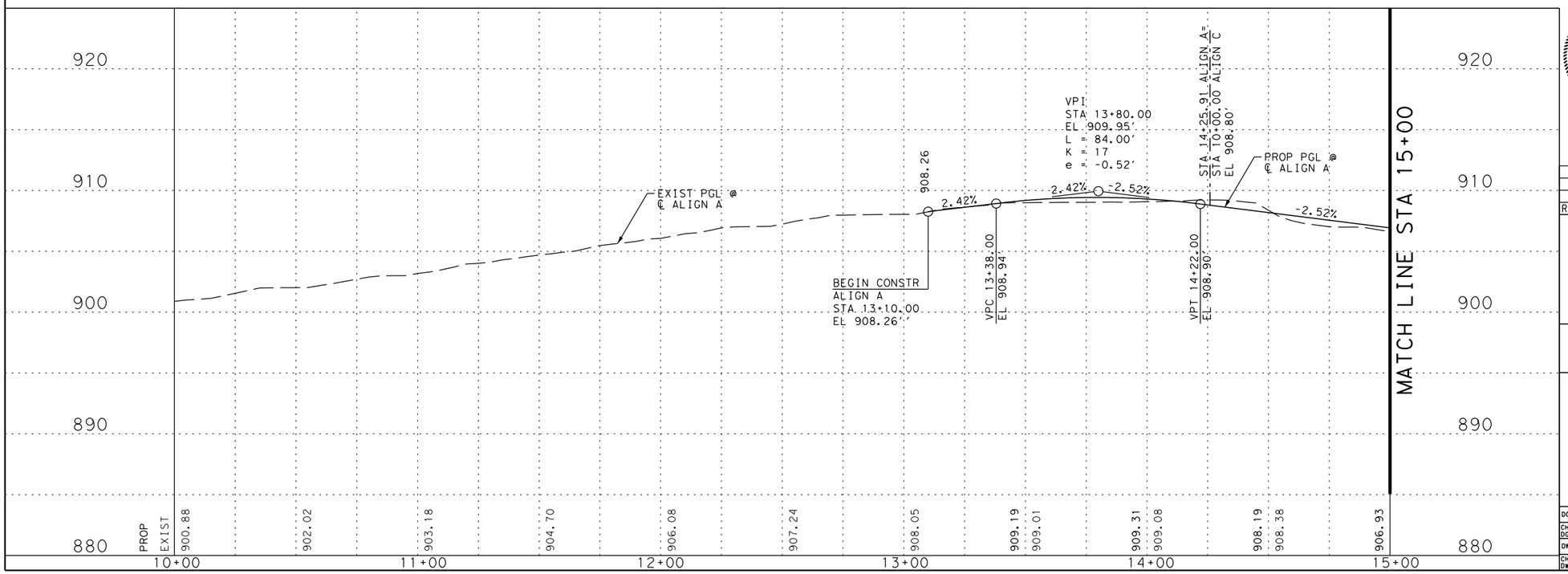

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT A
BEGIN TO STA 15+00

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	44

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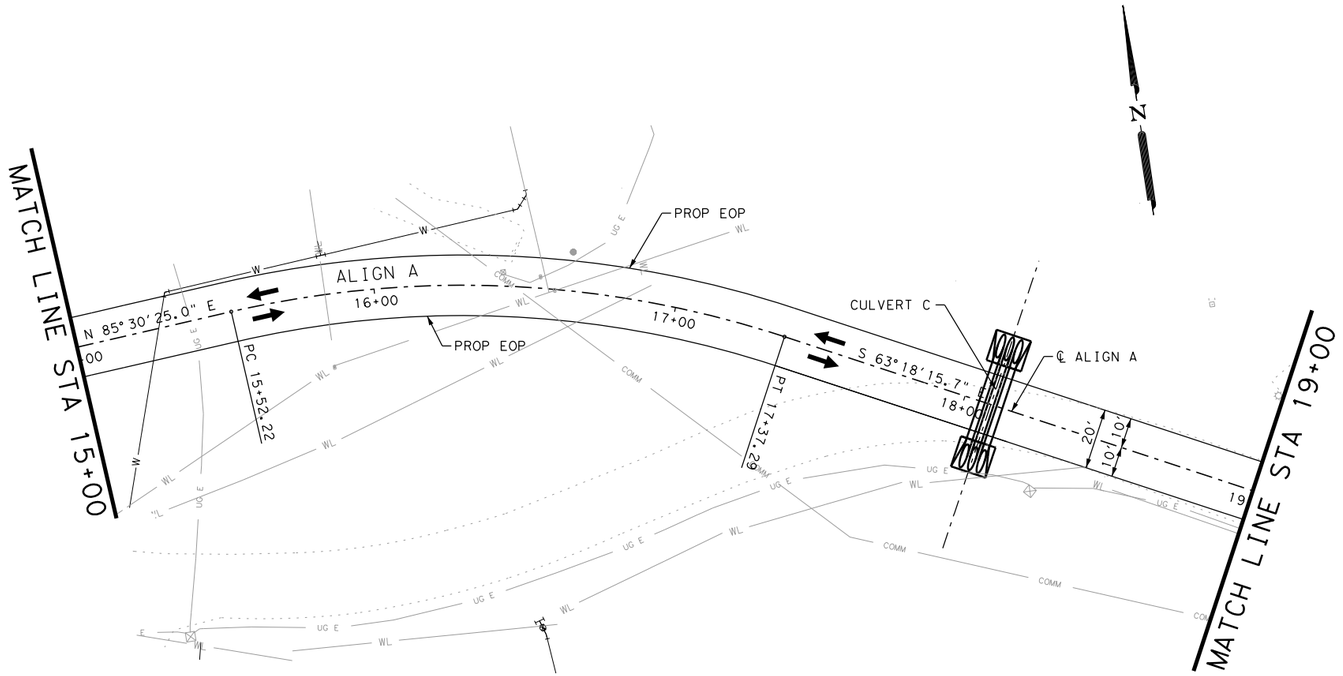

LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- UG E — EXISTING UG ELECTRIC
- WL — EXISTING WATER LINE
- WWL — EXISTING WASTEWATER LINE
- FM — EXISTING WASTEWATER FORCE MAIN
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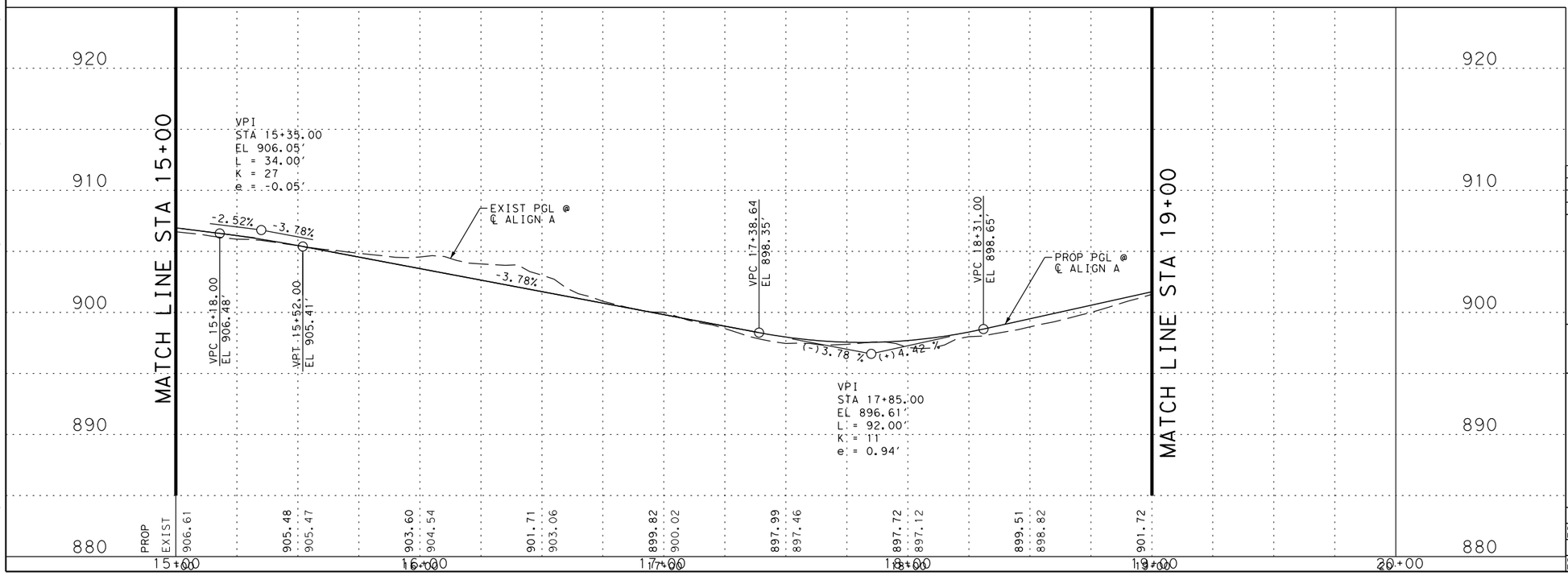

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E.

1/27/2023
DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT A
STA 15+00 TO STA 19+00

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	45

Plotted on: 1/27/2023

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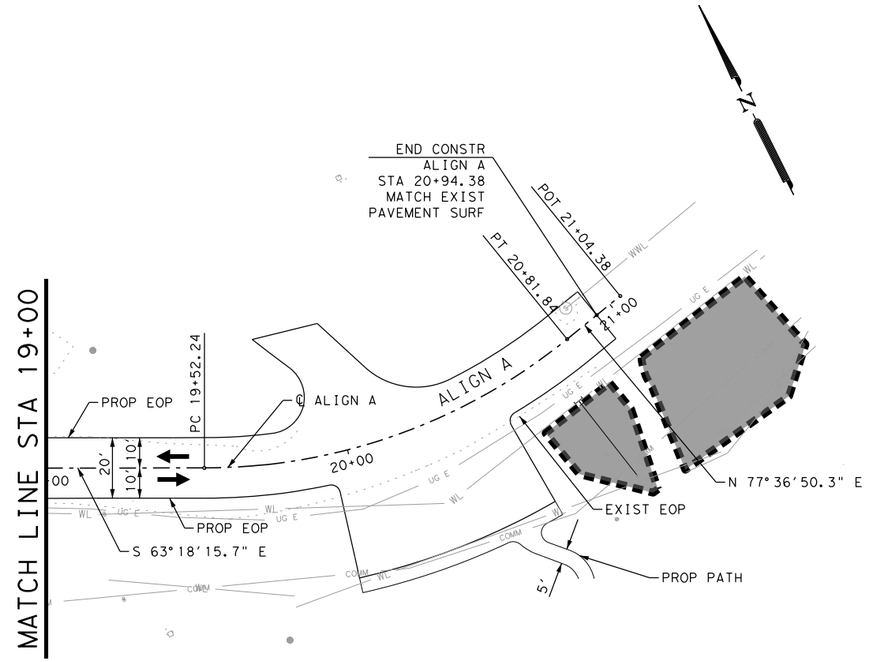

LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
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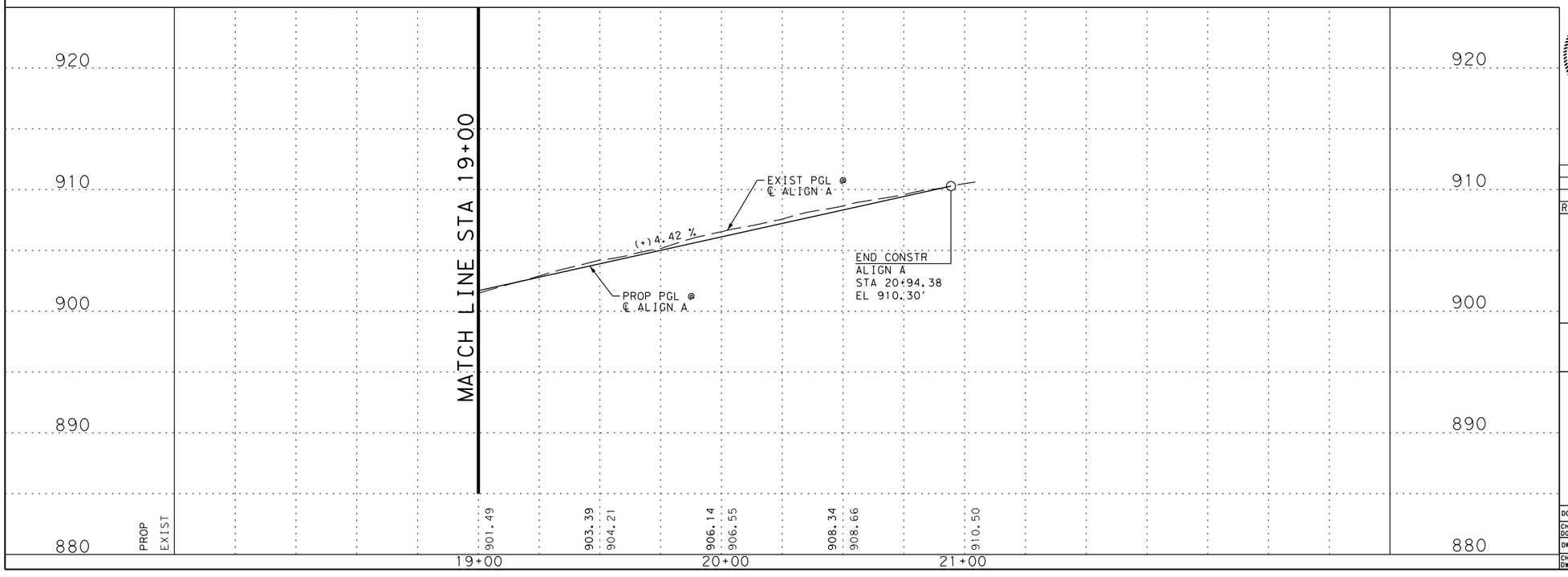


DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50

SCALE: PLAN 1" = 50' PROFILE 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

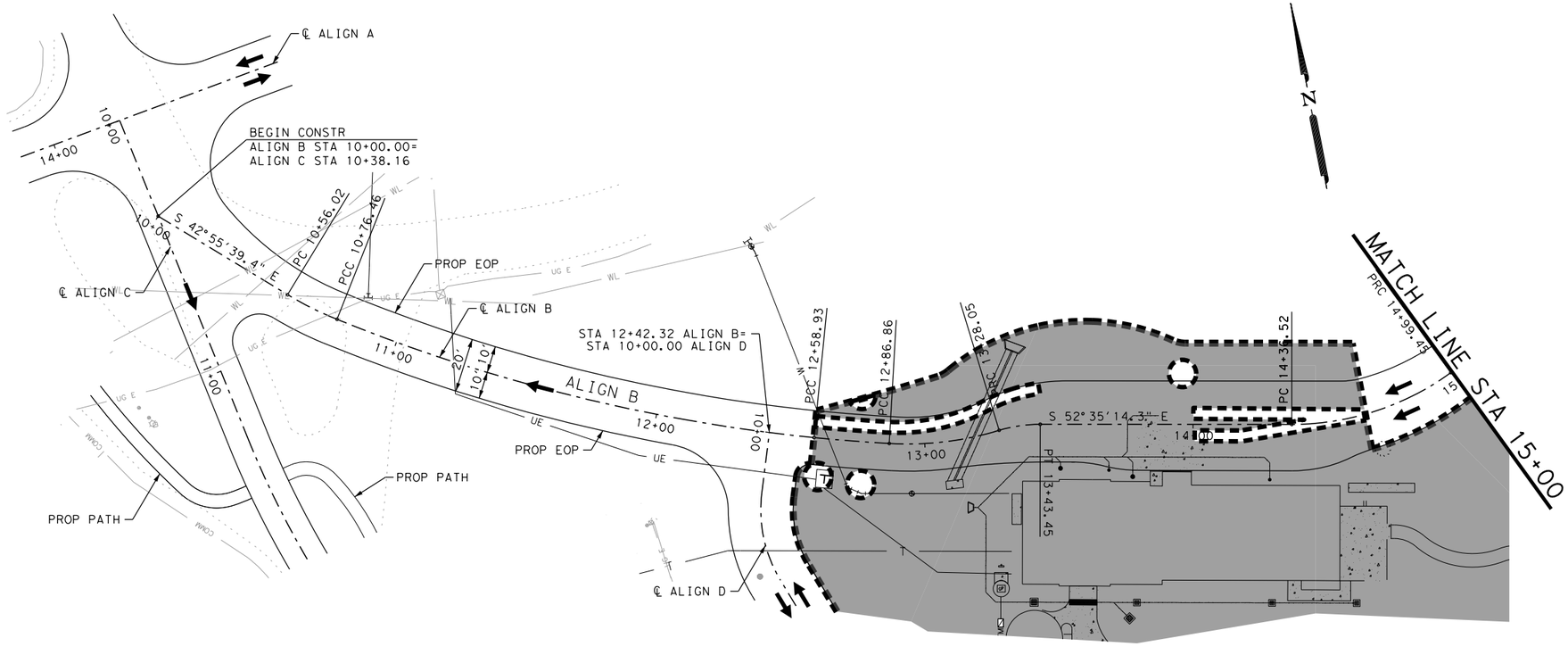
INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT A
STA 19+00 TO END

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	46



LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
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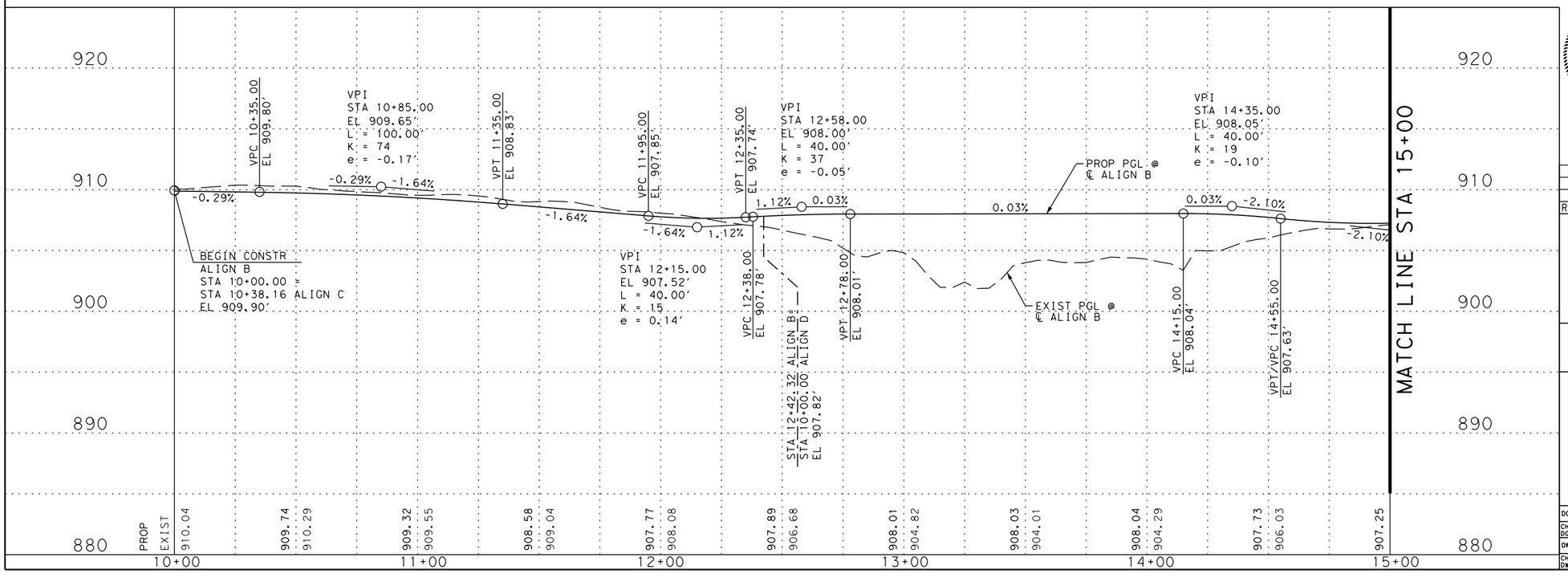


STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E.

1/27/2023
DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

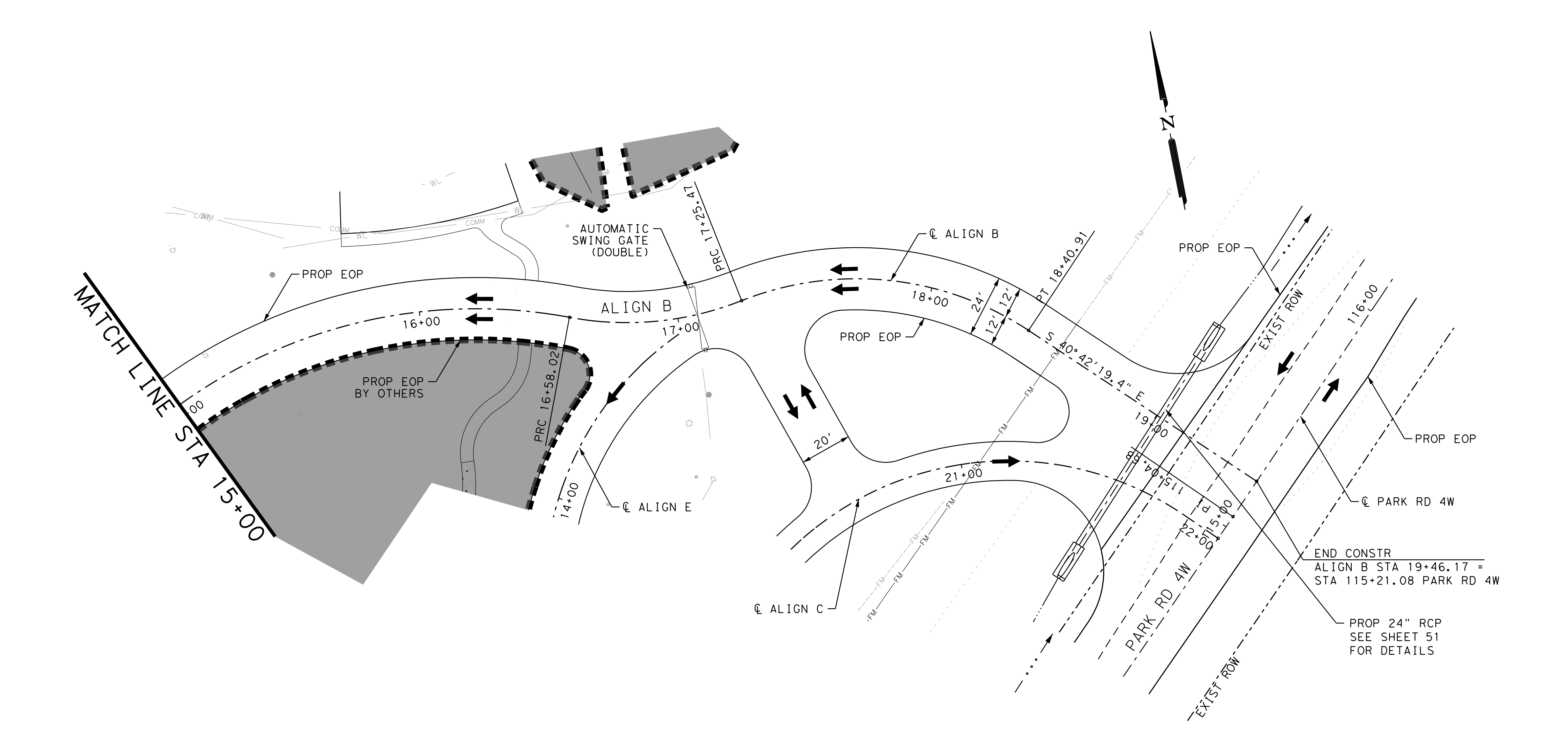
INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT B
BEGIN TO STA 15+00

SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	47



LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
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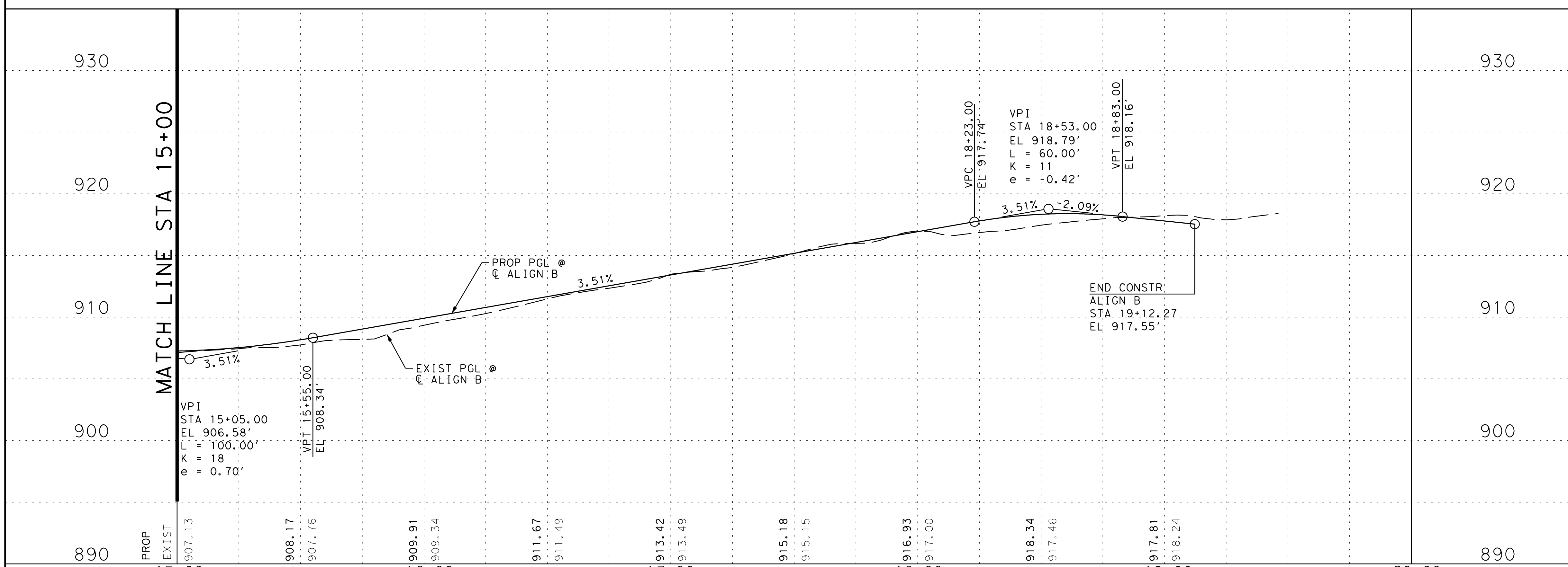

DENNIS K. SEAL, P.E. — STATE OF TEXAS — DENNIS K. SEAL — 80287 — LICENSED PROFESSIONAL ENGINEER
1/30/2023
DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT B
STA 15+00 TO END

SHEET 2 OF 2

FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
6	TEXAS	C 914-24-25			VA
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
AUS	BURNET	0914	24	025	48

DGN: CHK DGN: DWG: CHK DWG:

Plotted on: 1/27/2023

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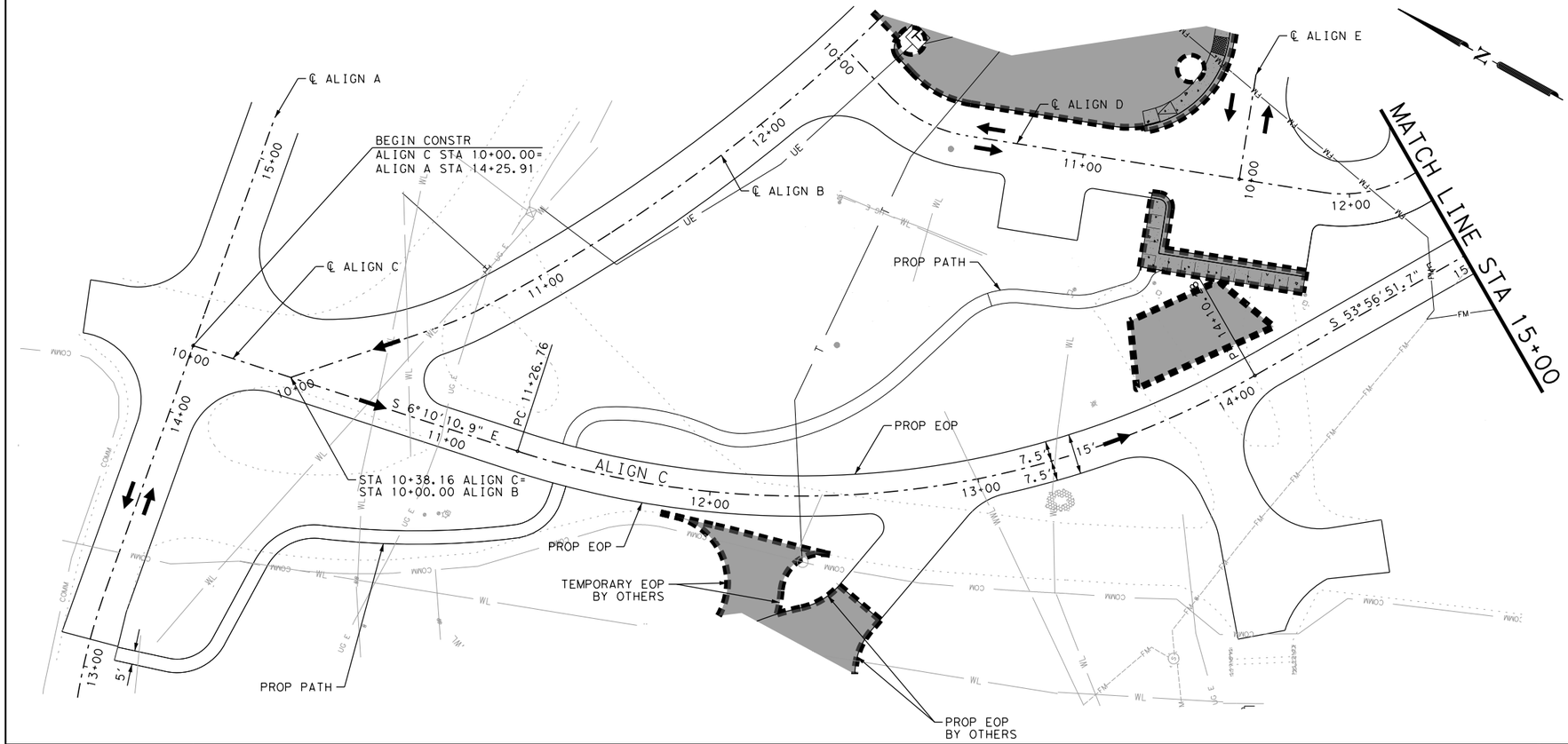

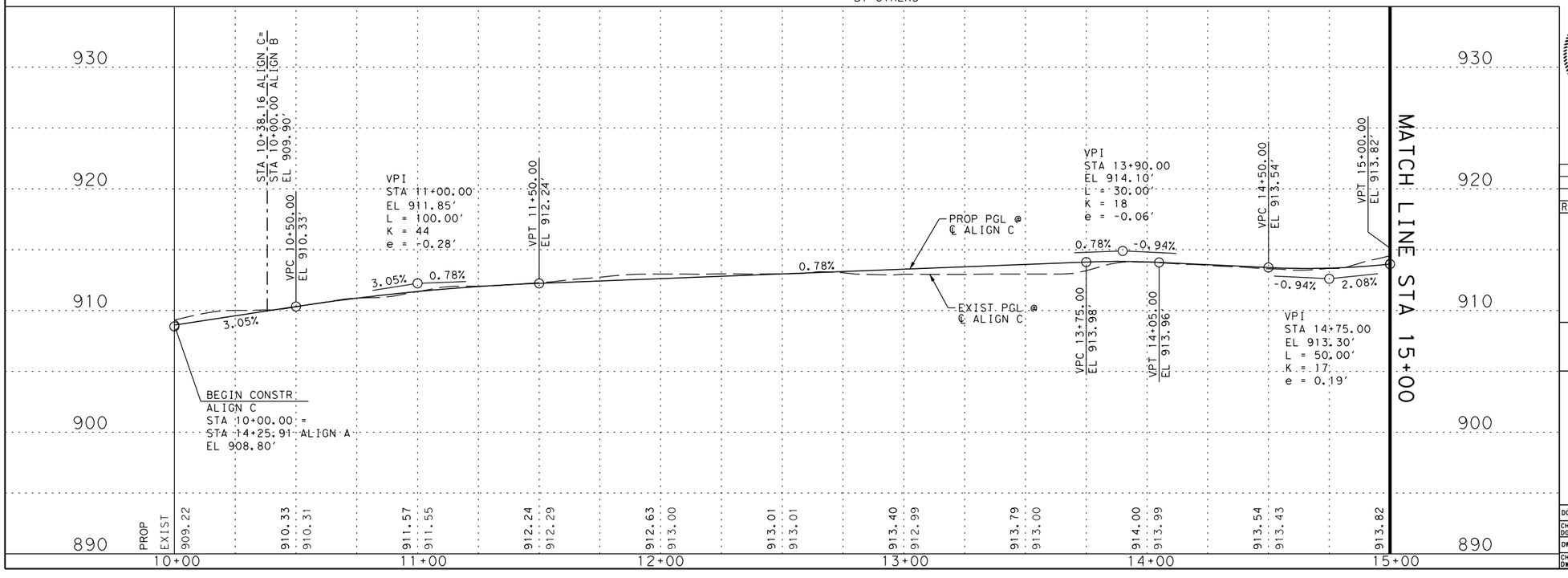

LEGEND

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STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50

SCALE: PLAN 1" = 50' PROFILE 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

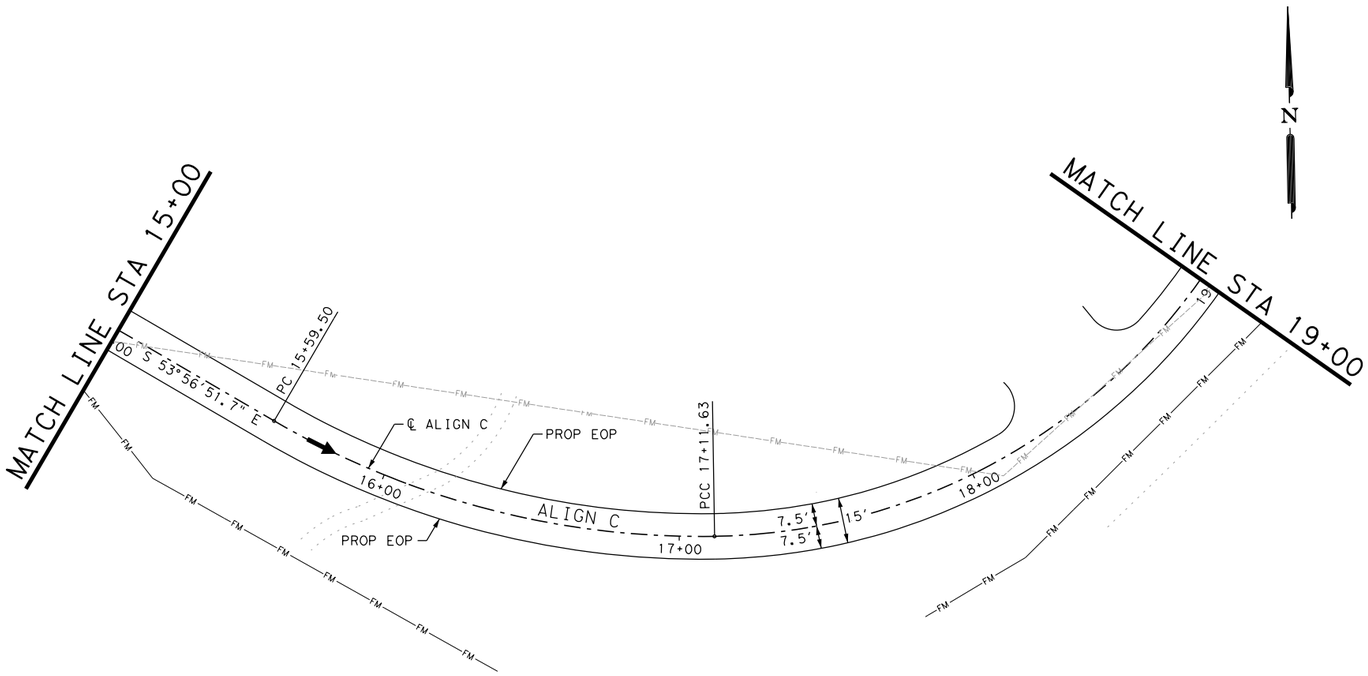
INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT C
BEGIN TO STA 15+00

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	49



LEGEND

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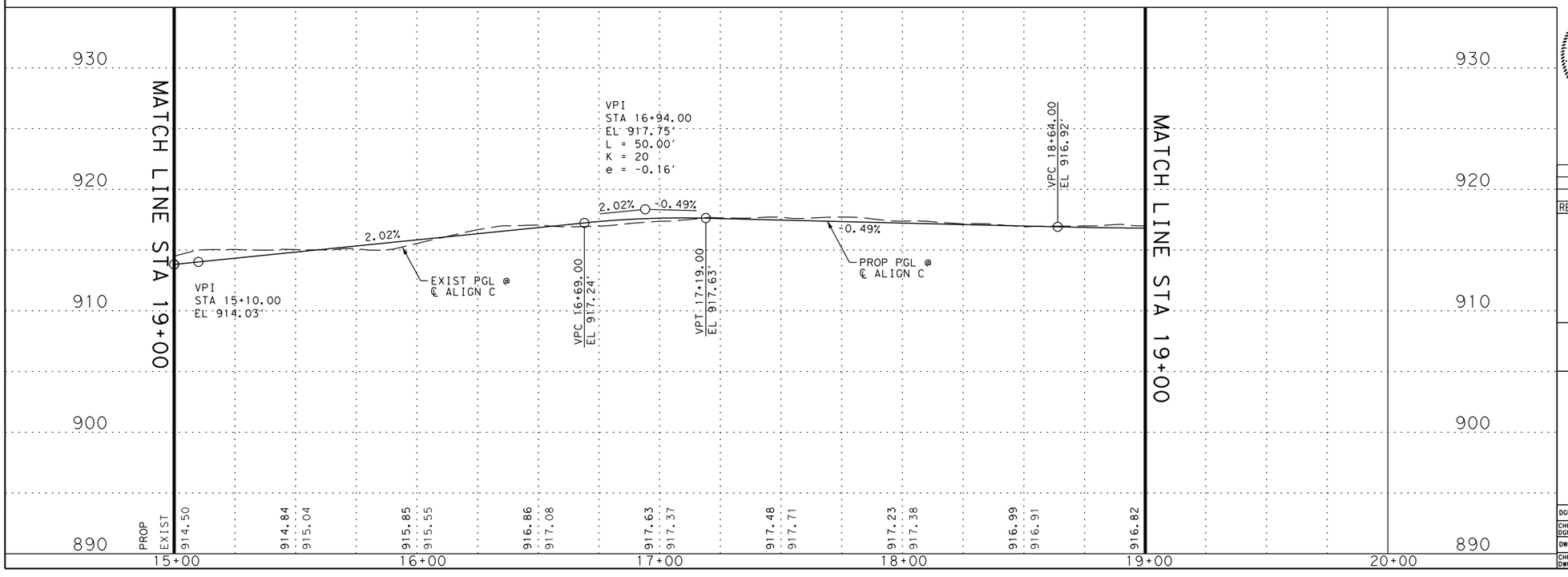


STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E.

1/27/2023
DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

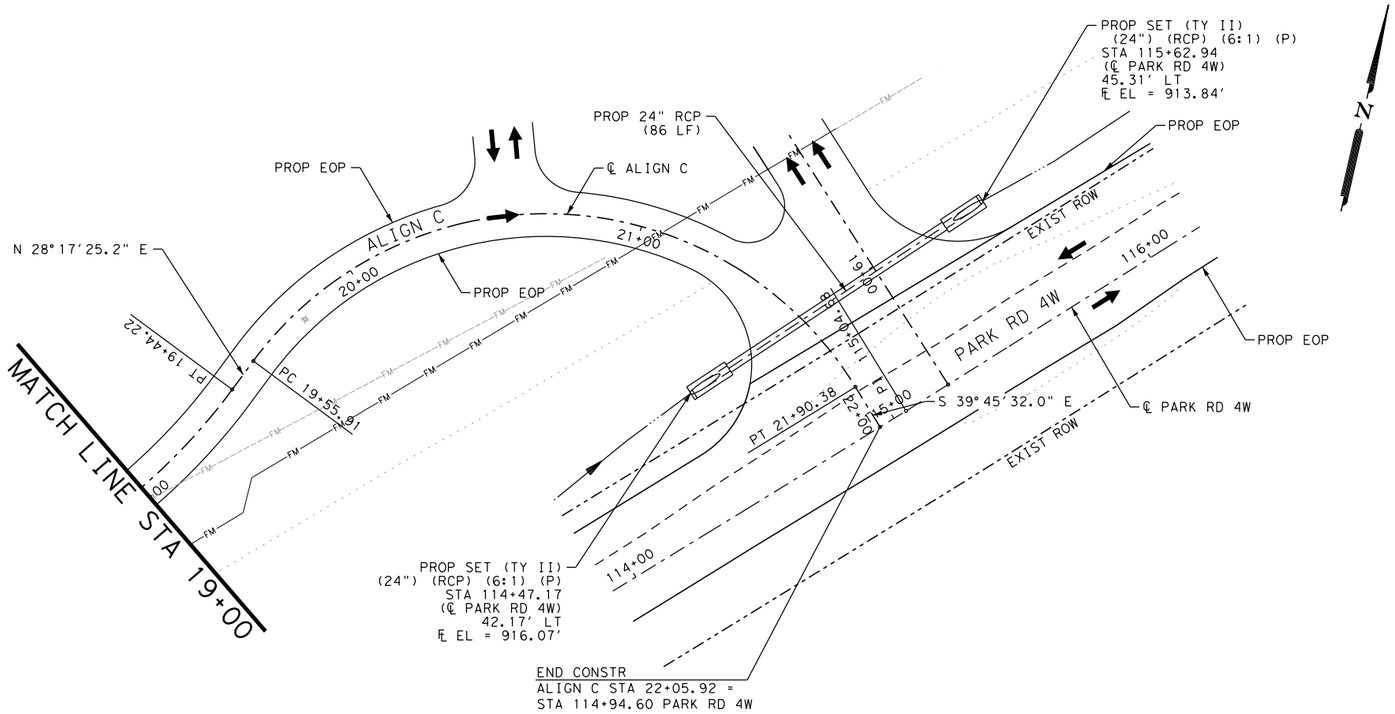
INKS LAKE

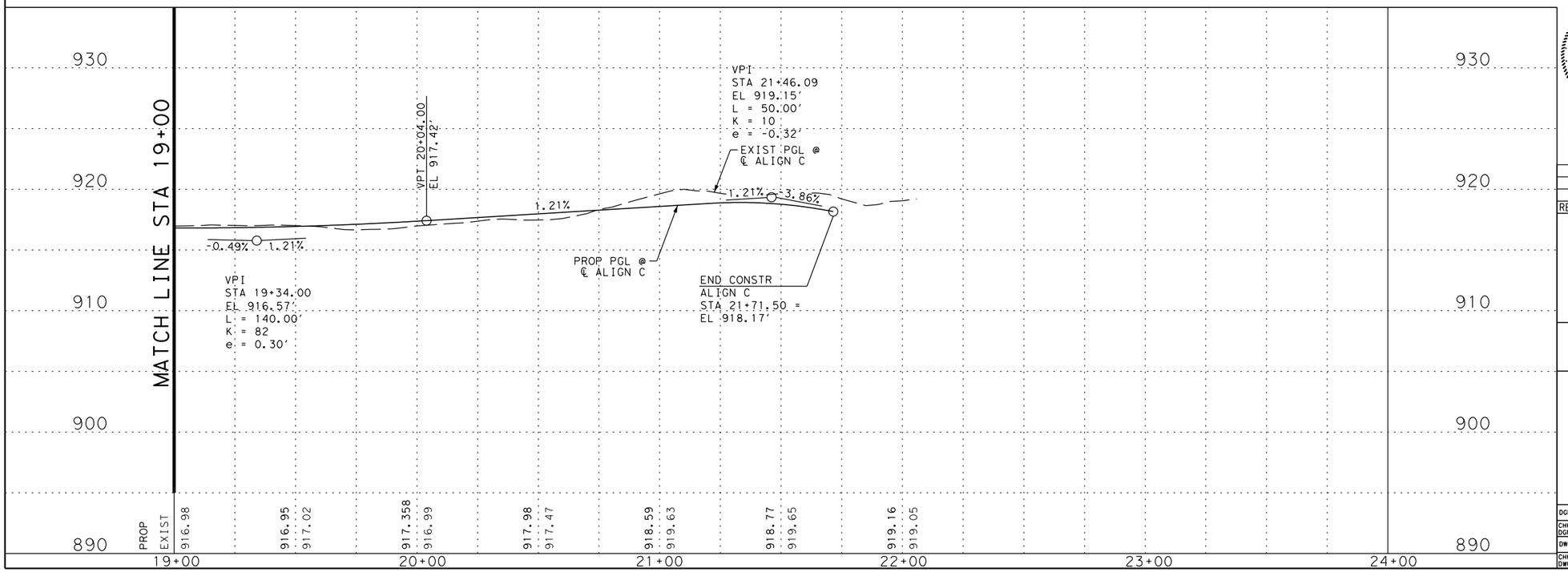
PAVING PLAN AND PROFILE

ALIGNMENT C
STA 15+00 TO STA 19+00

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	50





LEGEND

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SCALE: PLAN 1"= 50' PROFILE 1"= 10'

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PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PAVING PLAN AND PROFILE

ALIGNMENT C
STA 19+00 TO END

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	51

Plotted on: 1/27/2023

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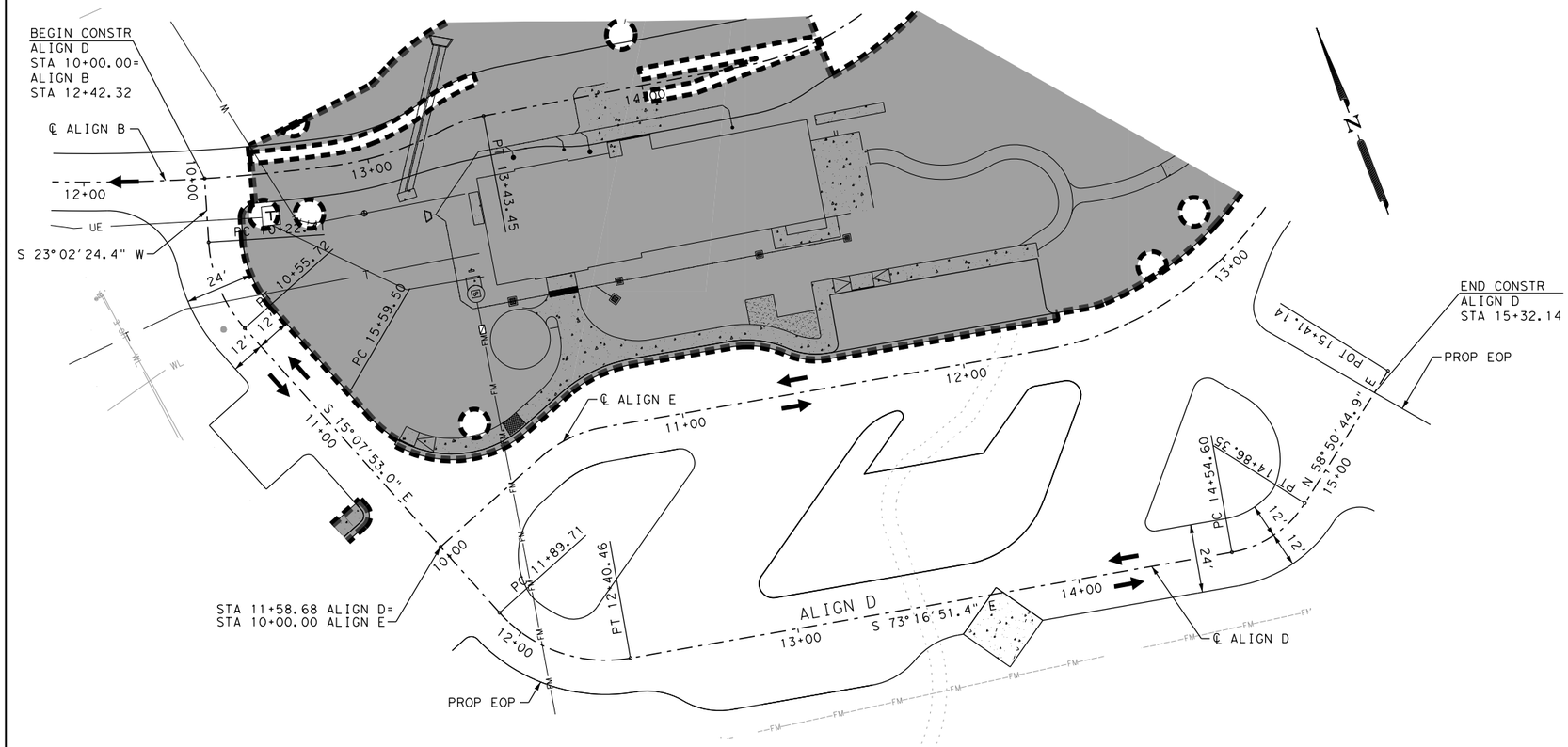
Plotted on: 1/27/2023

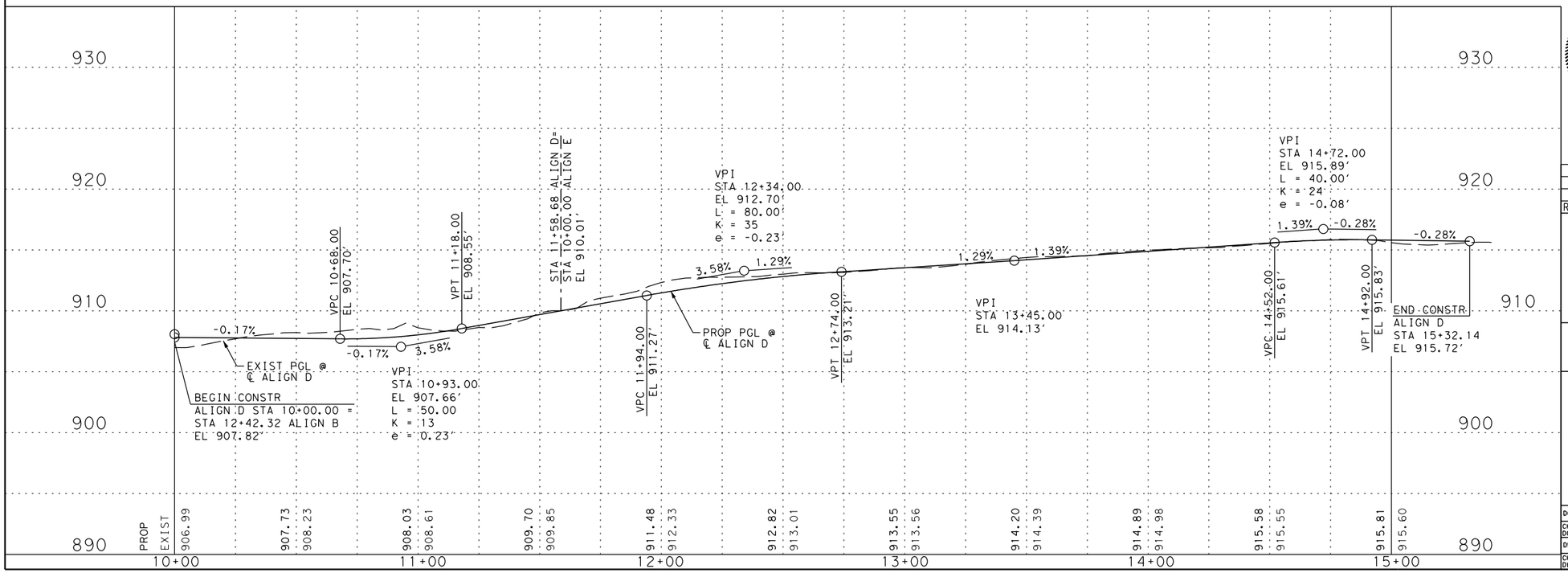


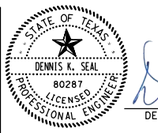
LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- UG E — EXISTING UG ELECTRIC
- WL — EXISTING WATER LINE
- WWL — EXISTING WASTEWATER LINE
- FM — EXISTING WASTEWATER FORCE MAIN
- COMM — EXISTING COMMUNICATION LINE
- UE — PROP UG ELECTRIC BY OTHERS
- W — PROP WATER LINE BY OTHERS
- WW — PROP WASTEWATER LINE BY OTHERS
- FM — PROP WASTEWATER FORCE MAIN BY OTHERS
- T — PROP COMMUNICATION LINE BY OTHERS

NOTES

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE "DRIVEWAY DETAILS" SHEETS FOR INTERSECTION DETAILS.
3. ALL TREES WITHIN THE EXISTING STATE RIGHT-OF-WAY IN CONFLICT WITH THE PROPOSED ROADWAY AND DITCH SHALL BE REMOVED UNLESS OTHERWISE NOTED.
4. PROPOSED PAVEMENT SLOPES OF ALL WIDENINGS SHALL MATCH THE ADJACENT EXISTING CROSS SLOPES UNLESS OTHERWISE NOTED.
5. ANY EXISTING CONFLICTING FEATURES WILL BE REMOVED USING ITEM 100: PREP ROW.
6. EXISTING FENCE WILL BE REMOVED FOR ENTRY SUBSIDIARY TO ITEM 100: PREP ROW.





DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

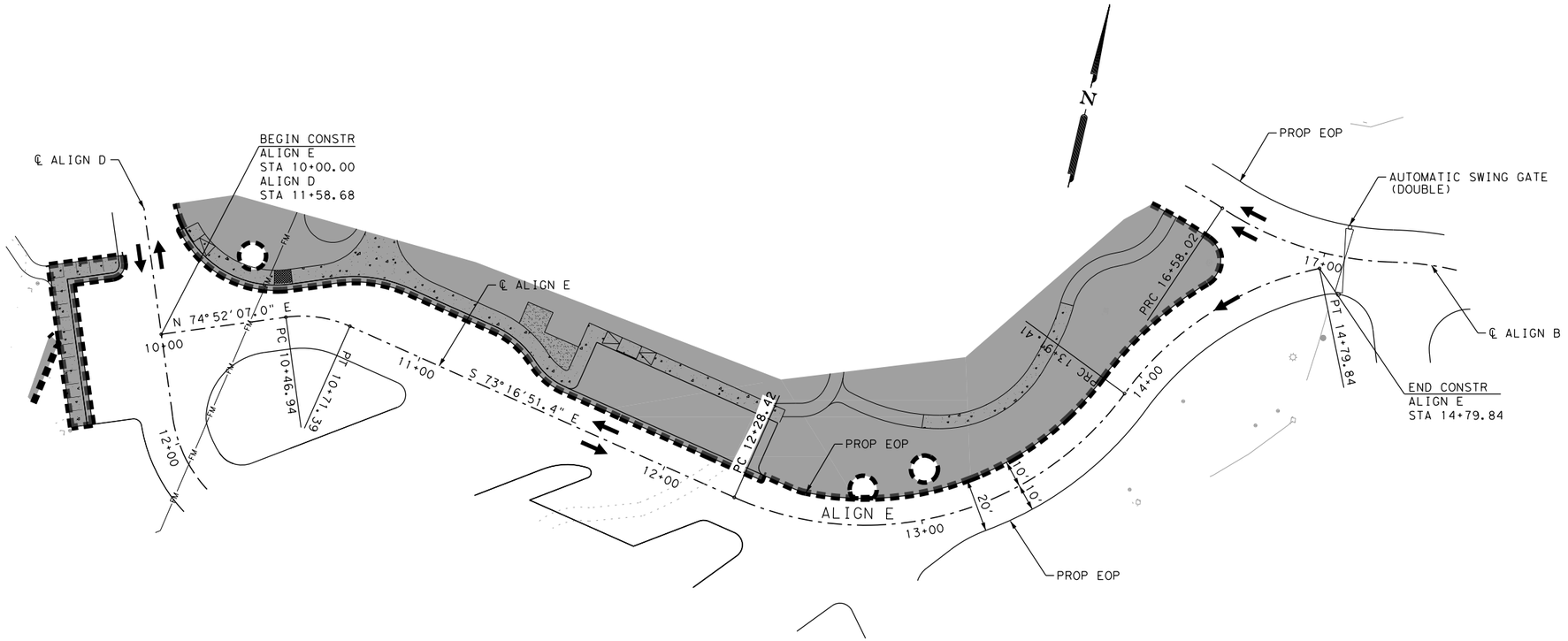
PAVING PLAN AND PROFILE

ALIGNMENT D
STA 10+00 TO END

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	52

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_PP01_D.dgn



LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- SAWCUT LINE
- EXISTING FEATURES
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- DITCH FLOW CENTERLINE
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- UG E — EXISTING UG ELECTRIC
- WL — EXISTING WATER LINE
- WWL — EXISTING WASTEWATER LINE
- FM — EXISTING WASTEWATER FORCE MAIN
- COMM — EXISTING COMMUNICATION LINE
- UE — PROP UG ELECTRIC BY OTHERS
- W — PROP WATER LINE BY OTHERS
- WW — PROP WASTEWATER LINE BY OTHERS
- FM — PROP WASTEWATER FORCE MAIN BY OTHERS
- T — PROP COMMUNICATION LINE BY OTHERS

NOTES

1. SEE "HORIZONTAL ALIGNMENT DATA" SHEETS FOR HORIZONTAL ALIGNMENT DATA.
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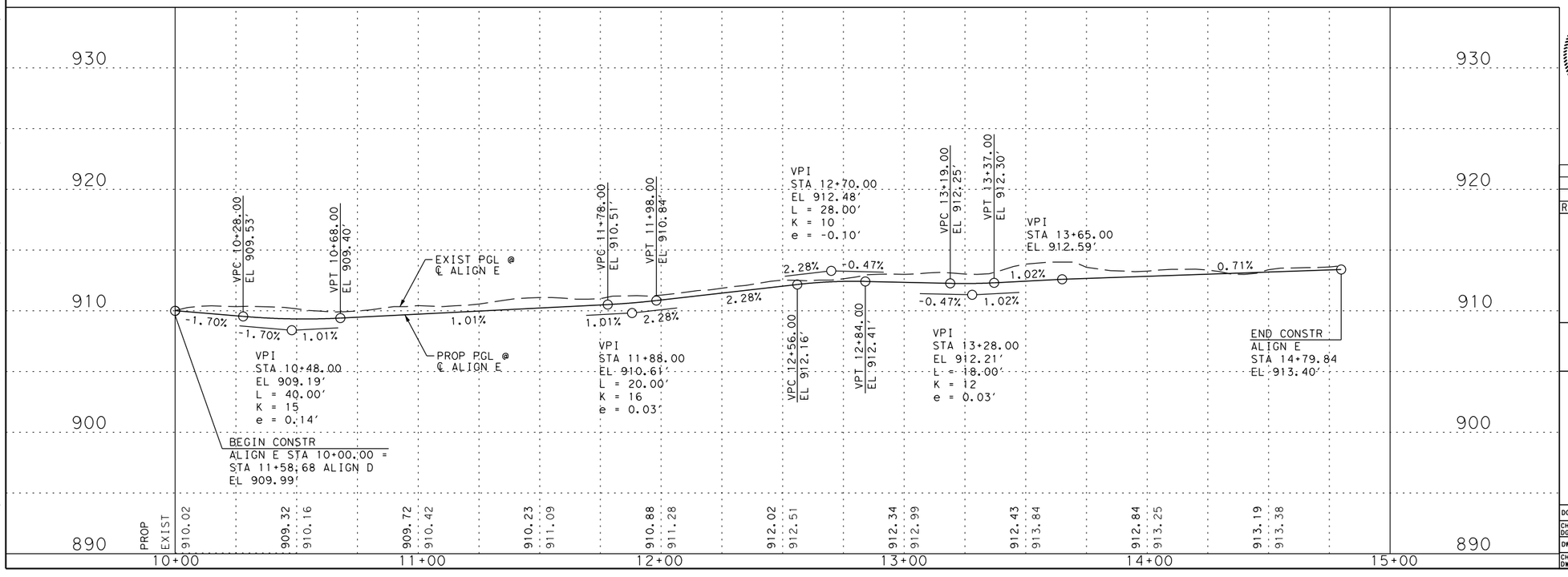
3. ALL TREES WITHIN THE EXISTING STATE RIGHT-OF-WAY IN CONFLICT WITH THE PROPOSED ROADWAY AND DITCH SHALL BE REMOVED UNLESS OTHERWISE NOTED.
4. PROPOSED PAVEMENT SLOPES OF ALL WIDENINGS SHALL MATCH THE ADJACENT EXISTING CROSS SLOPES UNLESS OTHERWISE NOTED.
5. ANY EXISTING CONFLICTING FEATURES WILL BE REMOVED USING ITEM 100: PREP ROW.
6. EXISTING FENCE WILL BE REMOVED FOR ENTRY SUBSIDIARY TO ITEM 100: PREP ROW.



STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E.

1/30/2023
DATE

0 25 50

SCALE: PLAN 1"= 50' PROFILE 1"= 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

PAVING PLAN AND PROFILE

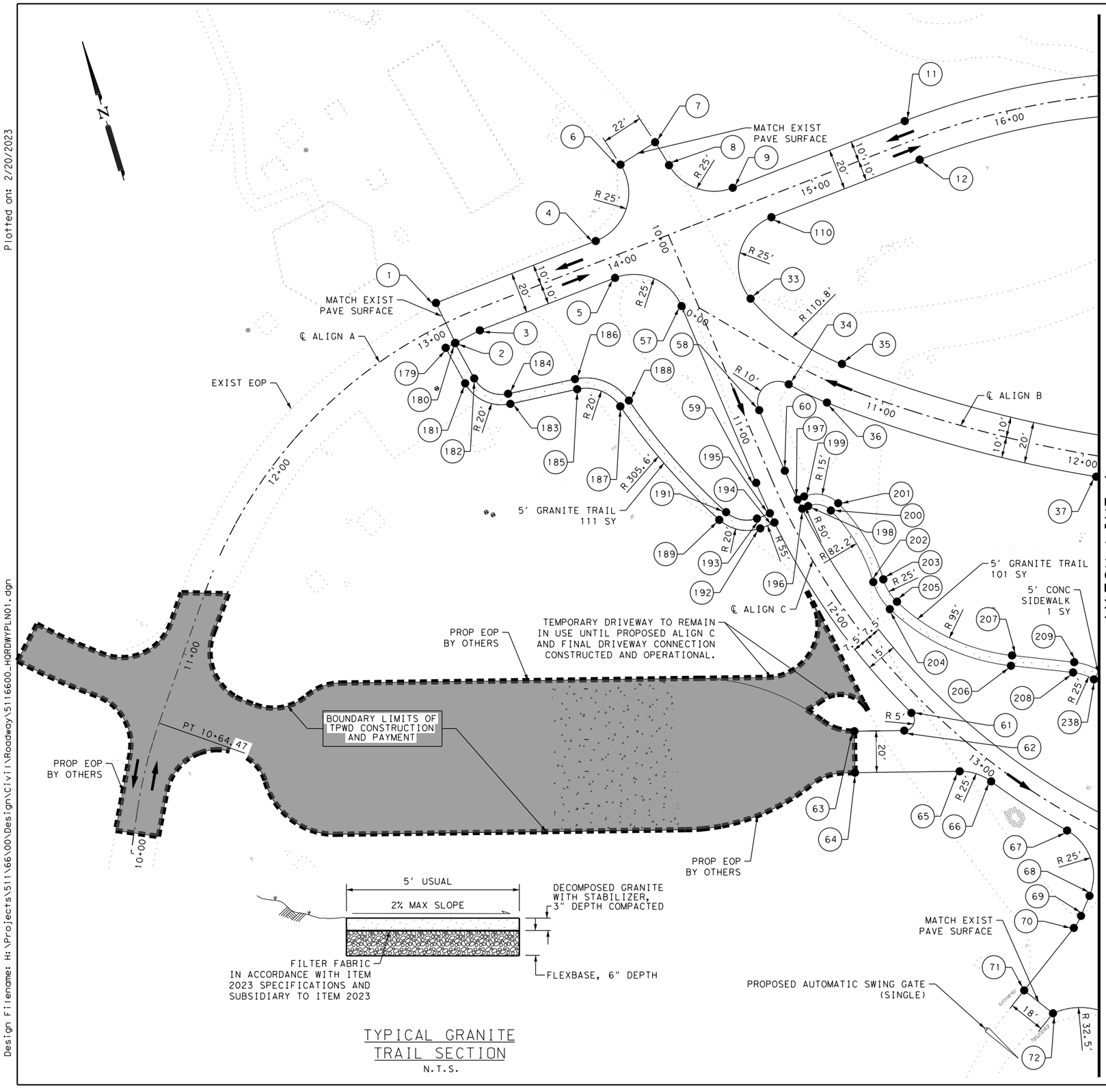
ALIGNMENT E
STA 10+00 TO END

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	53

Plotted on: 2/20/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_HQRDWYPLN01.dgn



TYPICAL GRANITE TRAIL SECTION
N.T.S.

LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- (XXX) POINT NUMBER
- PROPOSED CONCRETE SIDEWALK
- PROPOSED DECOMPOSED GRANITE TRAIL

NOTES:

1. CONTRACTOR WILL REPAIR ANY DAMAGE DONE TO GRAVEL AND CONCRETE SIDEWALKS THROUGHOUT THE DURATION OF THE PROJECT CONSTRUCTION FOR NO EXTRA PAYMENT.
2. TXDOT LIMITS OF CONSTRUCTION AND PAYMENT ARE ALL AREAS OF PROPOSED WORK SHOWN ON PLANS THAT ARE OUTSIDE OF TPWD LIMITS OF CONSTRUCTION BOUNDARIES AS SHOWN ON THIS SHEET.
3. SEE "HEADQUATERS ROADWAY AND PARKING PLAN" SHEET 3 OF 3 FOR POINT INFORMATION.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 2/20/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HEADQUARTERS ROADWAY AND PARKING PLAN

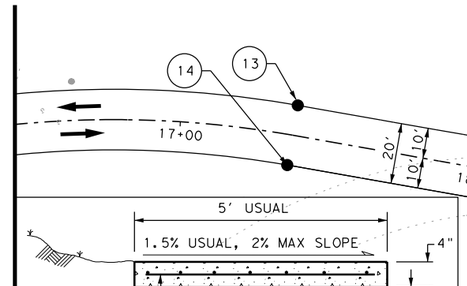
SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	54

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_HQRDWYPLN02.dgn

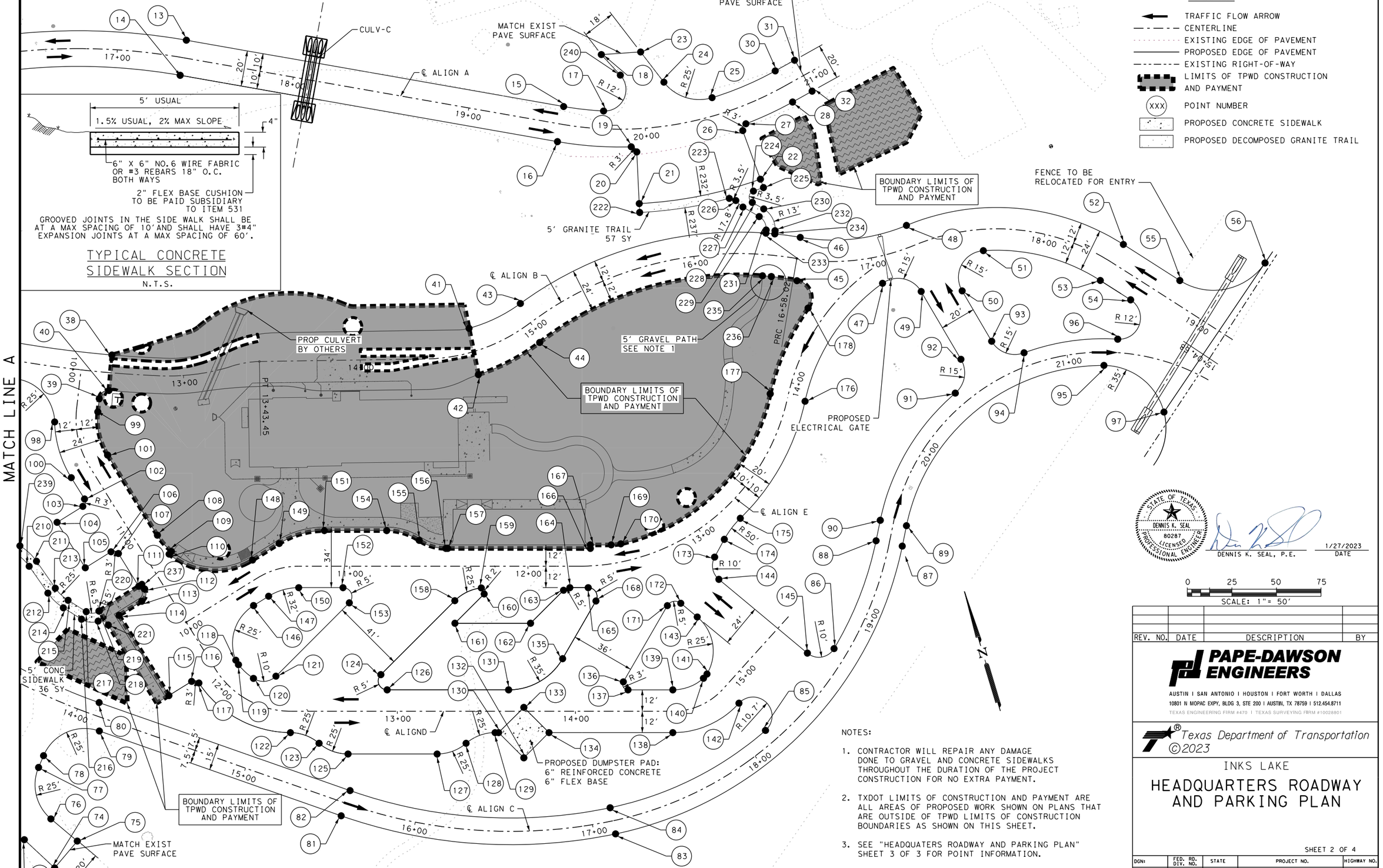
MATCH LINE A



GROOVED JOINTS IN THE SIDE WALK SHALL BE AT A MAX SPACING OF 10' AND SHALL HAVE 3#4" EXPANSION JOINTS AT A MAX SPACING OF 60'.

TYPICAL CONCRETE SIDEWALK SECTION

N.T.S.



LEGEND

- TRAFFIC FLOW ARROW
- CENTERLINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT
- (XXX) POINT NUMBER
- PROPOSED CONCRETE SIDEWALK
- PROPOSED DECOMPOSED GRANITE TRAIL

NOTES:

1. CONTRACTOR WILL REPAIR ANY DAMAGE DONE TO GRAVEL AND CONCRETE SIDEWALKS THROUGHOUT THE DURATION OF THE PROJECT CONSTRUCTION FOR NO EXTRA PAYMENT.
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3. SEE "HEADQUATERS ROADWAY AND PARKING PLAN" SHEET 3 OF 3 FOR POINT INFORMATION.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HEADQUARTERS ROADWAY AND PARKING PLAN

SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	55

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_HQRDWYPLN03.dgn

HEADQUATERS PAVEMENT PLAN POINT LIST							
POINT	NORTH	EAST	ALIGNMENT	STA	OFFSET	RT/LT	ELEV
1	10,238,752.78	2,914,308.52	ALIGNA	13+10.30	10.81	LT	908.42'
2	10,238,731.62	2,914,311.94	ALIGNA	13+10.30	10.62	RT	907.99'
3	10,238,734.02	2,914,325.02	ALIGNA	13+24.20	9.95	RT	908.46'
4	10,238,759.26	2,914,390.99	ALIGNA	13+92.16	10.00	LT	909.62'
5	10,238,739.50	2,914,394.81	ALIGNA	13+94.42	10.00	RT	909.60'
6	10,238,791.15	2,914,413.04	ALIGNA	14+16.64	40.06	LT	907.80'
7	10,238,796.69	2,914,432.17	ALIGNA	14+36.15	44.09	LT	908.63'
8	10,238,784.15	2,914,435.41	ALIGNA	14+38.40	31.33	LT	907.99'
9	10,238,764.82	2,914,461.74	ALIGNA	14+63.13	10.00	LT	907.70'
10	10,238,745.85	2,914,475.54	ALIGNA	14+75.40	10.00	RT	907.78'
11	10,238,771.80	2,914,550.55	ALIGNA	15+52.22	10.00	LT	905.15'
12	10,238,751.86	2,914,552.12	ALIGNA	15+52.22	10.00	RT	905.55'
13	10,238,735.57	2,914,735.21	ALIGNA	17+37.29	10.00	LT	898.18'
14	10,238,717.70	2,914,726.23	ALIGNA	17+37.29	10.00	RT	898.58'
15	10,238,639.01	2,914,927.24	ALIGNA	19+52.24	10.00	LT	903.97'
16	10,238,621.14	2,914,918.26	ALIGNA	19+52.24	10.00	RT	904.37'
17	10,238,630.16	2,914,947.97	ALIGNA	19+76.04	10.00	LT	904.64'
18	10,238,660.85	2,914,955.89	ALIGNA	19+72.47	41.54	LT	904.54'
19	10,238,606.44	2,914,957.06	ALIGNA	19+91.72	10.00	RT	906.19'
20	10,238,602.82	2,914,959.21	ALIGNA	19+94.53	12.98	RT	906.38'
21	10,238,574.65	2,914,952.21	ALIGNA	19+94.53	42.00	RT	906.96'
22	10,238,568.19	2,915,021.26	ALIGNA	20+51.54	42.00	RT	909.96'
23	10,238,655.92	2,914,977.42	ALIGNA	20+00.84	42.86	LT	905.14'
24	10,238,635.91	2,914,985.05	ALIGNA	20+14.21	24.48	LT	906.35'
25	10,238,619.82	2,915,008.46	ALIGNA	20+41.13	10.00	LT	908.06'
26	10,238,597.17	2,915,019.61	ALIGNA	20+51.54	12.98	RT	908.97'
27	10,238,600.33	2,915,022.39	ALIGNA	20+54.35	10.00	RT	909.02'
28	10,238,604.47	2,915,051.01	ALIGNA	20+81.84	10.00	RT	910.02'
30	10,238,624.01	2,915,046.72	ALIGNA	20+81.84	10.00	LT	909.62'
31	10,238,626.70	2,915,058.97	ALIGNA	20+94.38	10.00	LT	909.81'
32	10,238,607.17	2,915,063.26	ALIGNA	20+94.38	10.00	RT	910.60'
33	10,238,710.92	2,914,454.58	ALIGNB	10+19.32	16.25	LT	909.19'
34	10,238,666.17	2,914,460.35	ALIGNB	10+56.02	10.00	RT	909.94'
35	10,238,668.03	2,914,487.80	ALIGNB	10+74.98	10.01	LT	909.38'
36	10,238,652.28	2,914,475.48	ALIGNB	10+75.01	10.00	RT	909.78'
37	10,238,580.71	2,914,589.71	ALIGNB	12+07.96	10.00	RT	907.96'
38	10,238,578.40	2,914,644.40	ALIGNB	12+58.93	10.00	LT	907.49'
39	10,238,557.10	2,914,630.61	ALIGNB	12+54.05	14.89	RT	907.81'
40	10,238,559.80	2,914,637.05	ALIGNB	12+58.93	10.00	RT	908.20'
41	10,238,535.05	2,914,840.60	ALIGNB	14+65.51	13.20	LT	907.15'
42	10,238,508.69	2,914,838.15	ALIGNB	14+63.03	13.16	RT	907.71'
43	10,238,540.11	2,914,872.19	ALIGNB	15+01.80	12.00	LT	907.01'
44	10,238,516.05	2,914,876.28	ALIGNB	14+97.68	12.03	RT	907.47'
45	10,238,508.04	2,915,024.50	ALIGNB	16+59.88	12.03	RT	912.20'
46	10,238,530.49	2,915,033.28	ALIGNB	16+57.96	12.00	LT	911.65'
47	10,238,492.54	2,915,070.09	ALIGNB	17+03.28	15.15	RT	913.94'
48	10,238,519.77	2,915,092.28	ALIGNB	17+25.47	12.00	LT	914.02'
49	10,238,481.89	2,915,089.52	ALIGNB	17+20.03	25.56	RT	915.45'
50	10,238,475.62	2,915,111.62	ALIGNB	17+45.84	32.63	RT	915.63'
51	10,238,493.79	2,915,129.51	ALIGNB	17+64.36	12.00	RT	915.73'
52	10,238,474.54	2,915,205.75	ALIGNB	18+40.91	12.00	LT	917.24'
53	10,238,458.89	2,915,187.55	ALIGNB	18+40.91	12.00	RT	917.72'
54	10,238,443.58	2,915,200.72	ALIGNB	18+61.10	12.00	RT	917.93'
55	10,238,446.03	2,915,230.28	ALIGNB	18+78.53	12.00	LT	917.62'
56	10,238,441.71	2,915,278.91	ALIGNB	19+13.51	46.06	LT	916.58'
57	10,238,717.27	2,914,421.62	ALIGNC	10+34.06	7.50	RT	909.98'
58	10,238,658.29	2,914,443.09	ALIGNC	10+95.01	7.50	LT	911.34'
59	10,238,625.11	2,914,431.59	ALIGNC	11+26.76	7.50	RT	912.11'
60	10,238,626.72	2,914,446.50	ALIGNC	11+26.76	7.50	LT	911.81'
61	10,238,497.12	2,914,471.42	ALIGNC	12+58.73	7.50	RT	913.21'
62	10,238,489.94	2,914,465.65	ALIGNC	12+62.15	16.02	RT	913.17'
63	10,238,496.56	2,914,442.52	ALIGNC	12+46.66	33.43	RT	912.92'
64	10,238,477.33	2,914,437.01	ALIGNC	12+59.64	47.18	RT	912.52'
65	10,238,463.41	2,914,485.64	ALIGNC	12+93.88	12.92	RT	913.05'
66	10,238,454.35	2,914,498.78	ALIGNC	13+08.45	7.50	RT	913.60'
67	10,238,421.08	2,914,527.08	ALIGNC	13+51.22	7.50	RT	913.95'
68	10,238,387.77	2,914,528.35	ALIGNC	13+74.04	30.56	RT	914.40'
69	10,238,379.69	2,914,521.66	ALIGNC	13+74.45	41.04	RT	914.68'
70	10,238,375.10	2,914,516.67	ALIGNC	13+73.90	47.79	RT	914.86'
71	10,238,353.10	2,914,485.02	ALIGNC	13+66.96	85.43	RT	915.90'
72	10,238,338.52	2,914,495.16	ALIGNC	13+80.73	89.43	RT	916.01'
73	10,238,332.02	2,914,519.07	ALIGNC	13+98.82	79.23	RT	916.50'
74	10,238,311.90	2,914,530.77	ALIGNC	14+17.46	88.37	RT	917.02'
75	10,238,322.71	2,914,547.30	ALIGNC	14+24.46	69.90	RT	916.40'
76	10,238,338.90	2,914,536.72	ALIGNC	14+06.99	63.06	RT	915.88'
77	10,238,368.53	2,914,538.39	ALIGNC	13+92.32	38.64	RT	915.04'
78	10,238,374.06	2,914,542.97	ALIGNC	13+92.38	31.46	RT	914.85'
79	10,238,378.32	2,914,576.93	ALIGNC	14+15.69	7.50	RT	914.00'
80	10,238,393.63	2,914,581.39	ALIGNC	14+10.28	7.50	LT	913.76'
81	10,238,293.69	2,914,693.20	ALIGNC	15+59.50	7.50	RT	915.17'
82	10,238,305.81	2,914,702.03	ALIGNC	15+59.50	7.50	LT	914.87'
83	10,238,239.69	2,914,837.73	ALIGNC	17+11.63	7.50	RT	917.81'
84	10,238,254.63	2,914,839.02	ALIGNC	17+11.63	7.50	LT	917.51'
85	10,238,271.09	2,914,935.00	ALIGNC	18+13.91	7.50	LT	917.02'
86	10,238,304.00	2,914,985.05	ALIGNC	18+76.41	7.50	LT	916.70'
87	10,238,348.08	2,915,038.25	ALIGNC	19+44.22	7.50	RT	916.71'

HEADQUATERS PAVEMENT PLAN POINT LIST							
POINT	NORTH	EAST	ALIGNMENT	STA	OFFSET	RT/LT	ELEV
88	10,238,355.19	2,915,025.04	ALIGNC	19+44.22	7.50	LT	916.41'
89	10,238,358.38	2,915,043.80	ALIGNC	19+55.91	7.50	RT	916.75'
90	10,238,365.51	2,915,030.60	ALIGNC	19+55.94	7.50	LT	916.45'
91	10,238,421.72	2,915,091.42	ALIGNC	20+35.33	7.50	LT	917.93'
92	10,238,438.99	2,915,099.95	ALIGNC	20+47.95	20.64	LT	917.71'
93	10,238,443.74	2,915,119.37	ALIGNC	20+65.03	20.65	LT	917.31'
94	10,238,432.31	2,915,134.89	ALIGNC	20+77.65	7.50	LT	918.84'
95	10,238,412.64	2,915,175.78	ALIGNC	21+20.79	7.50	RT	919.57'
96	10,238,424.52	2,915,187.43	ALIGNC	21+28.01	7.50	LT	919.26'
97	10,238,377.87	2,915,200.51	ALIGNC	21+65.53	27.13	RT	919.26'
98	10,238,551.64	2,914,602.81	ALIGND	10+29.11	12.00	RT	908.22'
99	10,238,550.08	2,914,627.62	ALIGND	10+22.41	12.00	LT	907.77'
100	10,238,519.02	2,914,602.74	ALIGND	10+55.72	12.00	RT	908.08'
101	10,238,525.29	2,914,625.91	ALIGND	10+55.72	12.00	LT	907.60'
102	10,238,505.40	2,914,606.43	ALIGND	10+69.84	12.00	RT	908.01'
103	10,238,501.72	2,914,604.32	ALIGND	10+72.84	15.00	RT	908.06'
104	10,238,497.28	2,914,587.90	ALIGND	10+72.84	32.00	RT	908.40'
105	10,238,468.32	2,914,595.74	ALIGND	11+02.84	32.00	RT	908.68'
106	10,238,472.76	2,914,612.15	ALIGND	11+02.84	15.00	RT	908.34'
107	10,238,470.65	2,914,615.83	ALIGND	11+05.84	12.00	RT	908.38'
108	10,238,474.16	2,914,639.74	ALIGND	11+08.68	12.00	LT	908.00'
109	10,238,463.21	2,914,644.66	ALIGND	11+20.54	13.90	LT	908.23'
110	10,238,462.11	2,914,642.99	ALIGND	11+21.16	12.00	LT	908.31'
111	10,238,449.72	2,914,621.48	ALIGND	11+27.51	12.00	RT	909.14'
112	10,238,447.35	2,914,624.20	ALIGND	11+30.51	10.00	RT	909.21'
113	10,238,441.22	2,914,620.68	ALIGND	11+35.51	15.00	RT	909.48'
114	10,238,437.30	2,914,606.20	ALIGND	11+35.51	30.00	RT	909.78'
115	10,238,386.14	2,914,620.03	ALIGND	11+88.51	30.00	RT	911.64'
116	10,238,390.06	2,914,634.53	ALIGND	11+88.51	14.98	RT	911.33'
117	10,238,388.03	2,914,638.19	ALIGND	11+91.10	12.00	RT	911.37'
118	10,238,394.33	2,914,661.69	ALIGND	11+92.06	12.31	LT	911.22'
119	10,238,391.50	2,914,662.39	ALIGND	11+95.89	12.00	LT	911.31'
120	10,238,381.72	2,914,668.23	ALIGND	12+10.93	12.00	LT	911.58'
121	10,238,379.27	2,914,680.69	ALIGND	12+26.77	18.50	LT	912.00'
122	10,238,346.60	2,914,679.34	ALIGND	12+40.13	12.00	RT	912.85'
123	10,238,336.23	2,914,693.02	ALIGND	12+56.13	18.00	RT	913.26'
124	10,238,363.17	2,914,737.30	ALIGND	12+90.79	20.54	LT	912.75'
125	10,238,325.81	2,914,706.85	ALIGND	12+72.38	24.00	RT	913.60'
126	10,238,353.97	2,914,738.23	ALIGND	12+94.32	12.00	LT	913.19'
127	10,238,311.43	2,914,754.74	ALIGND	13+22.37	24.00	RT	914.29'
128	10,238,312.50	2,914,772.02	ALIGND	13+38.62	18.00	RT	914.40'
129	10,238,313.57	2,914,789.31	ALIGND	13+54.87	12.00	RT	914.50'
130	10,238,312.99	2,914,791.23	ALIGND	13+56.87	12.00	RT	914.53'
131	10,238,334.37	2,914,803.50	ALIGND	13+62.48	12.00	LT	914.13'
132	10,238,295.38	2,914,800.70	ALIGND	13+71.01	26.14	RT	915.01'
133	10,238,322.47	2,914,808.84	ALIGND	13+71.01	2.14	LT	914.44'
134	10,238,304.86	2,914,818.31	ALIGND	13+85.15	12.00	RT	914.92'
135	10,238,342.41	2,914,837.57	ALIGND	13+92.79	29.50	LT	913.68'
136	10,238,320.16	2,914,866.45	ALIGND	14+26.86	16.50	LT	914.83'
137	10,238,315.10	2,914,867.65	ALIGND	14+29.45	12.00	LT	915.06'
138	10,238,284.88	2,914,884.83	ALIGND	14+54.60	12.00	RT	915.88'
139	10,238,307.87	2,914,891.73	ALIGND	14+54.60	12.00	LT	915.40'
140	10,238,309.15	2,914,910.09	ALIGND	14+82.10	12.00	LT	915.60'
141	10,238,310.86	2,914,912.66	ALIGND	14+86.53	12.29	LT	915.59'
142	10,238,290.01	2,914,925.30	ALIGND	14+86.56	12.09	RT	916.12'
143	10,238,343.08	2,914,916.64	ALIGND	15+06.60	37.81	LT	914.29'
144	10,238,359.85	2,914,934.32	ALIGND	15+30.41	43.01	LT	913.65'
145	10,238,305.89	2,914,969.98	ALIGND	15+33.01	21.61	RT	916.12'
146	10,238,420.84	2,914,680.05	ALIGNE	10+37.00	12.00	RT	909.62'
147	10,238,423.43	2,914,689.64	ALIGNE	10+46.94	12.00	RT	909.57'
148	10,238,445.47	2,914,686.86	ALIGNE	10+49.43	10.09	LT	909.13'
149	10,238,450.06	2,914,703.85	ALIGNE	10+63.01	13.82	LT	909.14'
150	10,238,423.19	2,914,707.20	ALIGNE	10+71.39	12.00	RT	909.70'
151	10,238,449.70	2,914,730.19	ALIGNE	10+85.78	20.00	LT	909.37'
152	10,238,416.04	2,914,731.01	ALIGNE	10+96.26	12.00	RT	909.95'
153	10,238,406.84	2,914,731.94	ALIGNE	10+99.79	20.54	RT	910.83'
154	10,238,439.63	2,914,763.71	ALIGNE	11+20.78	20.00	LT	909.72'
155	10,238,429.11	2,914,779.59	ALIGNE	11+39.02	14.50	LT	909.90'
156	10,238,420.51	2,914,792.59	ALIGNE	11+53.95	10.00	LT	910.08'
157	10,238,420.21	2,914,793.60	ALIGNE	11+55.00	10.00	LT	910.09'
158	10,238,390.98	2,914,788.99	ALIGNE	11+58.99	19.32	RT	911.18'
159	10,238,393.56	2,914,805.27	ALIGNE	11+73.83	12.16	RT	910.74'
160	10,238,389.83	2,914,805.86	ALIGNE	11+75.48	15.56	RT	911.09'
161	10,238,378.82	2,914,785.39	ALIGNE	11+59.04	32.00	RT	911.78'
162	10,238,366.61	2,914,826.02	ALIGNE	12+01.46	32.00	RT	912.41'
163	10,238,379.03	2,914,849.10	ALIGNE	12+20.00	13.46	RT	911.69'
164	10,238,379.36	2,914,852.85	ALIGNE	12+23.50	12.07	RT	911.68'
165	10,238,376.45	2,914,862.78	ALIGNE	12+33.35	12.11	RT	911.90'
166	10,238,397.19	2,914,870.22	ALIGNE	12+35.59	9.80	LT	911.51'
167	10,238,399.10	2,914,870.80	ALIGNE	12+35.72	11.80	LT	911.47'
168	10,238,368.03	2,914,864.77	ALIGNE	12+36.80	19.84	RT	912.90'
169	10,238,395.73	2,914,882.03	ALIGNE	12+48.57	10.45	LT	911.79'
170	10,238,394.74	2,914,887.36	ALIGNE	12+54.47	10.00	LT	911.93'
171	10,238,354.01	2,914,902.40	ALIGNE	12+68.89	30.58	RT	913.68'
172	10,238,353.12	2,914,910.00	ALIGNE	12+74.85	32.00	RT	913.83'
173	10,238,372.48	2,914,935.64	ALIGNE	12+98.82	17.91	RT	912.73'

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

HEADQUARTERS ROADWAY AND PARKING PLAN

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	56

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_HQRDWYPLN03.dgn

HEADQUATERS PAVEMENT PLAN POINT LIST							
POINT	NORTH	EAST	ALIGNMENT	STA	OFFSET	RT/LT	ELEV
174	10,238,380.44	2,914,943.71	ALIGNE	13+07.88	13.01	RT	912.59'
175	10,238,389.18	2,914,955.70	ALIGNE	13+21.15	10.00	RT	912.46'
176	10,238,441.61	2,915,009.38	ALIGNE	13+91.41	10.00	RT	913.05'
177	10,238,451.28	2,914,991.87	ALIGNE	13+91.41	10.00	LT	912.65'
178	10,238,491.23	2,915,026.07	ALIGNE	14+40.29	10.00	LT	913.14'
179	10,238,730.68	2,914,306.77	N/A	N/A	N/A	N/A	907.98'
180	10,238,731.58	2,914,311.69	N/A	N/A	N/A	N/A	907.99'
181	10,238,711.56	2,914,310.83	N/A	N/A	N/A	N/A	908.24'
182	10,238,712.59	2,914,315.72	N/A	N/A	N/A	N/A	908.18'
183	10,238,695.77	2,914,328.88	N/A	N/A	N/A	N/A	909.00'
184	10,238,700.75	2,914,329.26	N/A	N/A	N/A	N/A	908.97'
185	10,238,693.27	2,914,361.83	N/A	N/A	N/A	N/A	909.96'
186	10,238,698.26	2,914,362.21	N/A	N/A	N/A	N/A	909.86'
187	10,238,679.35	2,914,379.40	N/A	N/A	N/A	N/A	911.01'
188	10,238,680.86	2,914,384.16	N/A	N/A	N/A	N/A	910.96'
189	10,238,613.11	2,914,409.37	N/A	N/A	N/A	N/A	912.25'
191	10,238,615.70	2,914,413.65	N/A	N/A	N/A	N/A	912.23'
192	10,238,603.48	2,914,427.15	N/A	N/A	N/A	N/A	912.43'
193	10,238,608.48	2,914,426.99	N/A	N/A	N/A	N/A	912.36'
194	10,238,604.23	2,914,434.52	N/A	N/A	N/A	N/A	912.33'
195	10,238,609.16	2,914,433.69	N/A	N/A	N/A	N/A	912.29'
196	10,238,606.73	2,914,449.28	N/A	N/A	N/A	N/A	912.03'
197	10,238,611.66	2,914,448.44	N/A	N/A	N/A	N/A	911.99'
198	10,238,607.16	2,914,452.40	N/A	N/A	N/A	N/A	912.10'
199	10,238,612.14	2,914,451.87	N/A	N/A	N/A	N/A	912.01'
200	10,238,601.93	2,914,462.27	N/A	N/A	N/A	N/A	912.00'
201	10,238,604.29	2,914,466.68	N/A	N/A	N/A	N/A	911.90'
202	10,238,562.94	2,914,471.97	N/A	N/A	N/A	N/A	912.28'
203	10,238,562.93	2,914,476.97	N/A	N/A	N/A	N/A	912.18'
204	10,238,548.11	2,914,475.84	N/A	N/A	N/A	N/A	912.22'
205	10,238,550.57	2,914,480.20	N/A	N/A	N/A	N/A	912.02'
206	10,238,505.13	2,914,524.00	N/A	N/A	N/A	N/A	911.54'
207	10,238,509.73	2,914,525.95	N/A	N/A	N/A	N/A	911.44'
208	10,238,493.37	2,914,551.80	N/A	N/A	N/A	N/A	911.33'
209	10,238,497.98	2,914,553.75	N/A	N/A	N/A	N/A	911.23'
210	10,238,478.16	2,914,565.81	N/A	N/A	N/A	N/A	911.41'
211	10,238,479.72	2,914,570.56	N/A	N/A	N/A	N/A	911.34'
212	10,238,460.72	2,914,571.55	N/A	N/A	N/A	N/A	910.86'
213	10,238,462.29	2,914,576.30	N/A	N/A	N/A	N/A	910.76'
214	10,238,450.33	2,914,577.48	N/A	N/A	N/A	N/A	910.71'
215	10,238,453.63	2,914,581.24	N/A	N/A	N/A	N/A	910.61'
216	10,238,441.29	2,914,585.40	N/A	N/A	N/A	N/A	910.17'
217	10,238,444.59	2,914,589.16	N/A	N/A	N/A	N/A	910.07'
218	10,238,437.56	2,914,593.99	N/A	N/A	N/A	N/A	910.07'
219	10,238,442.84	2,914,596.04	N/A	N/A	N/A	N/A	909.84'
220	10,238,442.93	2,914,596.38	N/A	N/A	N/A	N/A	909.82'
221	10,238,433.87	2,914,598.84	N/A	N/A	N/A	N/A	909.97'
222	10,238,569.80	2,914,951.01	N/A	N/A	N/A	N/A	907.06'
223	10,238,562.91	2,915,001.44	N/A	N/A	N/A	N/A	909.26'
224	10,238,562.94	2,915,015.57	N/A	N/A	N/A	N/A	909.80'
225	10,238,563.20	2,915,021.54	N/A	N/A	N/A	N/A	910.06'
226	10,238,560.73	2,915,004.58	N/A	N/A	N/A	N/A	909.45'
227	10,238,556.06	2,915,007.37	N/A	N/A	N/A	N/A	909.85'
228	10,238,557.02	2,915,013.15	N/A	N/A	N/A	N/A	909.95'
229	10,238,548.31	2,915,014.56	N/A	N/A	N/A	N/A	910.31'
230	10,238,551.71	2,915,018.22	N/A	N/A	N/A	N/A	910.36'
231	10,238,539.96	2,915,016.14	N/A	N/A	N/A	N/A	910.94'
232	10,238,538.14	2,915,020.80	N/A	N/A	N/A	N/A	911.09'
233	10,238,538.30	2,915,015.50	N/A	N/A	N/A	N/A	911.01'
234	10,238,536.45	2,915,020.14	N/A	N/A	N/A	N/A	911.18'
235	10,238,515.94	2,915,006.78	N/A	N/A	N/A	N/A	911.49'
236	10,238,514.09	2,915,011.42	N/A	N/A	N/A	N/A	911.68'
237	10,238,450.24	2,914,623.41	ALIGND	11+27.51	10.00	RT	909.10'
238	10,238,487.28	2,914,560.45	N/A	N/A	N/A	N/A	911.27'
239	10,238,490.67	2,914,564.13	N/A	N/A	N/A	N/A	911.17'
240	10,238,646.73	2,914,962.77	ALIGNA	19+86.06	30.34	LT	904.92'

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

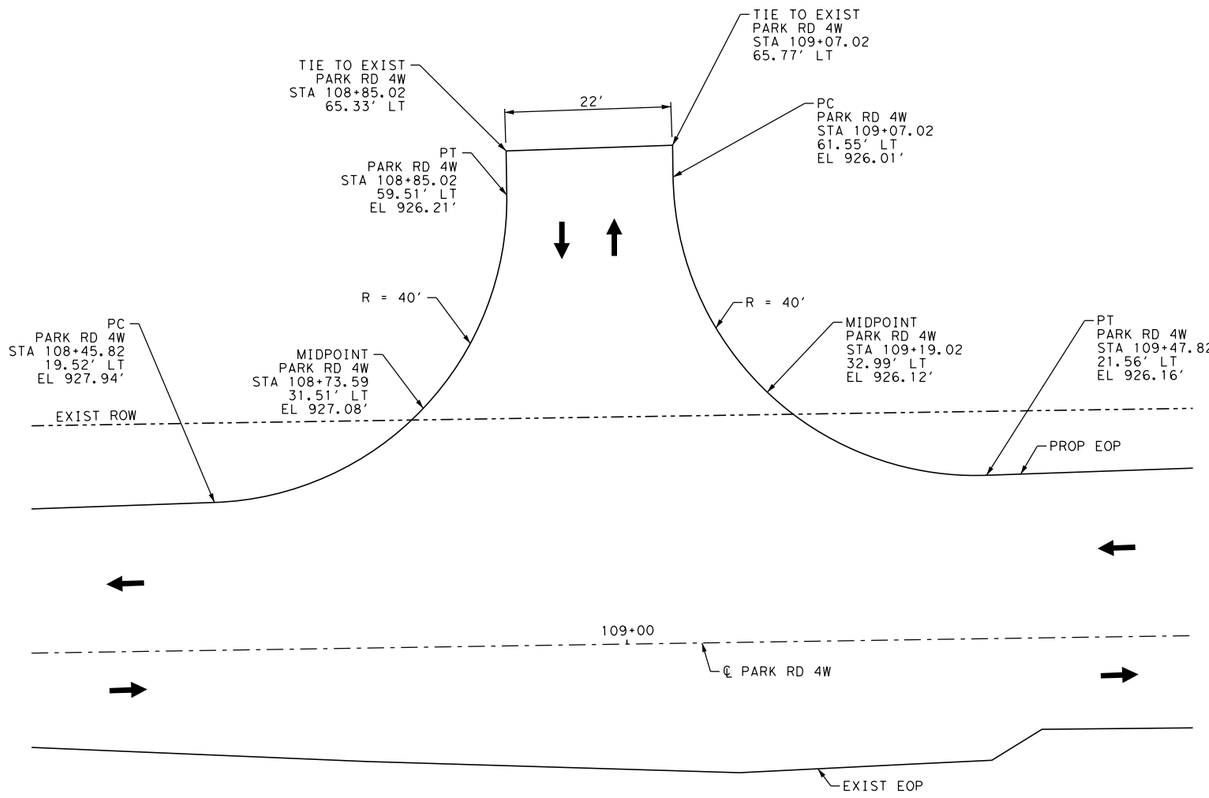
PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HEADQUARTERS ROADWAY AND PARKING PLAN

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	57



PLAN VIEW

PROPOSED DRIVEWAY
PR 4W STA 109+00 LEFT

LEGEND

← TRAFFIC FLOW DIRECTION

NOTES

1. SEE "ROADWAY PLAN & PROFILE" SHEETS FOR MORE PROPOSED ROADWAY AND SIDEWALK INFORMATION.
2. CONTRACTOR WILL REPAIR ANY DAMAGE DONE TO GRAVEL AND CONCRETE SIDEWALKS THROUGHOUT THE DURATION OF THE PROJECT CONSTRUCTION FOR NO EXTRA PAYMENT.
3. TxDOT WILL COORDINATE THE RELOCATION OF THE EXISTING INKS LAKE STATE PARK ENTRANCE SIGN WITH TPWD.
4. PROPOSED DRIVEWAY PAVEMENT MATERIALS AND DEPTHS TO MATCH PARK ROAD 4W MATERIALS AND DEPTHS. SEE "PROPOSED TYPICAL SECTIONS".

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 10 20 30
SCALE: 1" = 20'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

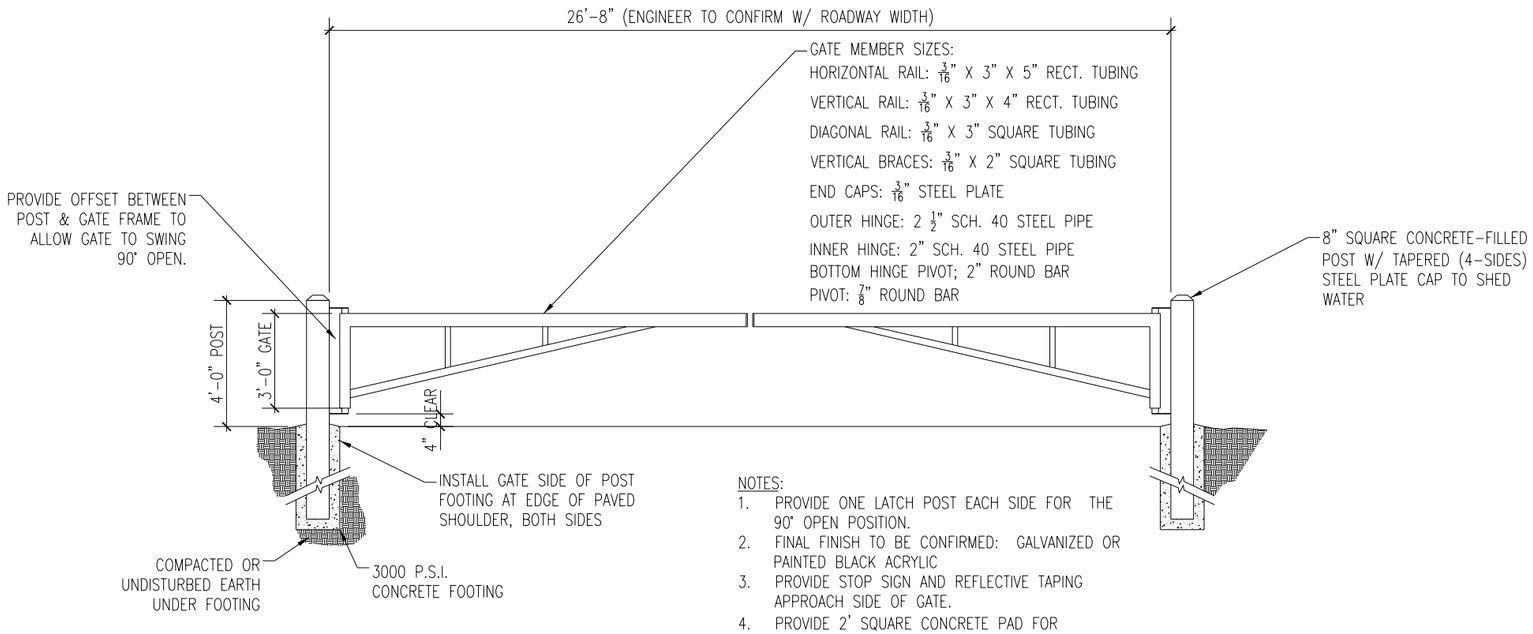
DRIVEWAY DETAIL

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	58

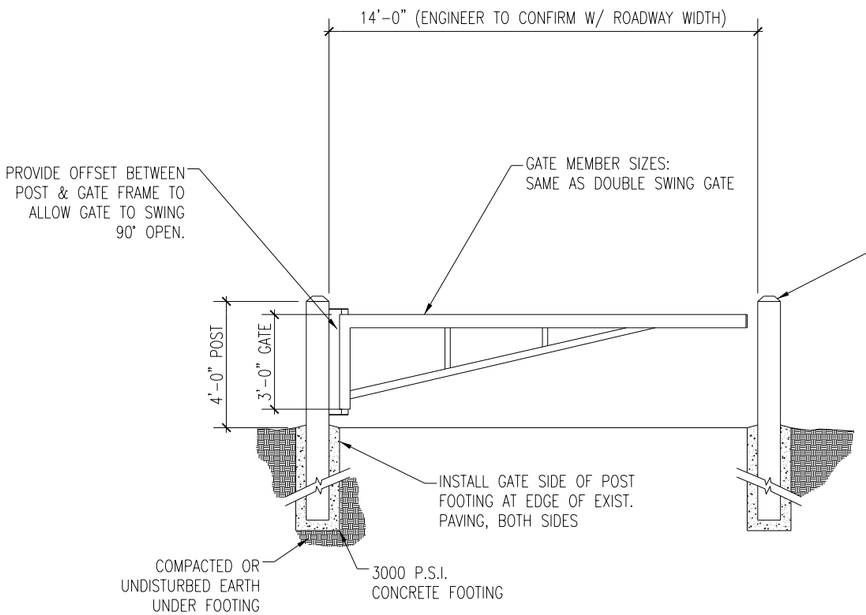
Plotted on: 1/27/2023

AUTOMATIC DOUBLE SWING GATE - ENTRY ROAD



NOTES:
1. PROVIDE ONE LATCH POST EACH SIDE FOR THE 90° OPEN POSITION.
2. FINAL FINISH TO BE CONFIRMED: GALVANIZED OR PAINTED BLACK ACRYLIC
3. PROVIDE STOP SIGN AND REFLECTIVE TAPING APPROACH SIDE OF GATE.
4. PROVIDE 2' SQUARE CONCRETE PAD FOR AUTOMATIC OPENER APPARATUS BOTH SIDES - BASIS OF DESIGN: LIFTMASTER CSW200UL, 1HP
5. PROVIDE SINGLE KEYPAD FOR OPENING BOTH GATES

AUTOMATIC SINGLE SWING GATE - RESIDENCE



NOTES:
1. PROVIDE ONE LATCH POST ON HINGE SIDE FOR THE 90° OPEN POSITION.
2. FINAL FINISH TO BE CONFIRMED: GALVANIZED OR PAINTED BLACK ACRYLIC
3. PROVIDE REFLECTIVE TAPING ON BOTH SIDES OF GATE.
4. PROVIDE 2' SQUARE CONCRETE PAD FOR AUTOMATIC OPENER APPARATUS: BASIS OF DESIGN: LIFTMASTER RSW12UL W/ SOLAR PANEL KIT
5. PROVIDE KEYPAD AND REMOTE FOB FOR OPENING GATE

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

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PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

AUTOMATIC SWING GATE DETAIL

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	59

Design Filename: H:\Projects\511\66\00\Design\Civil\Roadway\5116600_GATE_DETAIL.dgn

DATE: 1/27/2023
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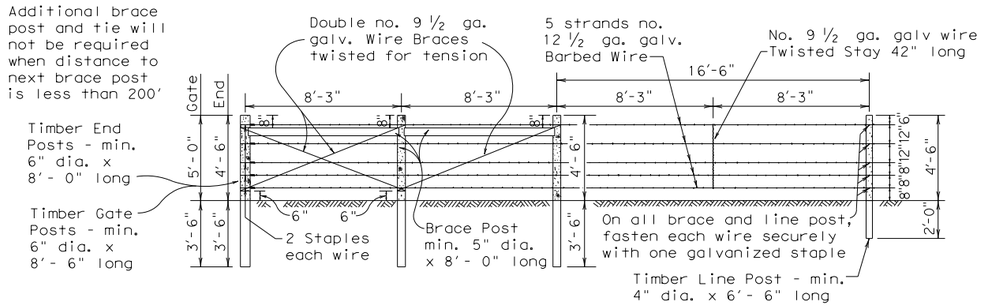
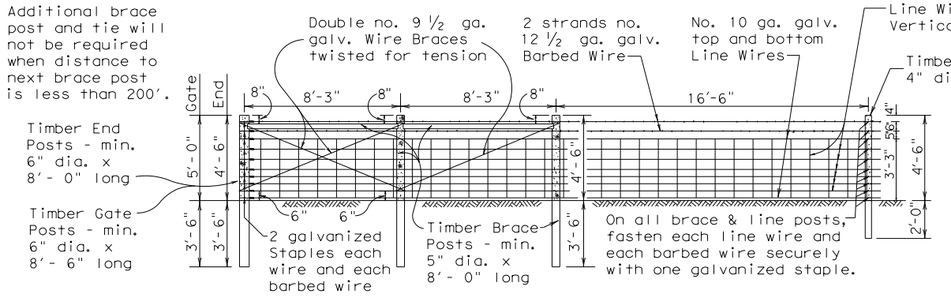


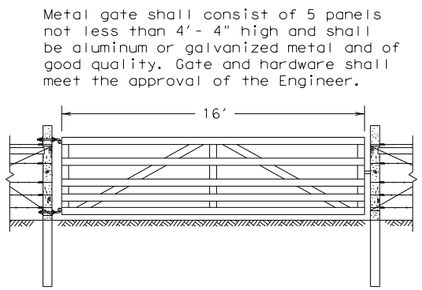
SECTION GALVANIZED BARBED WIRE FENCE WITH WOOD POSTS
Bracing Detail Used at Ends and Gates
TYPE "A" FENCE
(See General Note 6)



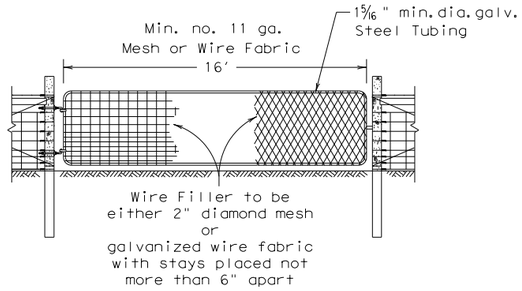
SECTION GALVANIZED WOVEN WIRE FENCE WITH WOOD POSTS
Bracing Detail Used at Ends and Gates
TYPE "B" FENCE
(See General Note 6)

TABLE OF EQUIVALENT SIZES FOR OPTIONAL SHAPE

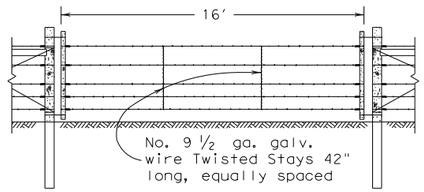
Minimum Diameter of Round Post (Inches)	Minimum Equivalent Dimension for Each Side of Square Post (Inches)
4	3 ½
5	4 ½
6	5 ¼



DETAIL TYPE 1 GATE



DETAIL TYPE 2 GATE

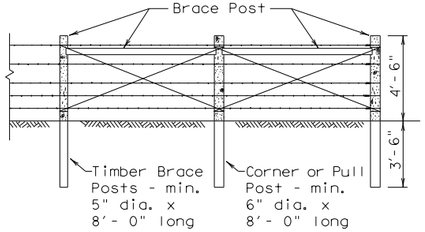


DETAIL TYPE 3 GATE

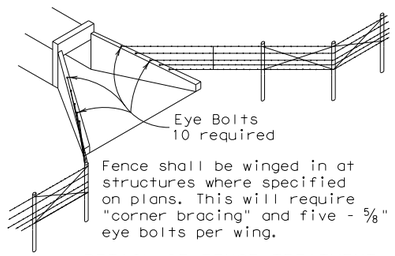
GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide 2" clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latches of the spring, fork or chain type. All latches shall be suitable for the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. If rock is encountered at a depth less than the embedded depth required, a 15" or larger diameter hole shall be drilled for the post and the post shall be set in concrete. If rock is encountered at a depth of 1'- 6" or more below the ground surface, the hole shall be drilled to the required depth. If rock is encountered at a depth less than 1'- 6" below the ground surface, the holes shall be drilled a minimum of 2'- 0" into the rock or to the depth whichever is the lesser depth.
6. Barbed Wire shall be in accordance with ASTM A 121 (Class 1) Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

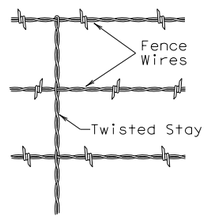
   Woven Wire Fence (Type B) shall be in accordance with ASTM A 116 (Class 1) No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
7. The location of gates and corner posts will be as indicated elsewhere on these plans.
8. Square wood posts may be used in lieu of round posts provided minimum equivalent size requirements, as shown are met. All wood posts shall be in accordance with Item 552, "Wire Fence."



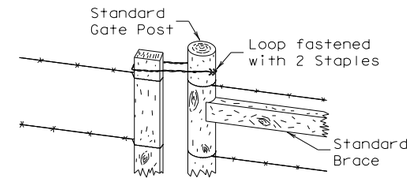
CORNER OR PULL POST ASSEMBLY



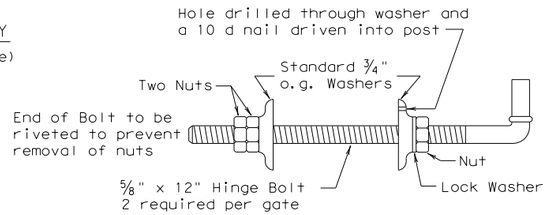
DETAIL OF FENCE TREATMENT AT STRUCTURES



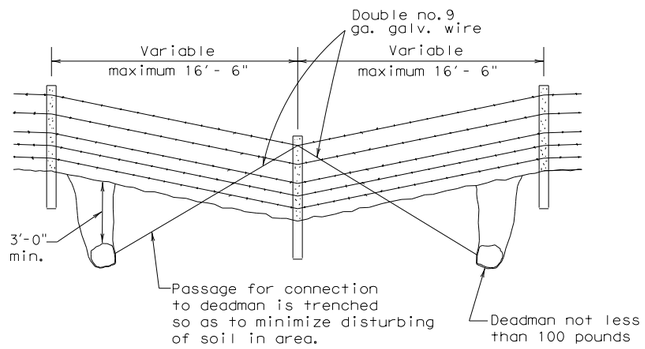
DETAIL OF STAY
(Barbed wire fence)



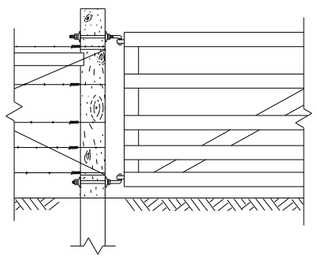
DETAIL FASTENER TYPE 3 GATE



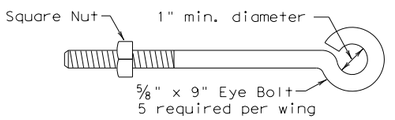
DETAIL OF GATE HINGE BOLT ASSEMBLY



DETAIL OF FENCE SAG
(Single Line Connection)



DETAIL SHOWING INSTALLATION OF HINGES OF TYPE 1 & 2 GATE



DETAIL OF EYE BOLT

Texas Department of Transportation
Design Division Standard

BARBED WIRE AND WOVEN WIRE FENCE
(WOOD POSTS)
WF(1)-10

FILE: wf110.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		60

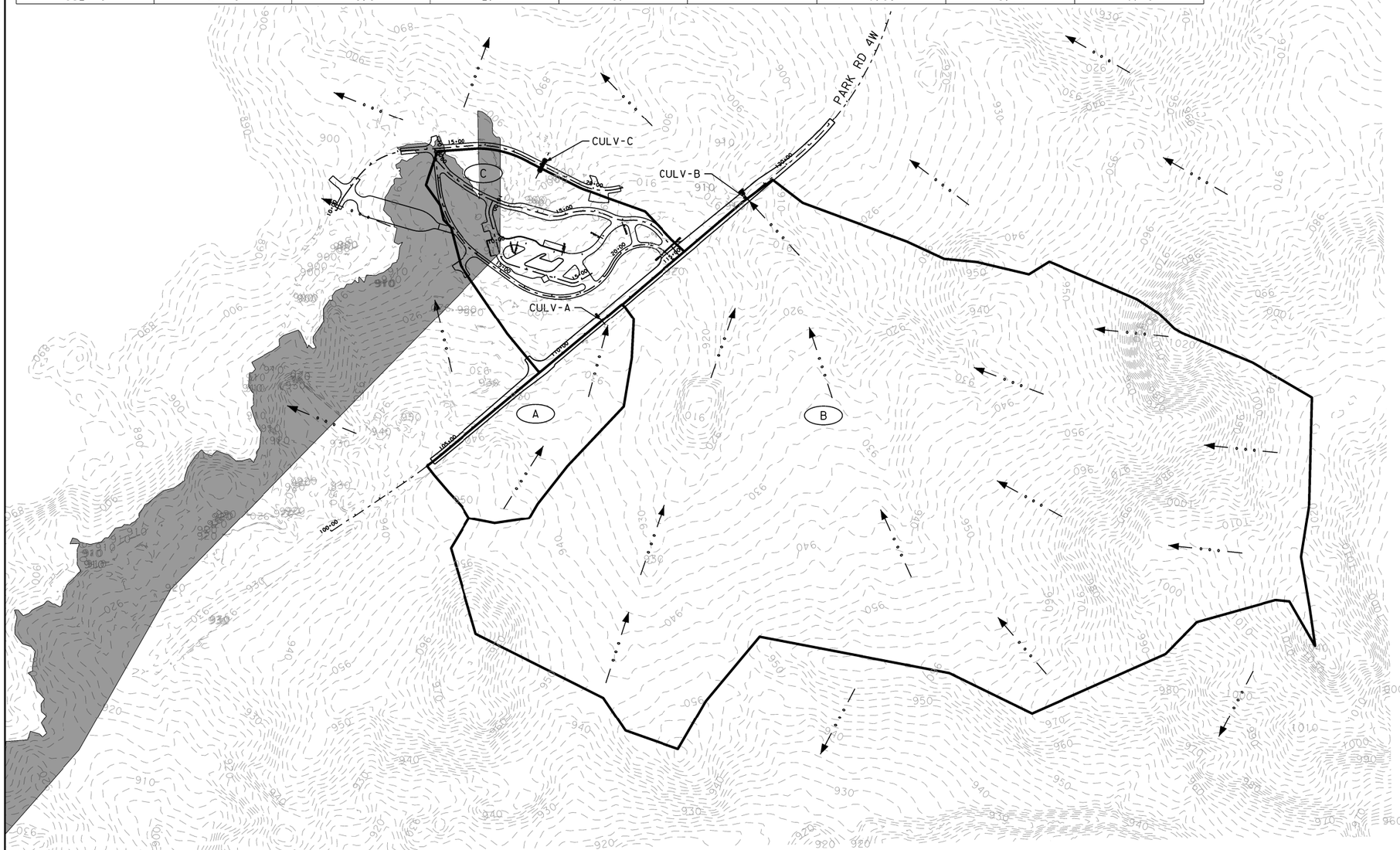
Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_DRNMAP.dgn

PROPOSED RATIONAL METHOD COMPUTATIONS

STRUCTURE ID	DRAINAGE AREA ID	TOTAL AREA (AC)	WEIGHTED C-VALUE	TIME OF CONC. (Tc)	5-YEAR INTENSITY (in/hr)	5-YEAR FLOW (cfs)	10-YEAR INTENSITY (in/hr)	10-YEAR FLOW (cfs)	25-YEAR INTENSITY (in/hr)	25-YEAR FLOW (cfs)	50-YEAR INTENSITY (in/hr)	50-YEAR FLOW (cfs)	100-YEAR INTENSITY (in/hr)	100-YEAR FLOW (cfs)
CULV-A	A	5.5	0.33	12.2	5.41	9.9	6.49	11.8	7.95	14.5	9.07	16.5	10.25	18.7
CULV-B	B	80.5	0.32	21.5	4.15	107.0	5.00	128.8	6.17	159.0	7.09	182.7	8.07	207.9
CULV-C	A + C	13.9	0.45	14.2	5.07	31.8	6.09	38.1	7.48	46.8	8.55	53.5	9.68	60.6

TO STRUCTURE	DRAINAGE AREA ID	TOTAL AREA (AC)	LAND USE CLASSIFICATION AREA (AC) C-VALUE: Asphalt Pavement	RURAL	POND	Industrial, Light areas	GRASS	WEIGHTED C-VALUE
			0.90	0.32	1.00	0.60	0.35	
CULV-A	A	5.5	0.09	5.41	0.00			0.33
CULV-B	B	80.5	0.16	79.99	0.35			0.32
CULV-C	A + C	13.9	2.44	5.41		0.83	5.17	0.45



LEGEND

— - — - —	R.O.W.
▬▬▬	DRAINAGE AREA BOUNDARY
— -850- —	EXISTING CONTOUR
— • • • →	FLOW ARROW
(X)	DRAINAGE AREA
▨	FEMA FLOODPLAIN

NOTES

1. RUNOFF COMPUTED USING RATIONAL METHOD.
2. C-VALUES WERE DEVELOPED USING ZONED LAND USE FROM TXDOT HYDRAULIC DESING MANUAL TABLE 4-11.
3. EXISTING FEATURES ARE SHOWN SCREENED BACK, i.e. FADED.
4. CULVERTS DESIGNED FOR A 10-YR DESIGN STORM EVENT.
5. HY-8 VERSION 7.50 USED TO CALCULATE CULVERT HYDRAULICS.
6. NOAA ATLAS 14 UTILIZED FOR INTENSITY CALCULATIONS.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E.

1/27/2023
DATE

0 200 400 600
SCALE: 1"= 400'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

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DRAINAGE AREA MAP

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	61

EXISTING CULVERT A HY-8 ANALYSIS

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_EXIST-A.dgn

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-A EXIST

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-A-EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
921.83	5 year	9.90	9.90	0.00	1
922.04	10 year	11.80	11.80	0.00	1
922.34	25 year	14.50	14.50	0.00	1
922.58	50 year	16.50	16.50	0.00	1
922.88	100 year	18.70	18.70	0.00	1
923.56	Overtopping	22.83	22.83	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-A-EXIST

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	9.90	9.90	921.83	1.682	0.935	1-S2n	0.797	1.121	0.872	0.319	7.269	2.102
10 year	11.80	11.80	922.04	1.885	1.165	1-S2n	0.879	1.229	0.967	0.342	7.589	2.197
25 year	14.50	14.50	922.34	2.186	1.515	5-S2n	0.990	1.368	1.093	0.372	7.991	2.313
50 year	16.50	16.50	922.58	2.432	1.789	5-S2n	1.071	1.459	1.183	0.391	8.267	2.390
100 year	18.70	18.70	922.88	2.734	2.336	5-S2n	1.159	1.555	1.279	0.411	8.551	2.464

****

Straight Culvert

Inlet Elevation (invert): 920.15 ft, Outlet Elevation (invert): 919.67 ft

Culvert Length: 36.00 ft, Culvert Slope: 0.0132

****

Site Data - CULV-A-EXIST

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 920.15 ft

Outlet Station: 36.00 ft

Outlet Elevation: 919.67 ft

Number of Barrels: 1

Culvert Data Summary - CULV-A-EXIST

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

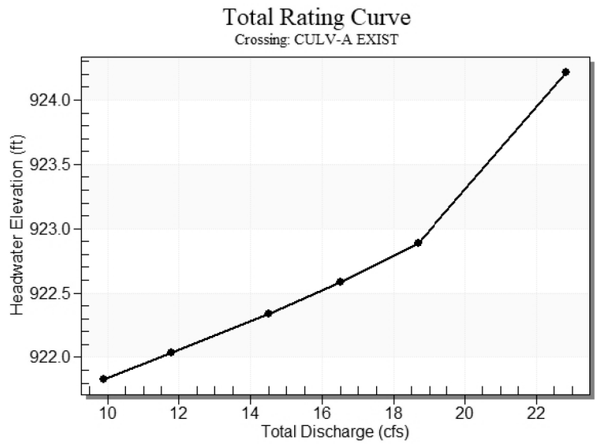
Barrel Manning's n: 0.0120

Culvert Type: Straight

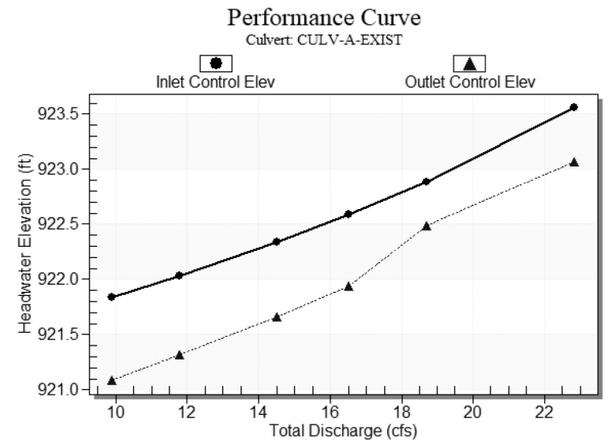
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-A EXIST



Culvert Performance Curve Plot: CULV-A-EXIST



Water Surface Profile Plot for Culvert: CULV-A-EXIST

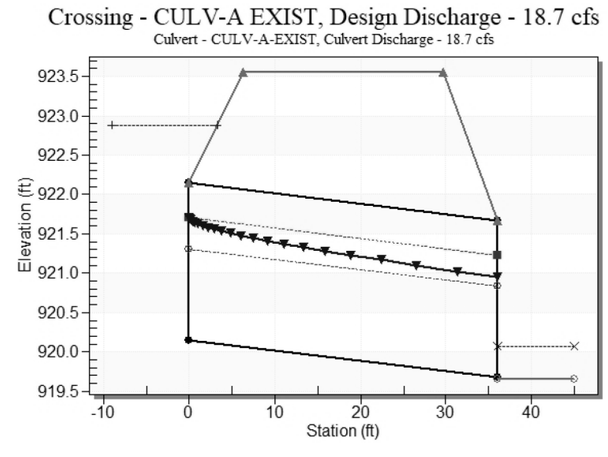


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-A EXIST)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
9.90	919.98	0.32	2.10	0.51	0.90
11.80	920.00	0.34	2.20	0.55	0.91
14.50	920.03	0.37	2.31	0.60	0.92
16.50	920.05	0.39	2.39	0.63	0.92
18.70	920.07	0.41	2.46	0.66	0.93

Tailwater Channel Data - CULV-A EXIST

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 40.00 (_:1)

Channel Slope: 0.0258

Channel Manning's n: 0.0350

Channel Invert Elevation: 919.66 ft

Roadway Data for Crossing: CULV-A EXIST

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 923.56 ft

Roadway Surface: Paved

Roadway Top Width: 23.50 ft

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

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HYDRAULIC DATA SHEET
EXISTING CULVERT A

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	62

PROPOSED CULVERT A HY-8 ANALYSIS

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_PROP-A.dgn

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-A PROP

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-A-PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
921.83	5 year	9.90	9.90	0.00	1
922.04	10 year	11.80	11.80	0.00	1
922.34	25 year	14.50	14.50	0.00	1
922.58	50 year	16.50	16.50	0.00	1
922.88	100 year	18.70	18.70	0.00	1
923.56	Overtopping	22.83	22.83	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-A-PROP

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	9.90	9.90	921.83	1.682	0.773	1-S2n	0.797	1.121	0.854	0.319	7.476	2.102
10 year	11.80	11.80	922.04	1.885	1.013	1-S2n	0.879	1.229	0.946	0.342	7.797	2.197
25 year	14.50	14.50	922.34	2.186	1.378	5-S2n	0.990	1.368	1.071	0.372	8.195	2.313
50 year	16.50	16.50	922.58	2.432	1.667	5-S2n	1.071	1.459	1.160	0.391	8.465	2.390
100 year	18.70	18.70	922.88	2.734	2.232	5-S2n	1.159	1.555	1.255	0.411	8.743	2.464

****

Straight Culvert

Inlet Elevation (invert): 920.15 ft, Outlet Elevation (invert): 919.49 ft

Culvert Length: 50.00 ft, Culvert Slope: 0.0132

****

Site Data - CULV-A-PROP

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 920.15 ft

Outlet Station: 50.00 ft

Outlet Elevation: 919.49 ft

Number of Barrels: 1

Culvert Data Summary - CULV-A-PROP

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

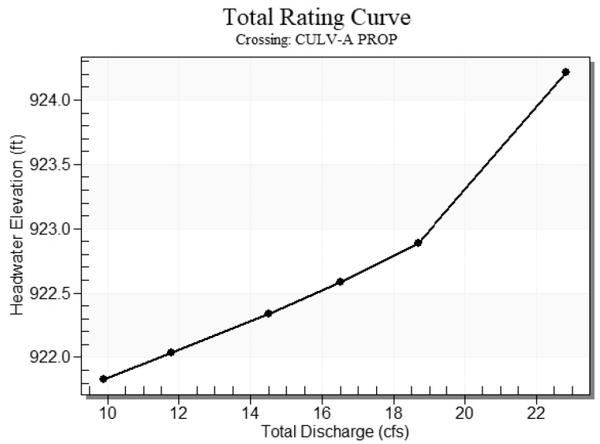
Barrel Manning's n: 0.0120

Culvert Type: Straight

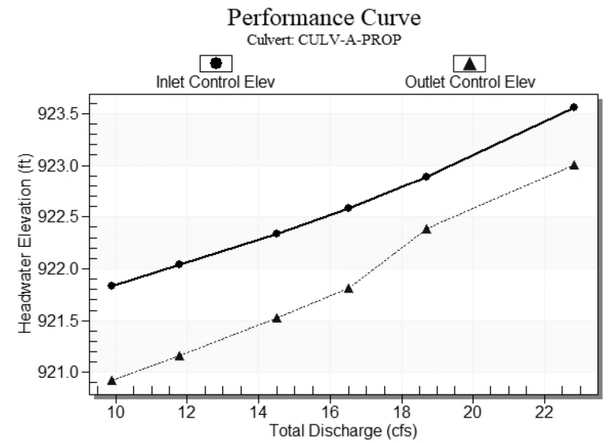
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-A PROP



Culvert Performance Curve Plot: CULV-A-PROP



Water Surface Profile Plot for Culvert: CULV-A-PROP

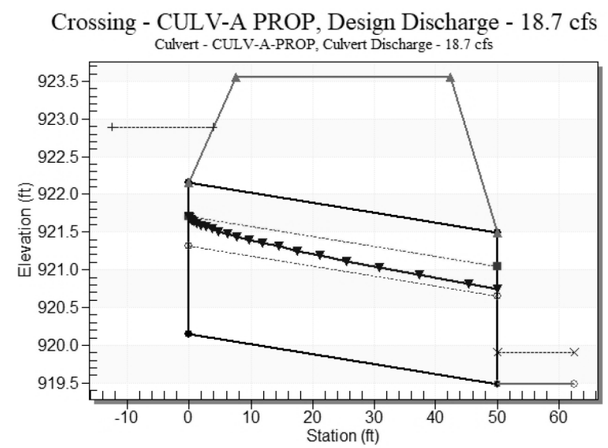


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-A PROP)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
9.90	919.81	0.32	2.10	0.51	0.90
11.80	919.83	0.34	2.20	0.55	0.91
14.50	919.86	0.37	2.31	0.60	0.92
16.50	919.88	0.39	2.39	0.63	0.92
18.70	919.90	0.41	2.46	0.66	0.93

Tailwater Channel Data - CULV-A PROP

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 40.00 (_:1)

Channel Slope: 0.0258

Channel Manning's n: 0.0350

Channel Invert Elevation: 919.49 ft

Roadway Data for Crossing: CULV-A PROP

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 923.56 ft

Roadway Surface: Paved

Roadway Top Width: 34.90 ft

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
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Texas Department of Transportation

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HYDRAULIC DATA SHEET
PROPOSED CULVERT A

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	63

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_EXIST-B.dgn

EXISTING CULVERT B HY-8 ANALYSIS

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-B EXIST

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-B-EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
905.95	5 year	107.00	107.00	0.00	1
906.42	10 year	128.80	128.80	0.00	1
907.04	25 year	159.00	159.00	0.00	1
907.53	50 year	182.70	182.70	0.00	1
908.05	100 year	207.90	207.90	0.00	1
909.00	Overtopping	250.70	250.70	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-B-EXIST

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	107.00	107.00	905.95	3.630	2.330	1-S2n	1.968	2.146	2.044	1.145	8.723	6.668
10 year	128.80	128.80	906.42	4.099	2.753	1-S2n	2.249	2.428	2.331	1.248	9.209	7.001
25 year	159.00	159.00	907.04	4.722	3.358	1-S2n	2.625	2.794	2.711	1.376	9.776	7.396
50 year	182.70	182.70	907.53	5.206	3.851	5-S2n	2.911	3.065	2.999	1.466	10.153	7.666
100 year	207.90	207.90	908.05	5.731	4.397	5-S2n	3.209	3.341	3.300	1.554	10.500	7.928

****

Straight Culvert

Inlet Elevation (invert): 902.32 ft, Outlet Elevation (invert): 902.19 ft

Culvert Length: 33.00 ft, Culvert Slope: 0.0039

****

Site Data - CULV-B-EXIST

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 902.32 ft

Outlet Station: 33.00 ft

Outlet Elevation: 902.19 ft

Number of Barrels: 1

Culvert Data Summary - CULV-B-EXIST

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

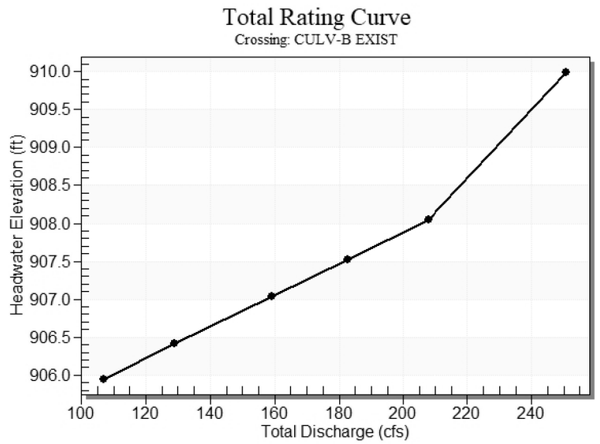
Barrel Manning's n: 0.0120

Culvert Type: Straight

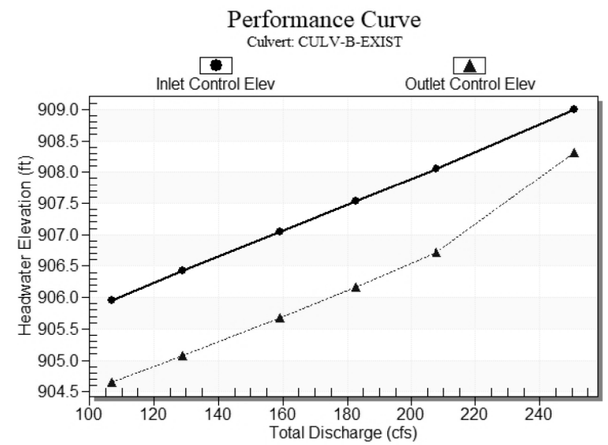
Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-B EXIST



Culvert Performance Curve Plot: CULV-B-EXIST



Water Surface Profile Plot for Culvert: CULV-B-EXIST

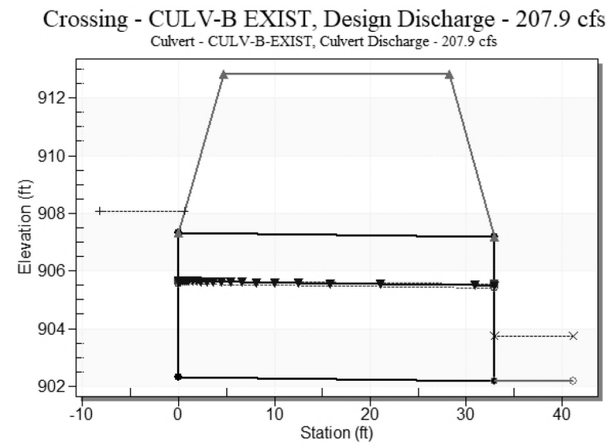


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-B EXIST)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
107.00	903.33	1.14	6.67	2.71	1.38
128.80	903.44	1.25	7.00	2.96	1.39
159.00	903.57	1.38	7.40	3.26	1.41
182.70	903.66	1.47	7.67	3.48	1.43
207.90	903.74	1.55	7.93	3.68	1.44

Tailwater Channel Data - CULV-B EXIST

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 6.00 ft

Side Slope (H:V): 7.00 (_:1)

Channel Slope: 0.0380

Channel Manning's n: 0.0350

Channel Invert Elevation: 902.19 ft

Roadway Data for Crossing: CULV-B EXIST

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	912.84
1	58.90	911.10
2	109.60	909.80
3	395.00	909.00

Roadway Surface: Paved

Roadway Top Width: 23.50 ft

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711

TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

Texas Department of Transportation ©2023

INKS LAKE

HYDRAULIC DATA SHEET
EXISTING CULVERT B

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	64

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_PROP-B.dgn

PROPOSED CULVERT B HY-8 ANALYSIS

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-B PROP

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-B-PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
905.95	5 year	107.00	107.00	0.00	1
906.42	10 year	128.80	128.80	0.00	1
907.04	25 year	159.00	159.00	0.00	1
907.53	50 year	182.70	182.70	0.00	1
908.05	100 year	207.90	207.90	0.00	1
909.00	Overtopping	250.70	250.70	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-B-PROP

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	107.00	107.00	905.95	3.630	2.279	1-S2n	1.979	2.146	2.045	1.145	8.721	6.668
10 year	128.80	128.80	906.42	4.099	2.706	1-S2n	2.262	2.428	2.334	1.248	9.198	7.001
25 year	159.00	159.00	907.04	4.722	3.317	1-S2n	2.640	2.794	2.718	1.376	9.750	7.396
50 year	182.70	182.70	907.53	5.206	3.817	5-S2n	2.928	3.065	3.011	1.466	10.112	7.666
100 year	207.90	207.90	908.05	5.731	4.370	5-S2n	3.228	3.341	3.319	1.554	10.440	7.928

****

Straight Culvert

Inlet Elevation (invert): 902.32 ft, Outlet Elevation (invert): 902.13 ft

Culvert Length: 49.00 ft, Culvert Slope: 0.0039

****

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 902.32 ft

Outlet Station: 49.00 ft

Outlet Elevation: 902.13 ft

Number of Barrels: 1

Culvert Data Summary - CULV-B-PROP

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

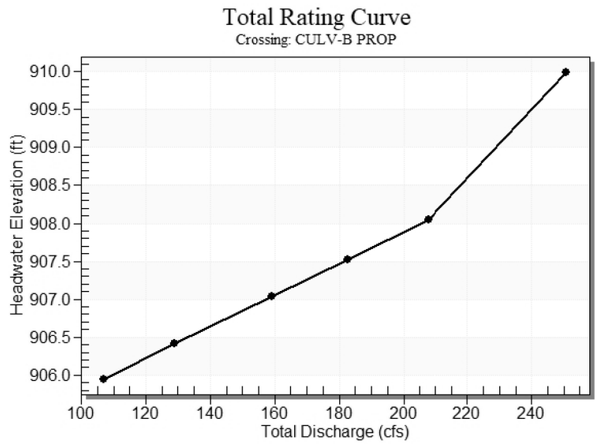
Barrel Manning's n: 0.0120

Culvert Type: Straight

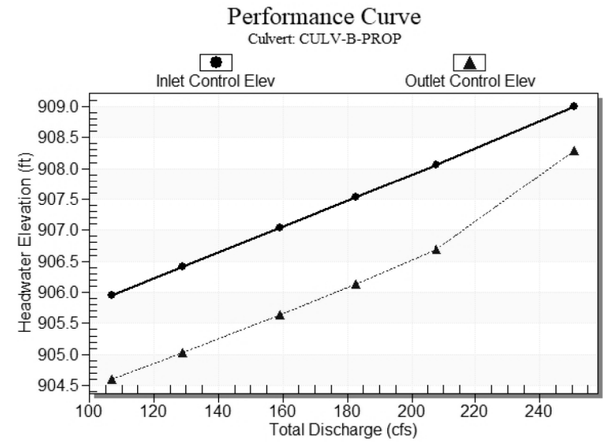
Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-B PROP



Culvert Performance Curve Plot: CULV-B-PROP



Water Surface Profile Plot for Culvert: CULV-B-PROP

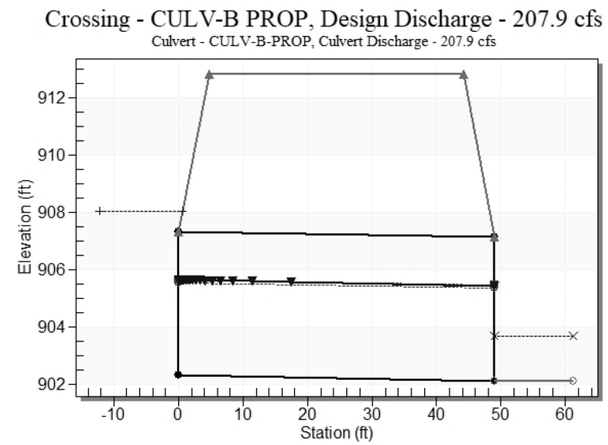


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-B PROP)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
107.00	903.27	1.14	6.67	2.71	1.38
128.80	903.38	1.25	7.00	2.96	1.39
159.00	903.51	1.38	7.40	3.26	1.41
182.70	903.60	1.47	7.67	3.48	1.43
207.90	903.68	1.55	7.93	3.68	1.44

Tailwater Channel Data - CULV-B PROP

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 6.00 ft

Side Slope (H:V): 7.00 (_:1)

Channel Slope: 0.0380

Channel Manning's n: 0.0350

Channel Invert Elevation: 902.13 ft

Roadway Data for Crossing: CULV-B PROP

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	912.84
1	58.90	911.10
2	109.60	909.80
3	395.00	909.00

Roadway Surface: Paved

Roadway Top Width: 39.50 ft

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711

TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HYDRAULIC DATA SHEET
PROPOSED CULVERT B

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	65

EXISTING CULVERT C HY-8 ANALYSIS

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_EXIST-C.dgn

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-C-EXIST

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-C EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
897.85	5 year	31.80	22.20	9.60	9
897.92	10 year	38.10	22.72	15.28	5
898.00	25 year	46.80	23.40	23.28	4
898.06	50 year	53.50	23.81	29.67	4
898.11	100 year	60.60	24.20	36.30	3
897.46	Overtopping	19.00	19.00	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-C EXIST

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	31.80	22.20	897.85	2.955	3.029	7-M2c	2.000	1.680	1.680	0.238	7.878	3.058
10 year	38.10	22.72	897.92	3.030	3.104	7-M2c	2.000	1.697	1.697	0.265	7.997	3.276
25 year	46.80	23.40	898.00	3.129	3.185	7-M2c	2.000	1.717	1.717	0.300	8.151	3.542
50 year	53.50	23.81	898.06	3.192	3.240	7-M2c	2.000	1.729	1.729	0.324	8.248	3.726
100 year	60.60	24.20	898.11	3.252	3.291	7-M2c	2.000	1.740	1.740	0.349	8.339	3.905

****

Straight Culvert

Inlet Elevation (invert): 894.82 ft, Outlet Elevation (invert): 894.79 ft

Culvert Length: 34.00 ft, Culvert Slope: 0.0009

****

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 894.82 ft

Outlet Station: 34.00 ft

Outlet Elevation: 894.79 ft

Number of Barrels: 1

Culvert Data Summary - CULV-C EXIST

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

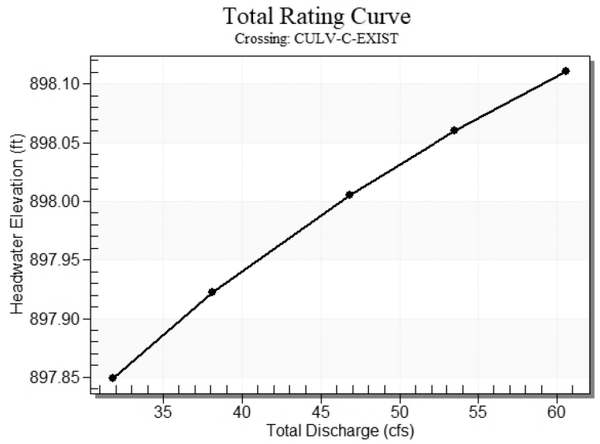
Barrel Manning's n: 0.0120

Culvert Type: Straight

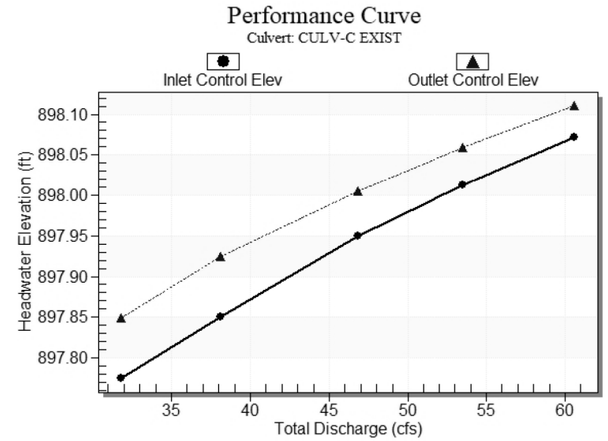
Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-C-EXIST



Culvert Performance Curve Plot: CULV-C EXIST



Water Surface Profile Plot for Culvert: CULV-C EXIST

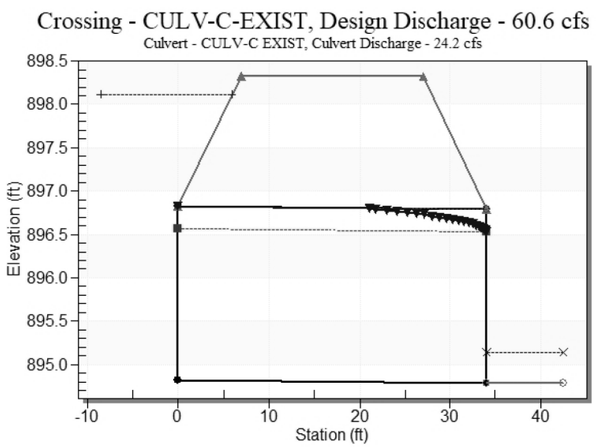


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-C-EXIST)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
31.80	895.03	0.24	3.06	0.55	1.12
38.10	895.06	0.27	3.28	0.61	1.14
46.80	895.09	0.30	3.54	0.69	1.17
53.50	895.11	0.32	3.73	0.75	1.18
60.60	895.14	0.35	3.90	0.81	1.20

Tailwater Channel Data - CULV-C-EXIST

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 42.00 ft

Side Slope (H:V): 7.00 (_:1)

Channel Slope: 0.0370

Channel Manning's n: 0.0350

Channel Invert Elevation: 894.79 ft

Roadway Data for Crossing: CULV-C-EXIST

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	898.33
1	25.00	897.83
2	50.00	897.46
3	75.00	898.36
4	100.00	899.26

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711

TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HYDRAULIC DATA SHEET
EXISTING CULVERT C

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	66

Plotted on: 1/27/2023

Design Filename: H:\Projects\511\66\00\Design\Civil\Drainage\5116600_HDS_PROP-C.dgn

PROPOSED CULVERT C HY-8 ANALYSIS

Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: CULV-C-PROP

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CULV-C PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
896.79	5 year	31.80	31.80	0.00	1
897.05	10 year	38.10	38.10	0.00	1
897.47	25 year	46.80	46.80	0.00	1
897.84	50 year	53.50	53.21	0.19	21
898.01	100 year	60.60	55.94	4.57	10
897.77	Overtopping	52.10	52.10	0.00	Overtopping

Table 2 - Culvert Summary Table: CULV-C PROP

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	31.80	31.80	896.79	1.800	1.096	1-S2n	0.799	1.164	0.901	0.291	7.466	2.480
10 year	38.10	38.10	897.05	2.058	1.365	5-S2n	0.884	1.279	1.002	0.324	7.801	2.655
25 year	46.80	46.80	897.47	2.479	1.763	5-S2n	0.996	1.419	1.134	0.366	8.226	2.868
50 year	53.50	53.21	897.84	2.847	2.325	5-S2n	1.076	1.515	1.226	0.396	8.518	3.015
100 year	60.60	55.94	898.01	3.020	2.448	5-S2n	1.111	1.553	1.264	0.427	8.643	3.158

****

Straight Culvert

Inlet Elevation (invert): 894.99 ft, Outlet Elevation (invert): 894.57 ft

Culvert Length: 28.00 ft, Culvert Slope: 0.0150

****

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 894.99 ft

Outlet Station: 28.00 ft

Outlet Elevation: 894.57 ft

Number of Barrels: 3

Culvert Data Summary - CULV-C PROP

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

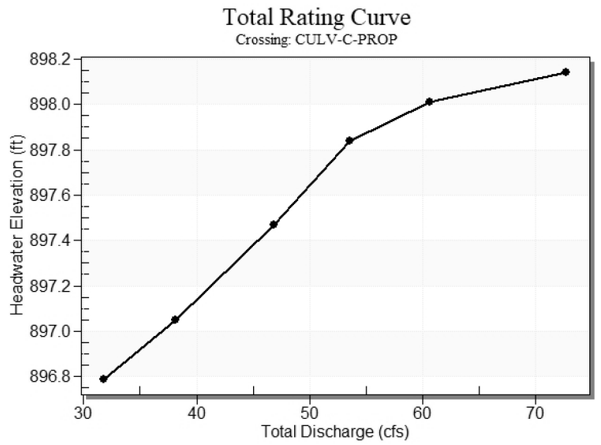
Barrel Manning's n: 0.0120

Culvert Type: Straight

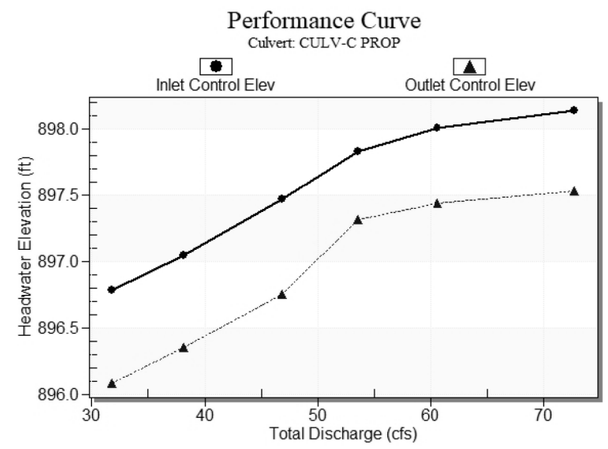
Inlet Configuration: Mitered to Conform to Slope

Inlet Depression: None

Rating Curve Plot for Crossing: CULV-C-PROP



Culvert Performance Curve Plot: CULV-C PROP



Water Surface Profile Plot for Culvert: CULV-C PROP

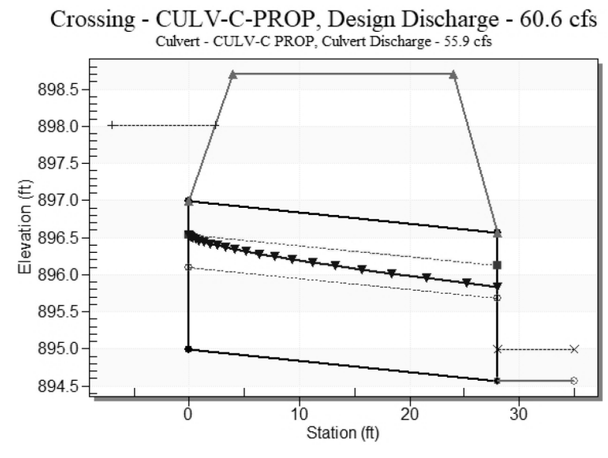


Table 3 - Downstream Channel Rating Curve (Crossing: CULV-C-PROP)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
31.80	894.86	0.29	2.48	0.34	0.83
38.10	894.89	0.32	2.65	0.38	0.84
46.80	894.94	0.37	2.87	0.43	0.86
53.50	894.97	0.40	3.01	0.46	0.87
60.60	895.00	0.43	3.16	0.50	0.88

Tailwater Channel Data - CULV-C-PROP

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 42.00 ft

Side Slope (H:V): 7.00 (_:1)

Channel Slope: 0.0188

Channel Manning's n: 0.0350

Channel Invert Elevation: 894.57 ft

Roadway Data for Crossing: CULV-C-PROP

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	898.71
1	25.00	898.09
2	50.00	897.77
3	75.00	898.09
4	100.00	898.72

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

STATE OF TEXAS · DENNIS K. SEAL · 80287 · LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN | SAN ANTONIO | HOUSTON | FORT WORTH | DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 | AUSTIN, TX 78759 | 512.454.8711

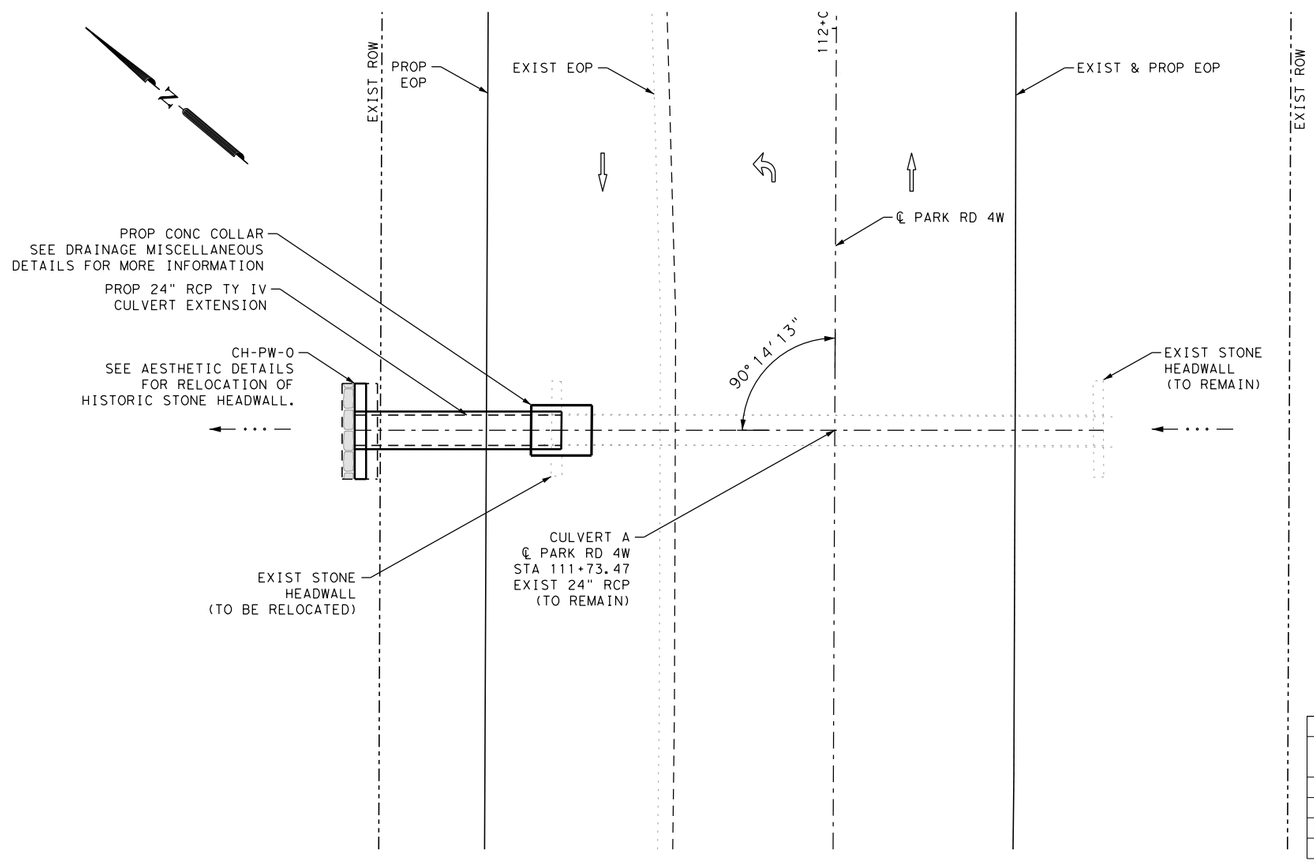
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028801

INKS LAKE

HYDRAULIC DATA SHEET
PROPOSED CULVERT C

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	67



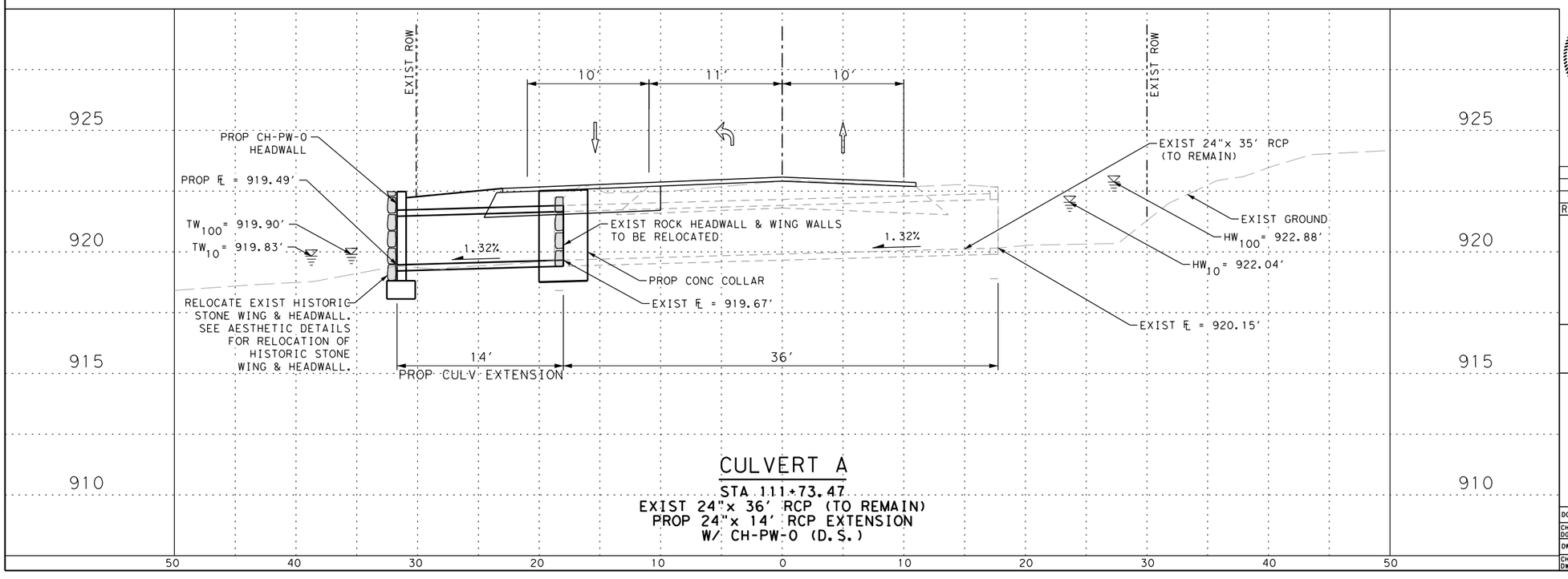
LEGEND

- R.O.W.
- 850 EXISTING CONTOUR
- FLOW ARROW

NOTES

1. RUNOFF COMPUTED USING RATIONAL METHOD.
2. C-VALUES WERE DEVELOPED USING ZONED LAND USE FROM TXDOT HYDRAULIC DESING MANUAL TABLE 4-11.
3. EXISTING FEATURES ARE SHOWN SCREENED BACK, i.e. FADED.
4. CULVERTS DESIGNED FOR A 10-YR DESIGN STORM EVENT.
5. HY-8 VERSION 7.50 USED TO CALCULATE CULVERT HYDRAULICS.
6. NOAA ATLAS 14 UTILIZED FOR INTENSITY CALCULATIONS.

HYDRAULIC DATA						
CULVERT A	EXIST		PROP		DIFFERENCE	
	10-YR	100-YR	10-YR	100-YR	10-YR	100-YR
Q (CFS)	11.80	18.70	11.80	18.70	0.00	0.00
V (FPS)	7.59	8.55	7.80	8.74	0.21	0.19
HW ELEV (FT)	922.04	922.88	922.04	922.88	0.00	0.00
TW ELEV (FT)	920.00	920.07	919.83	919.90	-0.17	-0.17



CULVERT A

STA 111+73.47
EXIST 24"x 36' RCP (TO REMAIN)
PROP 24"x 14' RCP EXTENSION
W/ CH-PW-0 (D.S.)

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 5 10

SCALE: PLAN 1"= 10' PROFILE 1"= 5'

REV. NO.	DATE	DESCRIPTION	BY

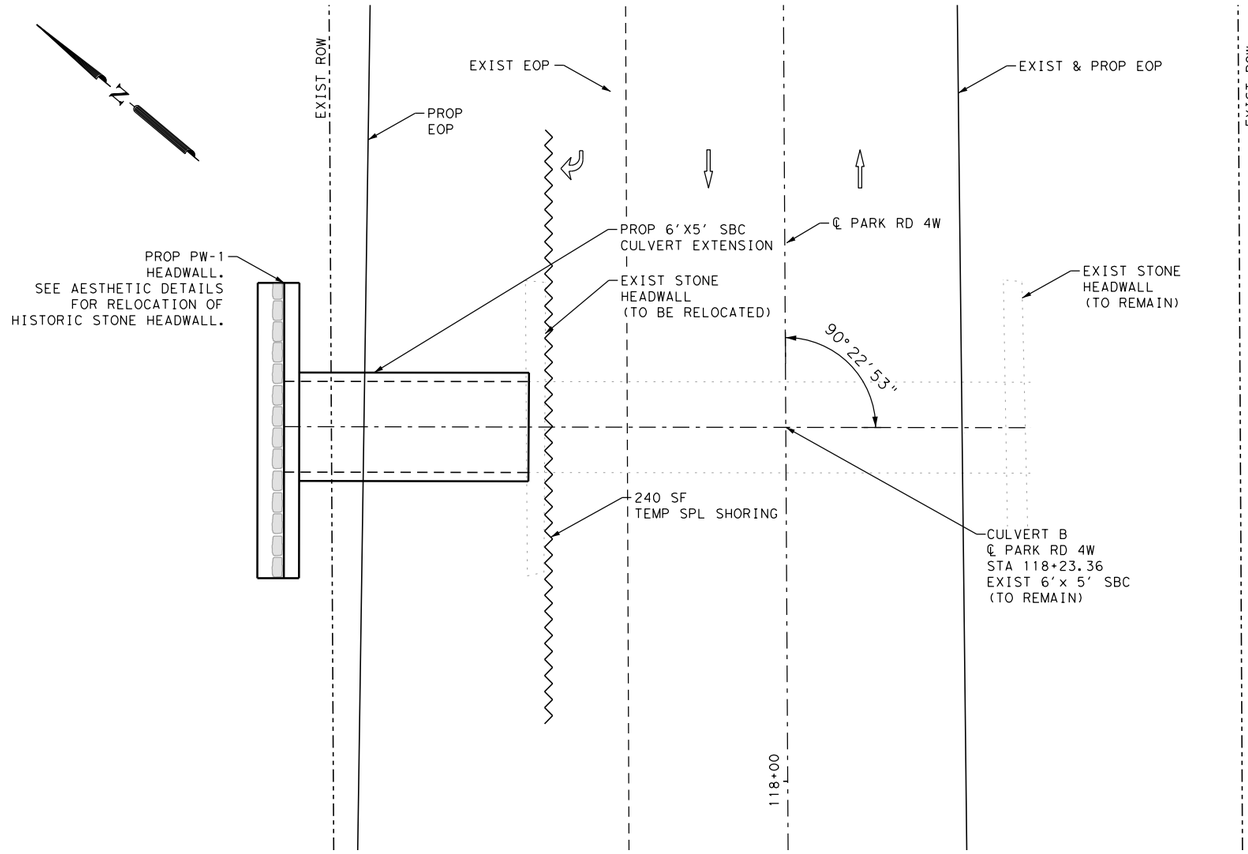
PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

CULVERT A LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	68



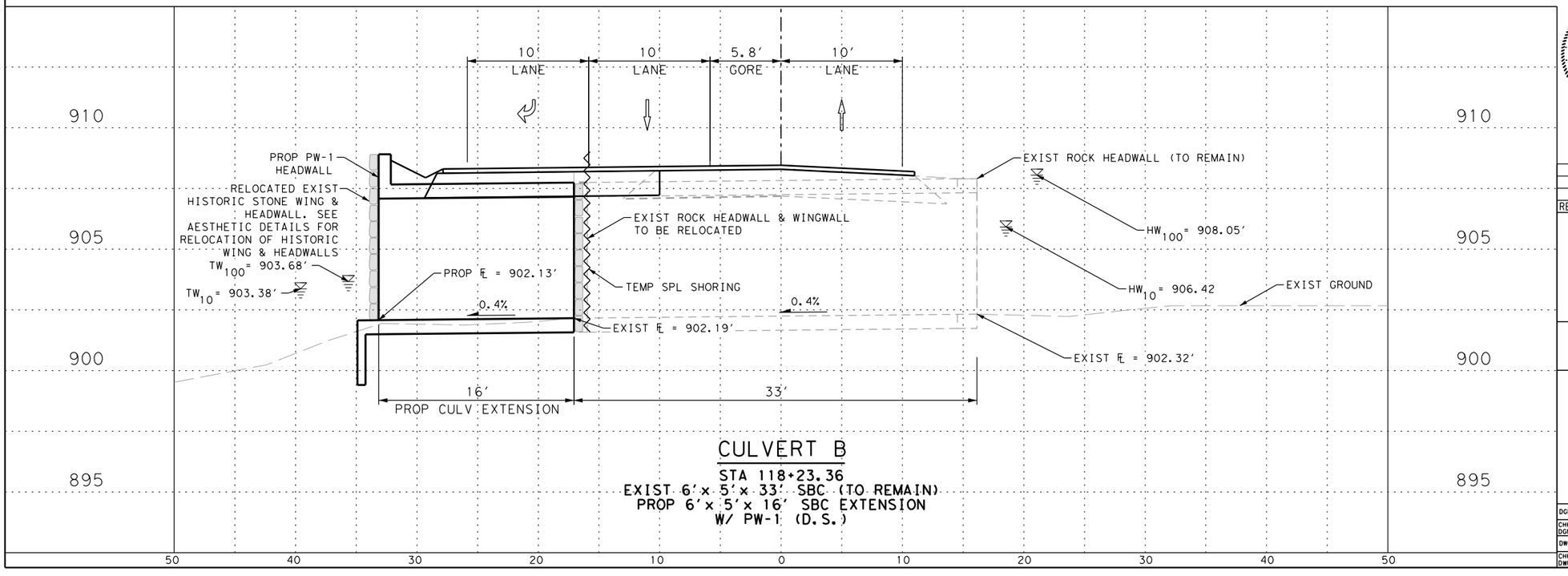
LEGEND

- R.O.W.
- 850 EXISTING CONTOUR
- FLOW ARROW
- TEMP SPL SHORING

NOTES

1. RUNOFF COMPUTED USING RATIONAL METHOD.
2. C-VALUES WERE DEVELOPED USING ZONED LAND USE FROM TXDOT HYDRAULIC DESING MANUAL TABLE 4-11.
3. EXISTING FEATURES ARE SHOWN SCREENED BACK, i.e. FADED.
4. CULVERTS DESIGNED FOR A 10-YR DESIGN STORM EVENT.
5. HY-8 VERSION 7.50 USED TO CALCULATE CULVERT HYDRAULICS.
6. NOAA ATLAS 14 UTILIZED FOR INTENSITY CALCULATIONS.

HYDRAULIC DATA						
CULVERT B	EXIST		PROP		DIFFERENCE	
	10-YR	100-YR	10-YR	100-YR	10-YR	100-YR
Q (CFS)	128.80	207.90	128.80	207.90	0.00	0.00
V (FPS)	9.21	10.50	9.20	10.44	-0.01	-0.06
HW ELEV (FT)	906.42	908.05	906.42	908.05	0.00	0.00
TW ELEV (FT)	903.44	903.74	903.38	903.68	-0.06	-0.06



CULVERT B

STA 118+23.36
EXIST 6'x 5'x 33' SBC (TO REMAIN)
PROP 6'x 5'x 16' SBC EXTENSION
W/ PW-1 (D.S.)

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 2/20/2023 DATE

0 5 10

SCALE: PLAN 1"= 10' PROFILE 1"= 5'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

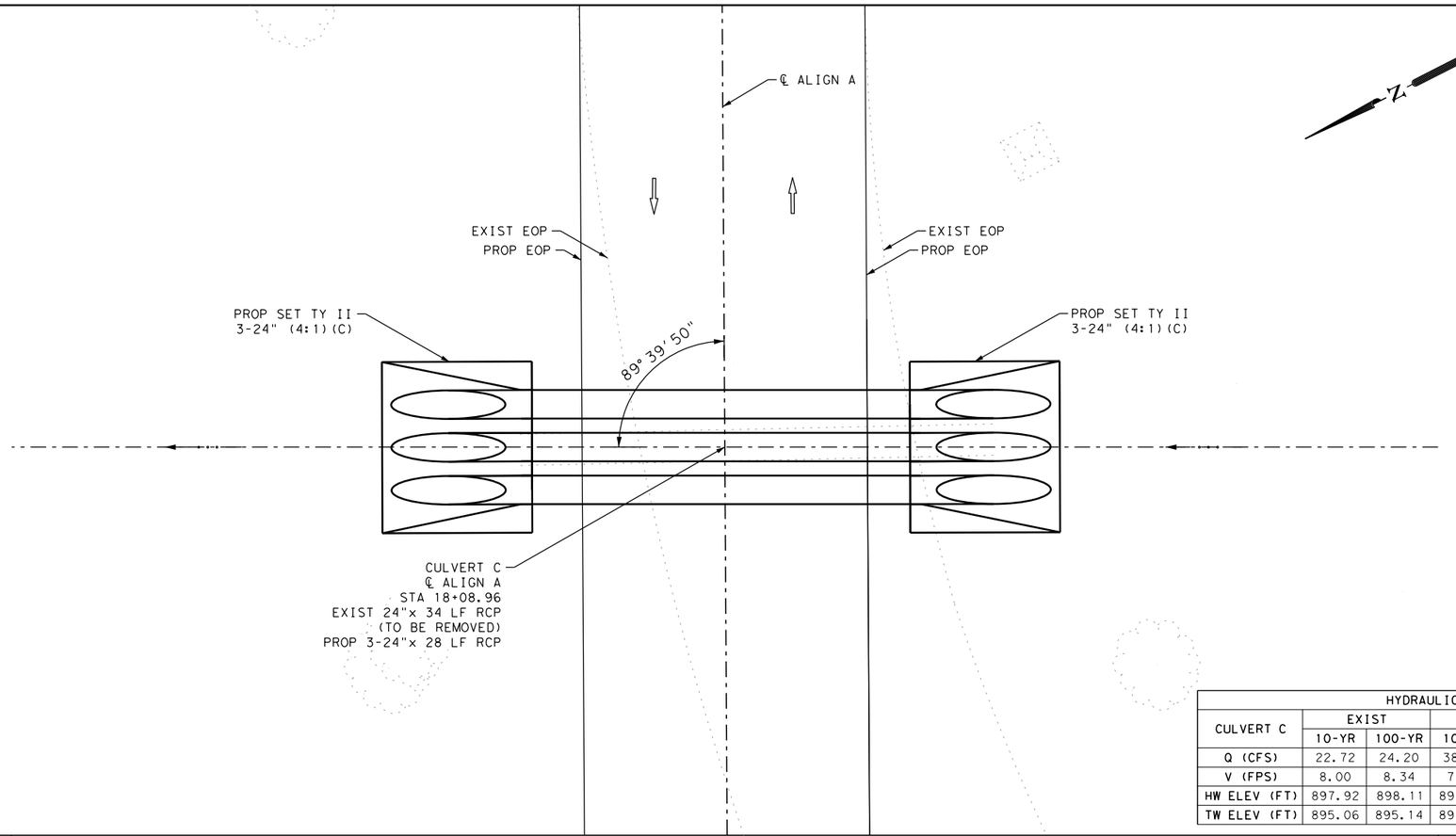
INKS LAKE

CULVERT B LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	69

Plotted on: 1/27/2023



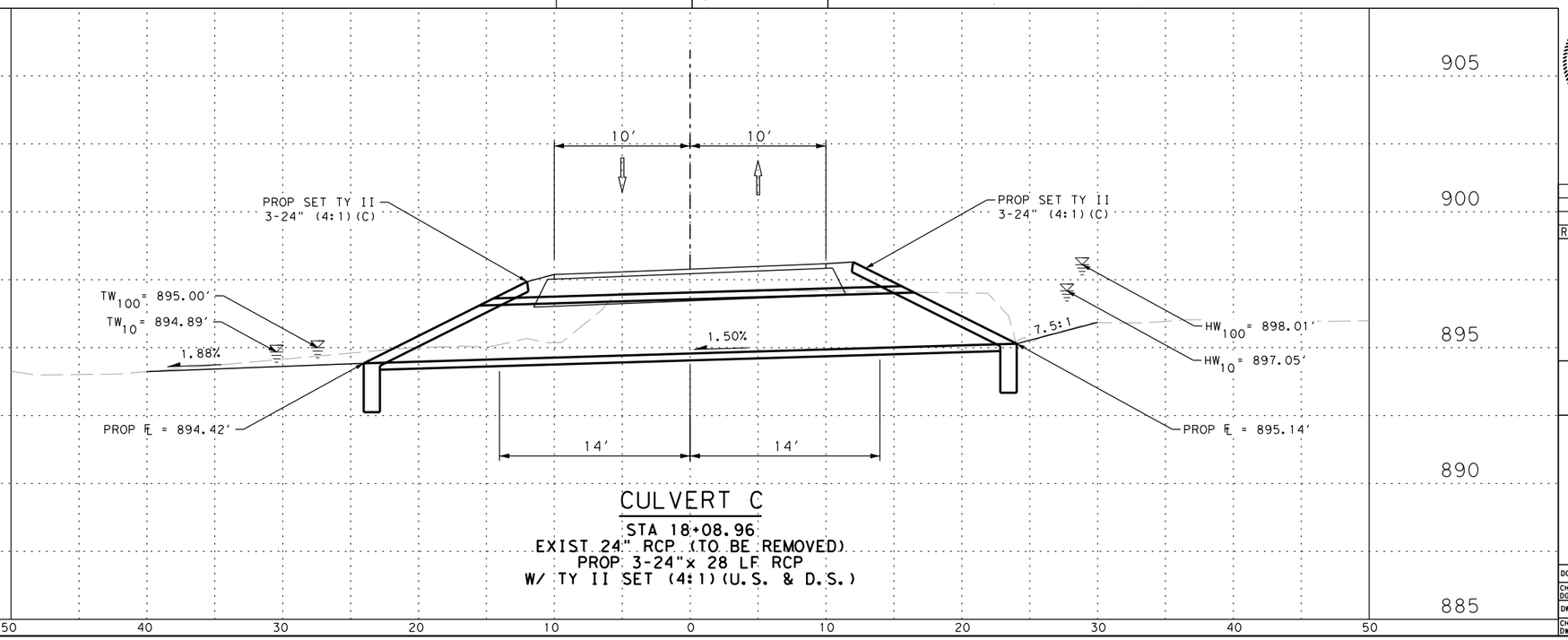
LEGEND

- R.O.W.
- 850 EXISTING CONTOUR
- FLOW ARROW

NOTES

1. RUNOFF COMPUTED USING RATIONAL METHOD.
2. C-VALUES WERE DEVELOPED USING ZONED LAND USE FROM TXDOT HYDRAULIC DESING MANUAL TABLE 4-11.
3. EXISTING FEATURES ARE SHOWN SCREENED BACK, i.e. FADED.
4. CULVERTS DESIGNED FOR A 10-YR DESIGN STORM EVENT.
5. HY-8 VERSION 7.50 USED TO CALCULATE CULVERT HYDRAULICS.
6. NOAA ATLAS 14 UTILIZED FOR INTENSITY CALCULATIONS.

HYDRAULIC DATA						
CULVERT C	EXIST		PROP		DIFFERENCE	
	10-YR	100-YR	10-YR	100-YR	10-YR	100-YR
Q (CFS)	22.72	24.20	38.10	55.94	15.38	31.74
V (FPS)	8.00	8.34	7.80	8.64	-0.20	0.30
HW ELEV (FT)	897.92	898.11	897.05	898.01	-0.87	-0.10
TW ELEV (FT)	895.06	895.14	894.89	895.00	-0.17	-0.14



CULVERT C

STA 18+08.96
EXIST 24" RCP (TO BE REMOVED)
PROP 3-24"x 28 LF RCP
W/ TY II SET (4:1)(U.S. & D.S.)

STATE OF TEXAS · DENNIS K. SEAL · 80287 · LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 5 10

SCALE: PLAN 1"= 10' PROFILE 1"= 5'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

CULVERT C LAYOUT

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	70

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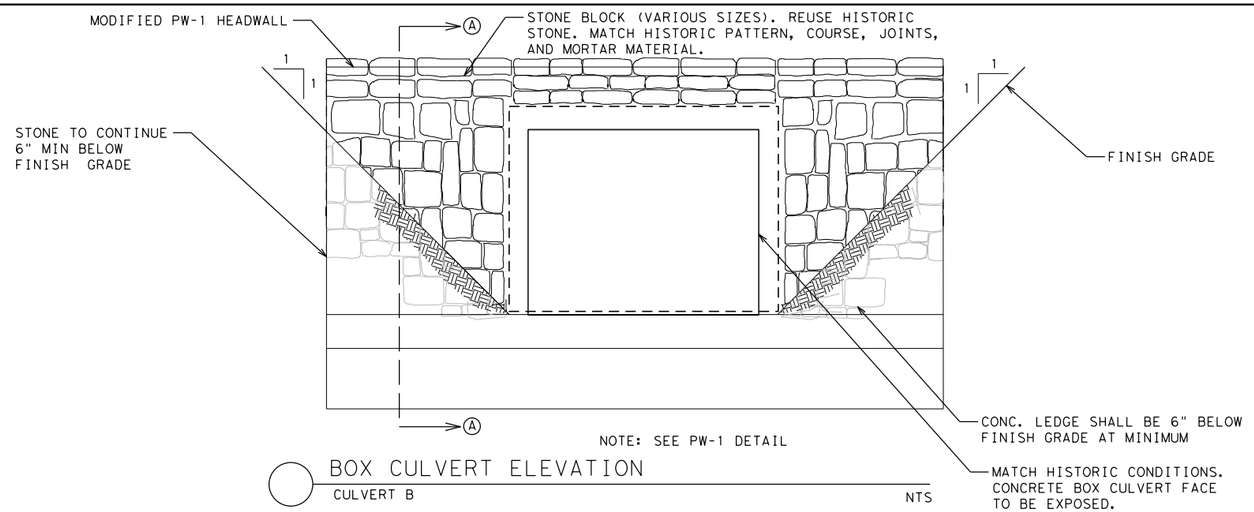


BOX CULVERT ELEVATION
CULVERT B — NTS

ELEVATION

SCHEDULE OF MATERIALS AND FINISHES FOR NATURAL STONE VENEER			
ITEM	DESCRIPTION	SPEC or FINISH	EXAMPLE
Subsidiary to Pertinent Items	WALL TIES	22 Gauge Galv. Wall Tie	Simpson Strong or Approved Equal
Subsidiary to Pertinent Items	MORTAR JOINT (RAKED)	(1) part lime to (6) parts sand, then (6) parts of mud to (1) part of cement. Color mixed in with cement in proportion to lime- (1) part for every (4) parts of lime used.	Information from Arthur Fehr's Day Book, dated Feb.1,1934 (TPWD approved mix)
0420-6074	CLASS C CONC. (MISC.)		

NOTES:
1. CONTRACTOR TO SALVAGE HISTORIC STONE, CATALOGUE AND NUMBER EXISTING STONE, STORE, AND REPLICATE EXISTING HISTORIC STONE AT SAME ORIGINAL WALL LOCATION. MORTAR MATERIAL AND JOINT TYPE ARE TO REPLICATE THE EXISTING HISTORIC HEADWALL. RELOCATED STONE HEADWALL TO VISUALLY MATCH GENERAL CONDITIONS OF EXISTING HISTORIC HEADWALL THAT WILL REMAIN IN PLACE. IF NEW WALL MATERIAL IS REQUIRED, MATCH EXISTING STONE MATERIAL, COLOR, AND SIZE.
2. EXISTING STONES MAY BE MODIFIED ONLY IF NECESSARY BY CUTTING AND HAMMERING EDGES. KEEP MODIFICATIONS TO EXISTING STONE TO A MINIMUM.
3. FOR CULVERT WINGWALLS, KEEP EXISTING STONE VISIBLE ABOVE FINISH GRADE. NEW CONCRETE HEADWALL NOT TO BE VISIBLE. NEW HEADWALL TO BE COVERED WITH SALVAGED STONE FROM SITE.
4. REINFORCING STEEL IS CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY.
5. PROVIDE ¾" BED JOINTS ON FACE OF MASONRY WALL. MATCH HISTORIC MORTAR AND JOINT TYPE AT STONE WALL JOINTS. SEE PHOTO FOR LOCATION OF SALVAGED STONES.
6. WALL TIES SHALL BE 22 GAUGE, GALV. CORRUGATED STEEL, SECURED WITH HILTI EXPANSION ANCHOR BOLT KB 3 ¼ X 3 ¼ SS 304, OR APPROVED EQUAL INSTALLED ACCORDING TO MANUFACTURE'S SPECIFICATIONS. PLACE WALL TIES AT EVERY SECOND HORIZONTAL BED JOINT, IN THE CENTER OF THE WALL FACE, AS SHOWN.
7. ADJUST HEIGHT OF MASONRY TO ENSURE THAT THE TOP OF WALL MASONRY IS IN HORIZONTAL ALIGNMENT.
8. PLACE BLACK POLY SHEETING (6 MIL) AS A BOND BREAKER AT BOTTOM CORNERS OF MASONRY. PLACE SHEETING BETWEEN MASONRY LEDGE AND THE BOTTOM MORTAR BED, EXTENDING 12" FROM CORNERS.
9. REFER TO THE CONC. LEDGE DETAIL SHEET FOR PLACEMENT, DIMENSIONS, AND SIZES OF REINFORCING STEEL.
10. MORTAR, GROUT, REINFORCING STEEL, AND TIES ARE CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY.
11. APPROVED EQUAL MASONRY SECURING DEVICES OR SYSTEMS MUST BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION.

EXISTING CONDITIONS IMAGE
CULVERT B — NTS

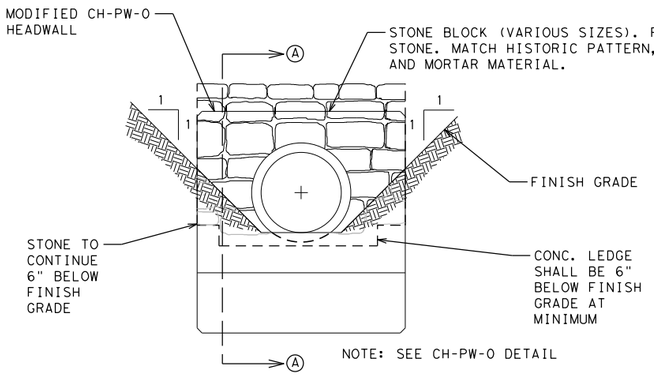
EXISTING CONDITIONS IMAGE
CULVERT A — NTS

REFERENCE PHOTO TO MATCH HISTORIC STONE PATTERN, KEYSTONE, NUMBER OF COURSES, AND SQUARE HEADWALL SHAPE.

MASONRY TIE DETAIL
NTS

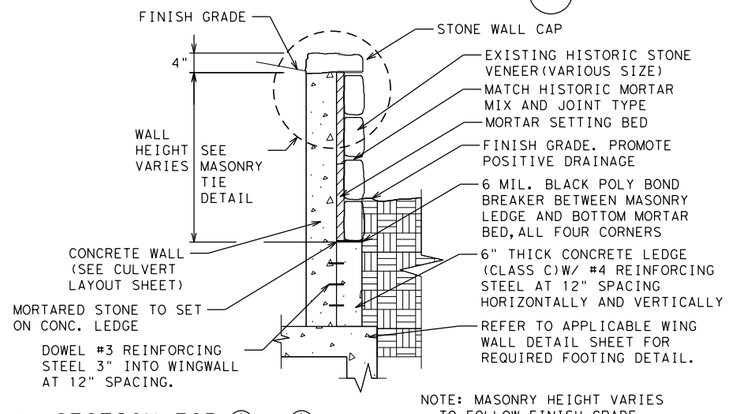
STATE OF TEXAS — DENNIS K. SEAL — 80287 — LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 (DATE)



CIRCULAR PIPE CULVERT ELEVATION
CULVERT A — NTS

ELEVATION



NOTE: MASONRY HEIGHT VARIES TO FOLLOW FINISH GRADE

SECTION FOR Ⓐ - Ⓐ
NTS

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

HEADWALL AESTHETIC DETAIL

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	71

Plotted on: 1/27/2023

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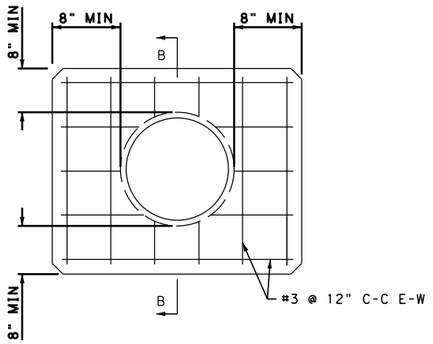
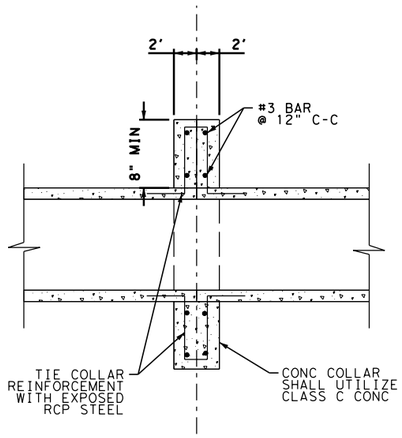


PIPE SIDE ELEVATION
N. T. S.

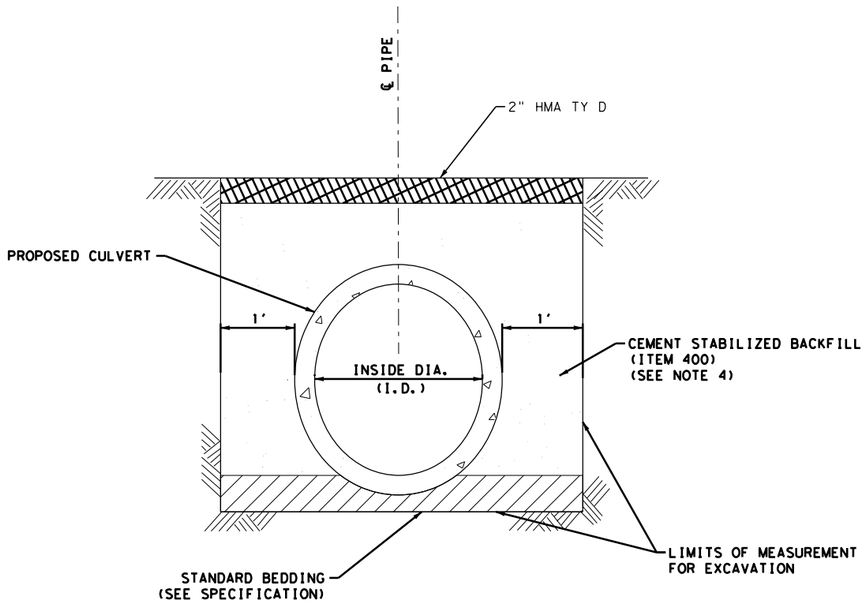


SECTION B-B
N. T. S.

CONCRETE COLLAR DETAILS
N. T. S.

NOTES

1. TIE IN LOCATIONS ARE APPROXIMATE AND TAKEN FROM THE BEST INFORMATION AVAILABLE AT THE TIME OF DESIGN. CONTRCTOR TO FIELD VERIFY EXISTING STRUCTURES PRIOR TO INSTALLATION OF PROPOSED DRAINAGE IMPROVEMENTS.
2. BREAK BACK OF RCP, MATERIALS AND FORMING OF CAST-IN-PLACE COLLAR IS SUBSIDIARY TO VARIOUS ITEMS. NO SEPARATE PAY ITEM.
3. DETAIL USED FOR REFERENCE STATION SEE TXDOT STANDARD FOR DESIGN DETAILS.
4. FLOWABLE FILL SHALL BE TESTED ACCORDING TO TEX-440-1, "INITIAL TIME OF SET OF FRESH CONCRETE," TEX-440-A REFERENCES ASTM C403 TEST PROCEDURE. A MINIMUM PENETRATION NUMBER OF 650 IS REQUIRED PRIOR TO PLACEMENT OF BACKFILL AND PAVEMENT SURFACE.



CEMENT STABILIZED BACKFILL DETAIL
N. T. S.

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

MISCELLANEOUS DRAINAGE DETAILS

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	72

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
CULV-B Station 118+23.36 Lt	1 - 6' x 5'	2'	SCC-5&6	PW-1	0°	2:1	8"	7"	0	5.667'	N/A	N/A	11.333'	7.167'	N/A	0.0	0.1	8.8	128

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 3/2/2023 DATE

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS MOD

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		73

DATE: 3/2/2023 3:57:01 PM
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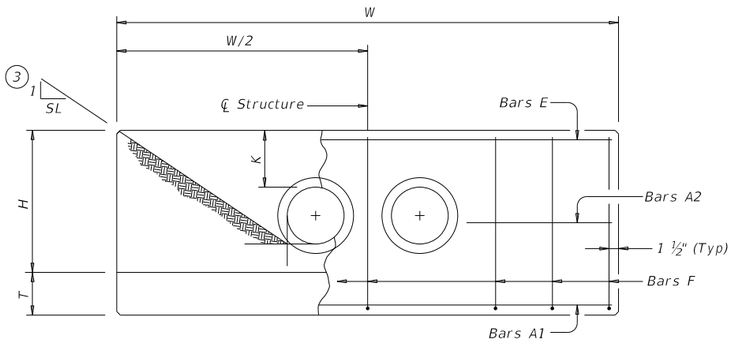
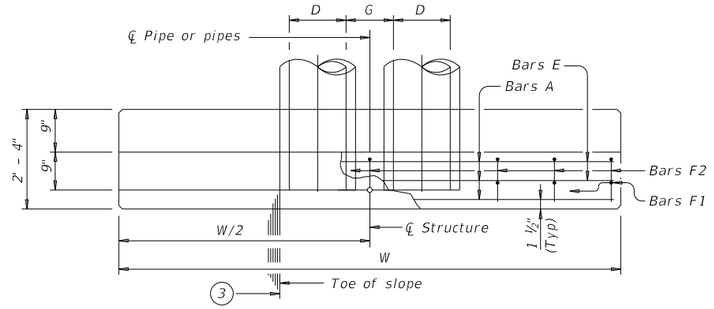
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

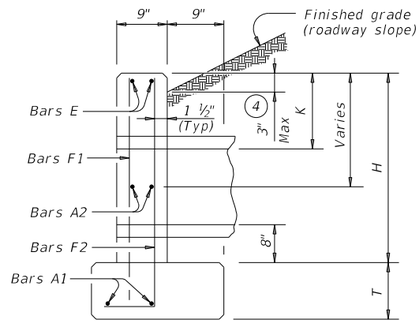
Slope	Dia of Pipe (D)	Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 0"	122	1.1	1' – 9"	15	0.2
	15"	10' – 3"	136	1.3	2' – 2"	16	0.2
	18"	11' – 6"	163	1.5	2' – 8"	19	0.3
	21"	12' – 9"	200	1.8	3' – 1"	31	0.4
	24"	14' – 0"	217	2.1	3' – 7"	34	0.4
	27"	15' – 3"	254	2.4	3' – 11"	37	0.5
	30"	16' – 6"	272	2.7	4' – 4"	40	0.6
	33"	17' – 9"	314	3.1	4' – 8"	43	0.6
	36"	19' – 0"	371	3.9	5' – 1"	46	0.8
	42"	21' – 6"	442	4.9	5' – 10"	52	1.0
	48"	25' – 0"	569	6.4	6' – 7"	59	1.3
	54"	27' – 6"	701	7.5	7' – 6"	82	1.6
	60"	30' – 0"	794	8.8	8' – 3"	90	1.8
	66"	32' – 6"	894	10.2	8' – 9"	96	2.0
	72"	35' – 0"	1,055	11.7	9' – 4"	103	2.3
3:1	12"	13' – 0"	175	1.6	1' – 9"	14	0.2
	15"	14' – 9"	193	1.9	2' – 2"	17	0.2
	18"	16' – 6"	228	2.2	2' – 8"	19	0.3
	21"	18' – 3"	299	2.6	3' – 1"	31	0.4
	24"	20' – 0"	323	3.0	3' – 7"	33	0.4
	27"	21' – 9"	371	3.5	3' – 11"	37	0.5
	30"	23' – 6"	415	4.0	4' – 4"	40	0.5
	33"	25' – 3"	469	4.6	4' – 8"	43	0.6
	36"	27' – 0"	556	5.7	5' – 1"	46	0.8
	42"	30' – 6"	675	7.1	5' – 10"	52	1.0
	48"	35' – 6"	837	9.2	6' – 7"	59	1.3
	54"	39' – 0"	1,015	11.0	7' – 6"	84	1.6
	60"	42' – 6"	1,171	12.9	8' – 3"	91	1.8
	66"	46' – 0"	1,298	14.9	8' – 9"	98	2.0
	72"	49' – 6"	1,561	17.1	9' – 4"	103	2.3
4:1	12"	17' – 0"	229	2.0	1' – 9"	15	0.2
	15"	19' – 3"	266	2.4	2' – 2"	17	0.2
	18"	21' – 6"	308	2.9	2' – 8"	19	0.3
	21"	23' – 9"	382	3.5	3' – 1"	31	0.3
	24"	26' – 0"	430	3.9	3' – 7"	34	0.4
	27"	28' – 3"	486	4.7	3' – 11"	37	0.5
	30"	30' – 6"	539	5.2	4' – 4"	40	0.6
	33"	32' – 9"	603	6.0	4' – 8"	42	0.6
	36"	35' – 0"	738	7.5	5' – 1"	47	0.8
	42"	39' – 6"	881	9.3	5' – 10"	52	1.0
	48"	46' – 0"	1,102	12.1	6' – 7"	61	1.3
	54"	50' – 6"	1,364	14.4	7' – 6"	84	1.6
	60"	55' – 0"	1,547	16.9	8' – 3"	91	1.8
	66"	59' – 6"	1,741	19.5	8' – 9"	98	2.0
	72"	64' – 0"	2,077	22.4	9' – 4"	102	2.3
6:1	12"	25' – 0"	336	3.0	1' – 9"	14	0.2
	15"	28' – 3"	384	3.6	2' – 2"	17	0.2
	18"	31' – 6"	452	4.2	2' – 8"	19	0.3
	21"	34' – 9"	581	5.1	3' – 1"	31	0.4
	24"	38' – 0"	644	5.8	3' – 7"	34	0.4
	27"	41' – 3"	737	6.9	3' – 11"	37	0.5
	30"	44' – 6"	807	7.7	4' – 4"	39	0.6
	33"	47' – 9"	912	8.9	4' – 8"	44	0.6
	36"	51' – 0"	1,108	11.0	5' – 1"	48	0.8
	42"	57' – 6"	1,318	13.7	5' – 10"	54	1.0
	48"	67' – 0"	1,682	17.9	6' – 7"	59	1.3
	54"	73' – 6"	2,072	21.3	7' – 6"	83	1.6
	60"	80' – 0"	2,351	24.9	8' – 3"	89	1.8
	66"	86' – 6"	2,643	28.9	8' – 9"	96	2.0
	72"	93' – 0"	3,121	33.1	9' – 4"	101	2.3



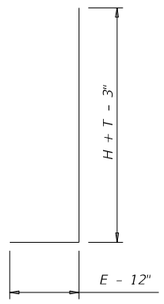
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

(1) Total quantities include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) 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.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 4"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

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.

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STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 3/2/2023 DATE

Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0 MOD

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		74

DATE: 1/27/2023 17:46:50
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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

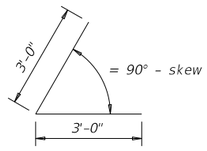
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

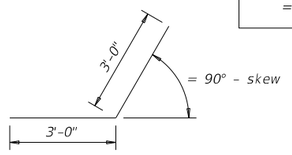
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2

WING DIMENSION FORMULAS:

(All values are in feet.)

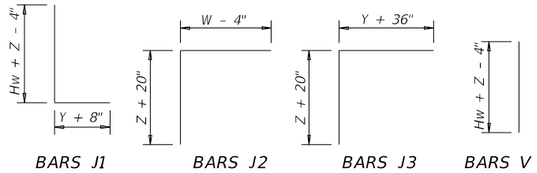
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

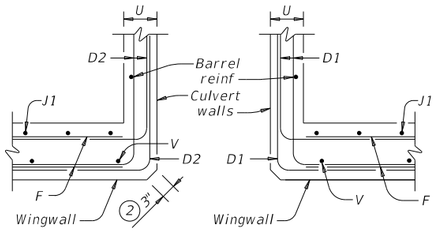
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

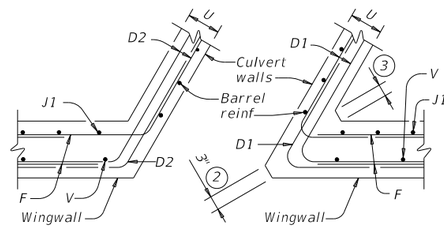
See applicable box culvert standard sheet for S, H, T, and U values.



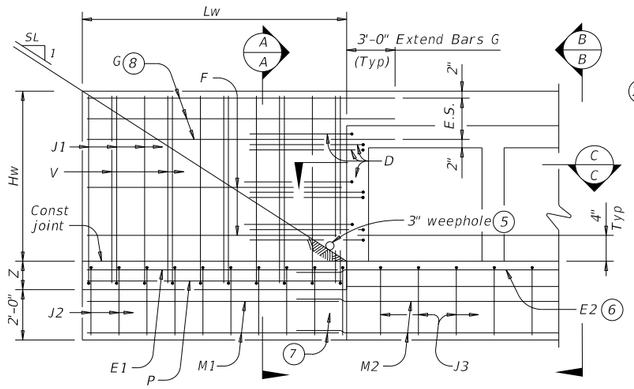
BARS J1 BARS J2 BARS J3 BARS V



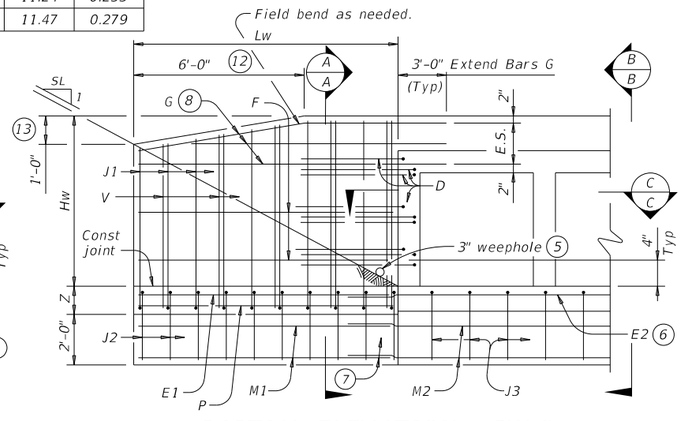
SECTION C-C - PW-1



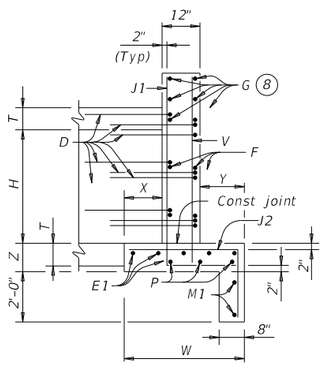
SECTION C-C - PW-2



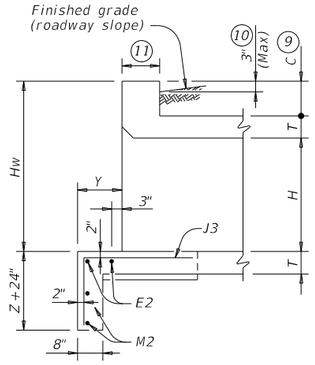
PARTIAL ELEVATION - PW-1



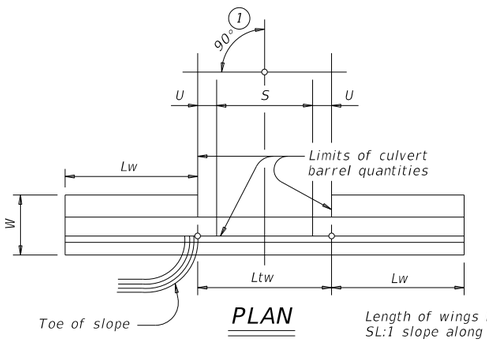
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

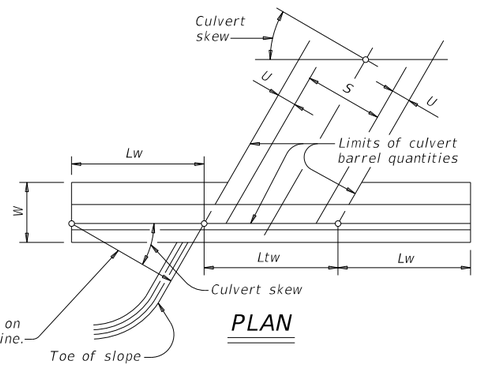


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

(1) Skew = 0°

(2) At discharge end, chamfer may be ¾" minimum.

(3) For 15° skew ~ 1"
For 30° skew ~ 2"
For 45° skew ~ 3"

(4) Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.

(5) Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.

(6) Extend Bars E2 1'-6" minimum into the wingwall footing.

(7) Lap Bars M1 1'-6" minimum with Bars M2.

(8) Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.

(9) 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.

(10) 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.

(11) 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.

(12) 3'-0" for Hw < 4'.

(13) 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the 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 PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		75

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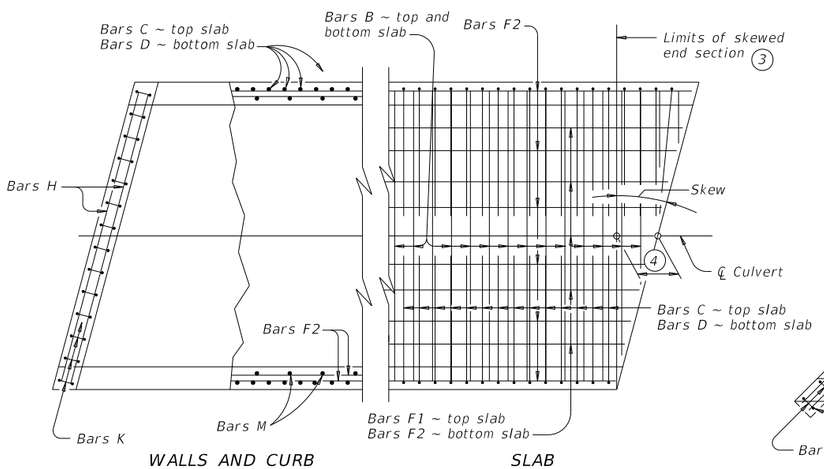
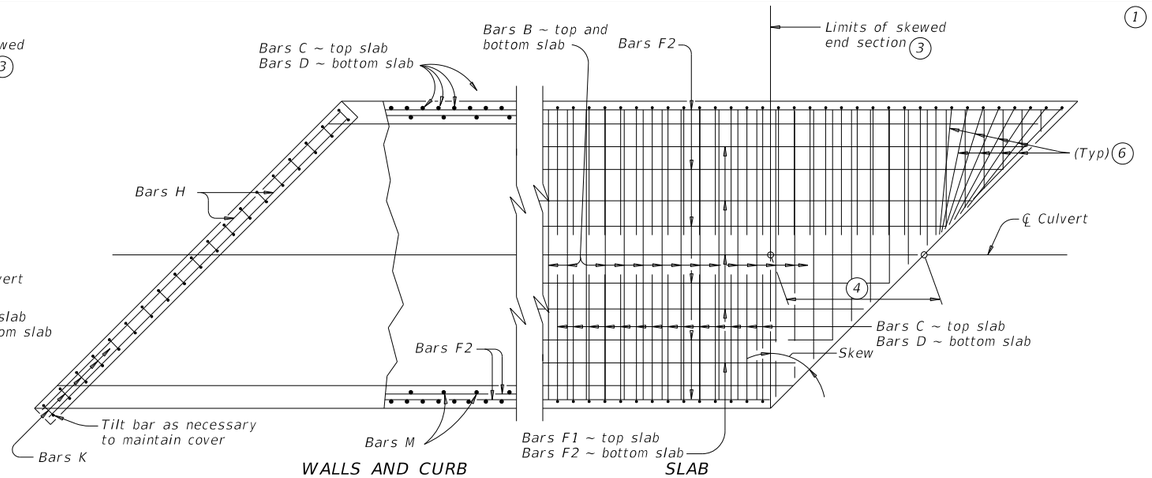
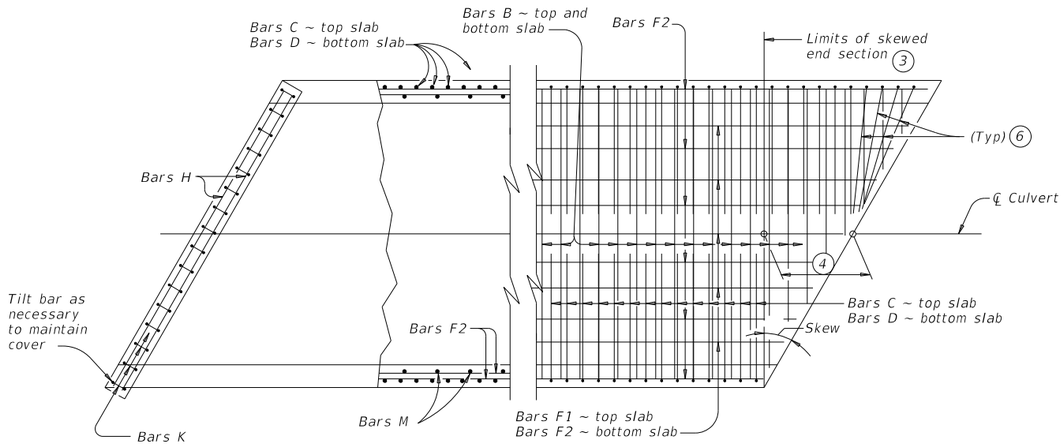


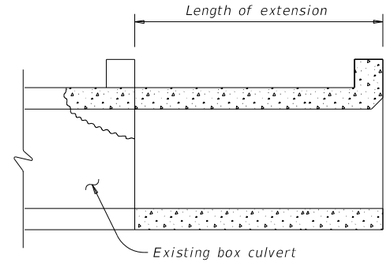
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



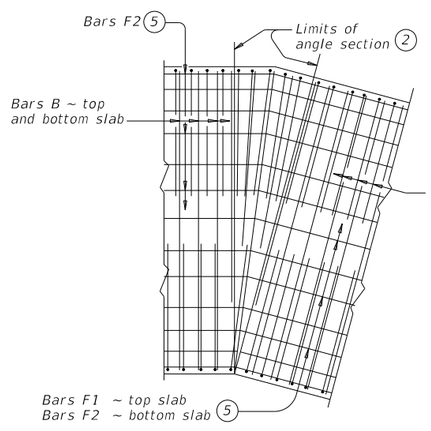
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



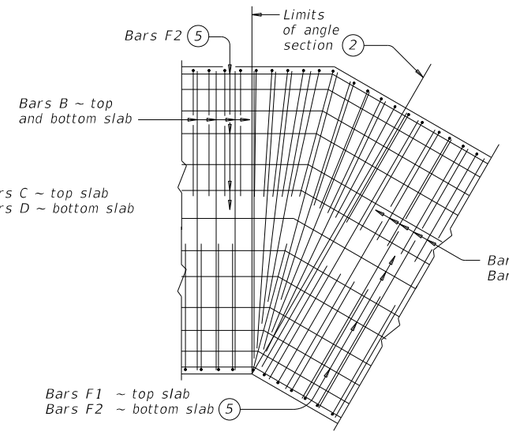
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



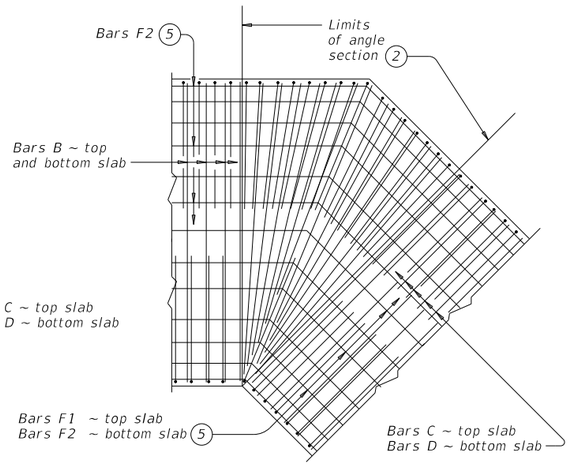
LENGTHENING DETAIL (1)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. 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." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.

For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.

For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

FILE: sccmdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		76

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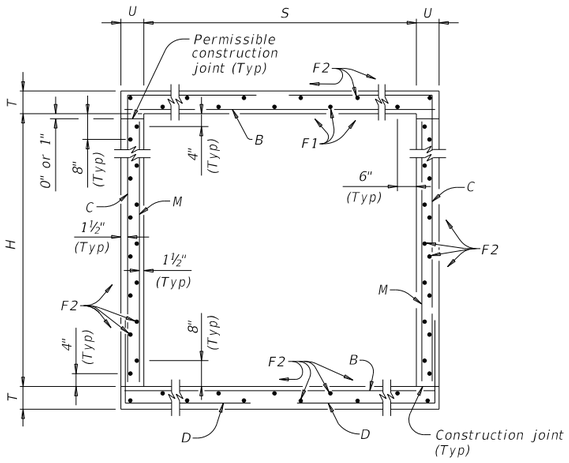
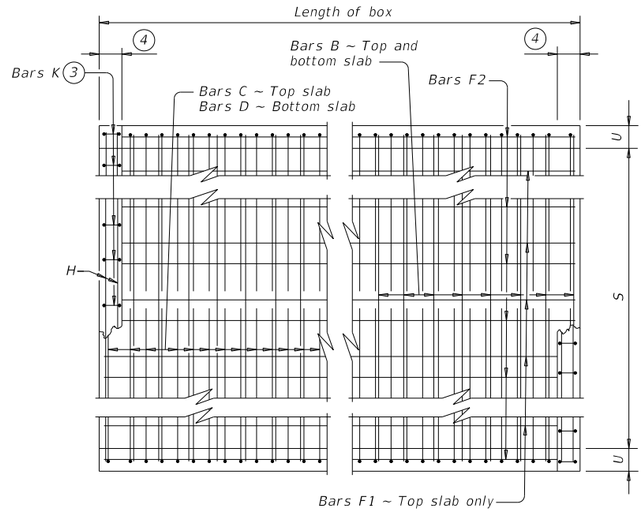
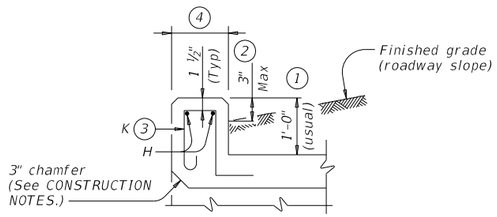


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1 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 Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 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.

3 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.

4 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

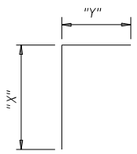
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'_c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'_c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

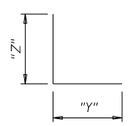
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

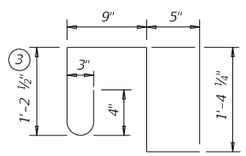
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	AUS	BURNET		77

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' – 0"	2' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 3"	704	2' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' – 0"	2' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 4"	713	2' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' – 0"	3' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 3"	817	3' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' – 0"	3' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 4"	826	3' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' – 0"	4' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 3"	929	4' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' – 0"	4' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 4"	939	4' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' – 0"	5' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 3"	1,042	5' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' – 0"	5' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 4"	1,051	5' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' – 0"	2' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	6' – 7"	742	2' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' – 0"	2' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	6' – 8"	1,126	2' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' – 0"	2' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	6' – 10"	1,155	2' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	2' – 0"	110	5	39' – 9"	133	25	39' – 9"	664	7' – 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' – 0"	3' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	7' – 7"	854	3' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' – 0"	3' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	7' – 8"	1,295	3' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' – 0"	3' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	7' – 10"	1,324	3' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' – 0"	4' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	8' – 7"	967	4' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' – 0"	4' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	8' – 8"	1,464	4' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' – 0"	4' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	8' – 10"	1,493	4' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' – 0"	5' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	9' – 7"	1,080	5' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' – 0"	5' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	9' – 8"	1,633	5' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' – 0"	5' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	9' – 10"	1,661	5' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	33	39' – 9"	876	7' – 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' – 0"	6' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	10' – 7"	1,192	6' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' – 0"	6' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	10' – 8"	1,802	6' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' – 0"	6' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	10' – 10"	1,830	6' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	37	39' – 9"	982	7' – 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

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HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	AUS	BURNET		78

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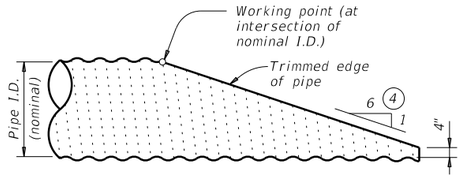
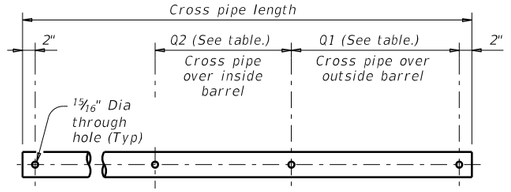


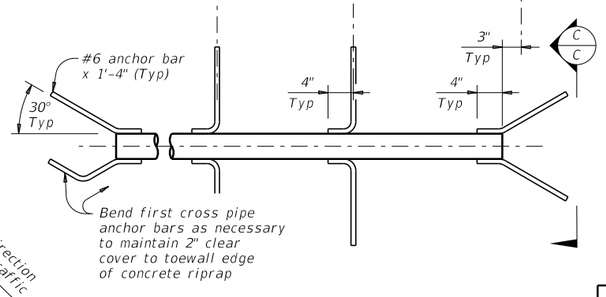
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

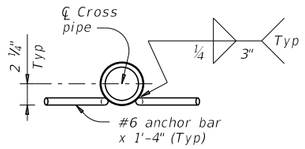
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

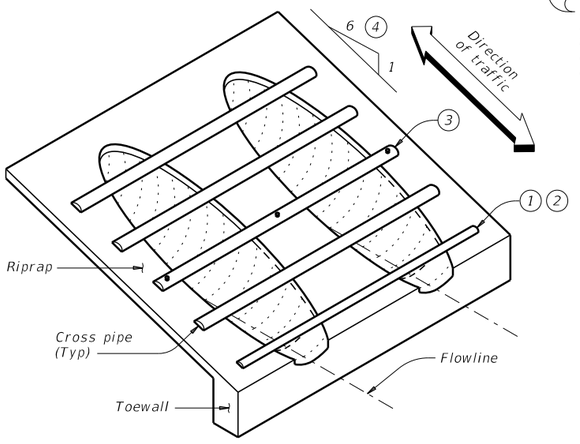


PIPE WITH ANCHOR BARS

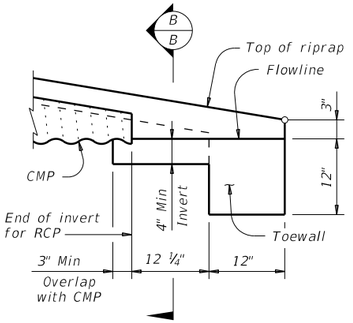


SECTION C-C

CROSS PIPE DETAILS

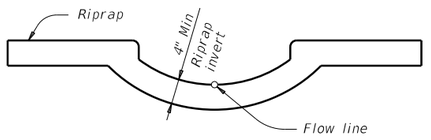


ISOMETRIC VIEW OF TYPICAL INSTALLATION



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

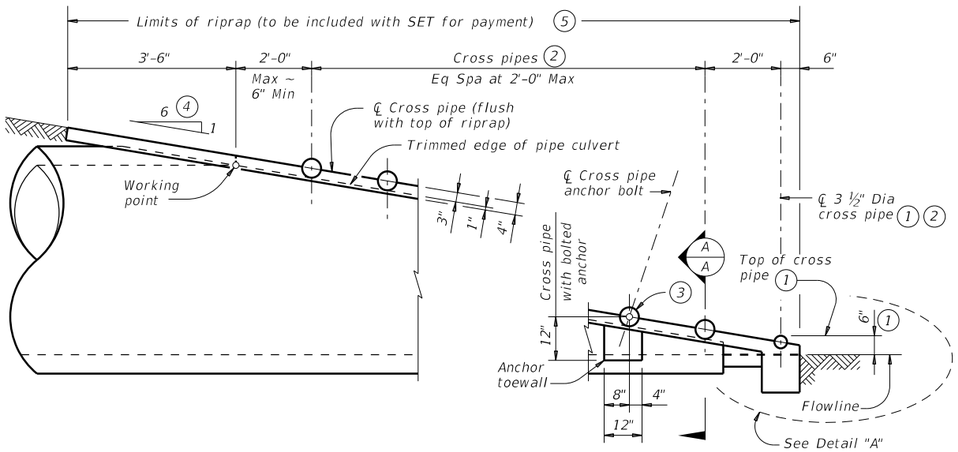
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

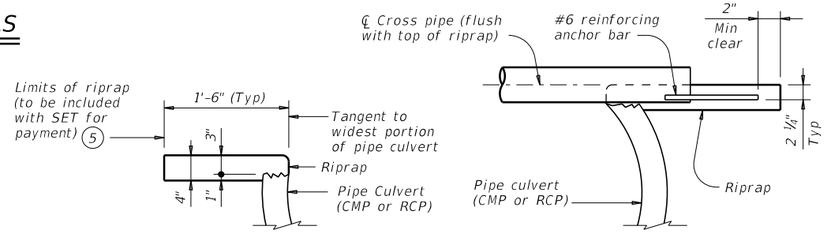
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

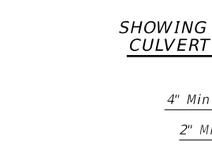


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

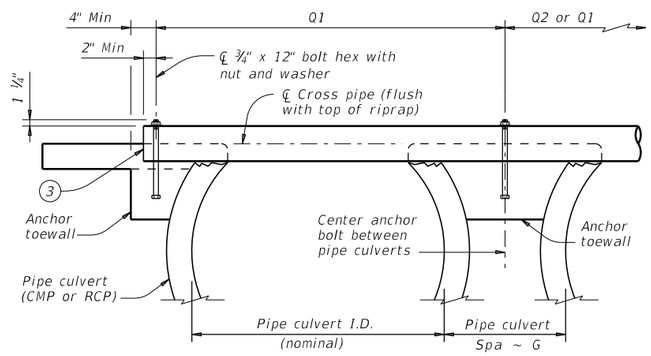
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

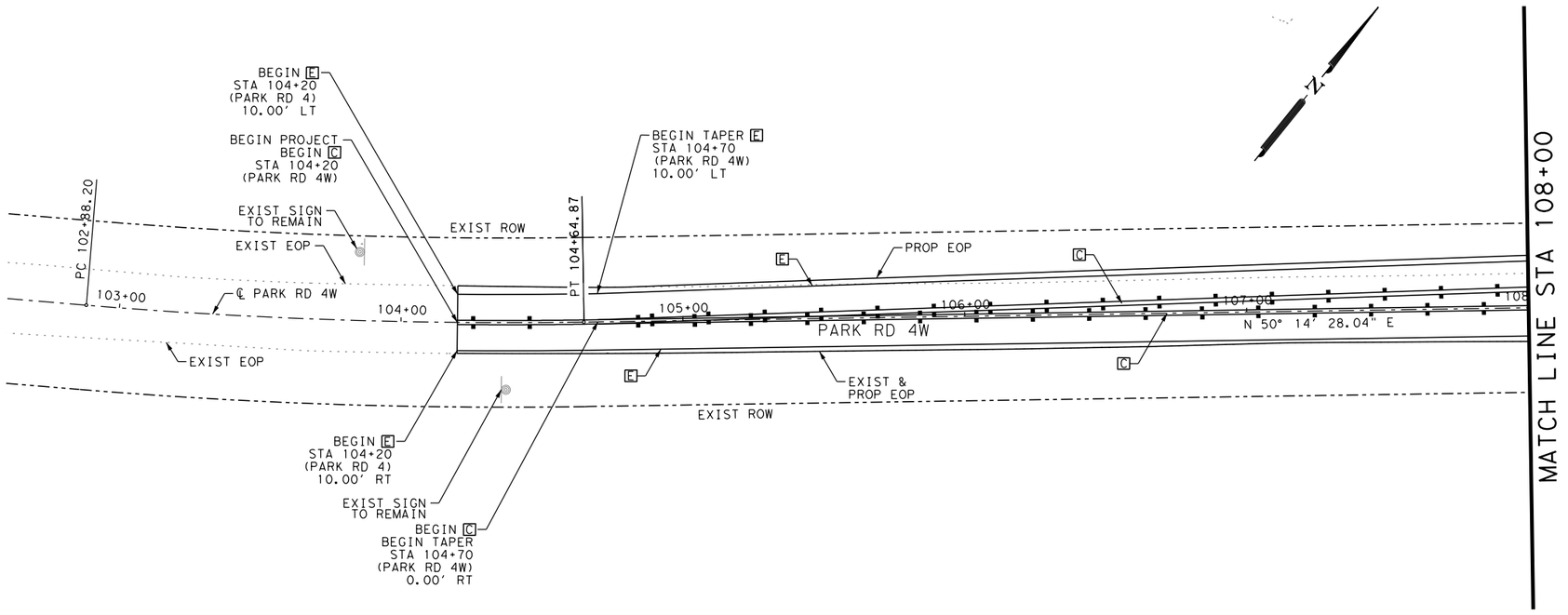
Bridge Division Standard

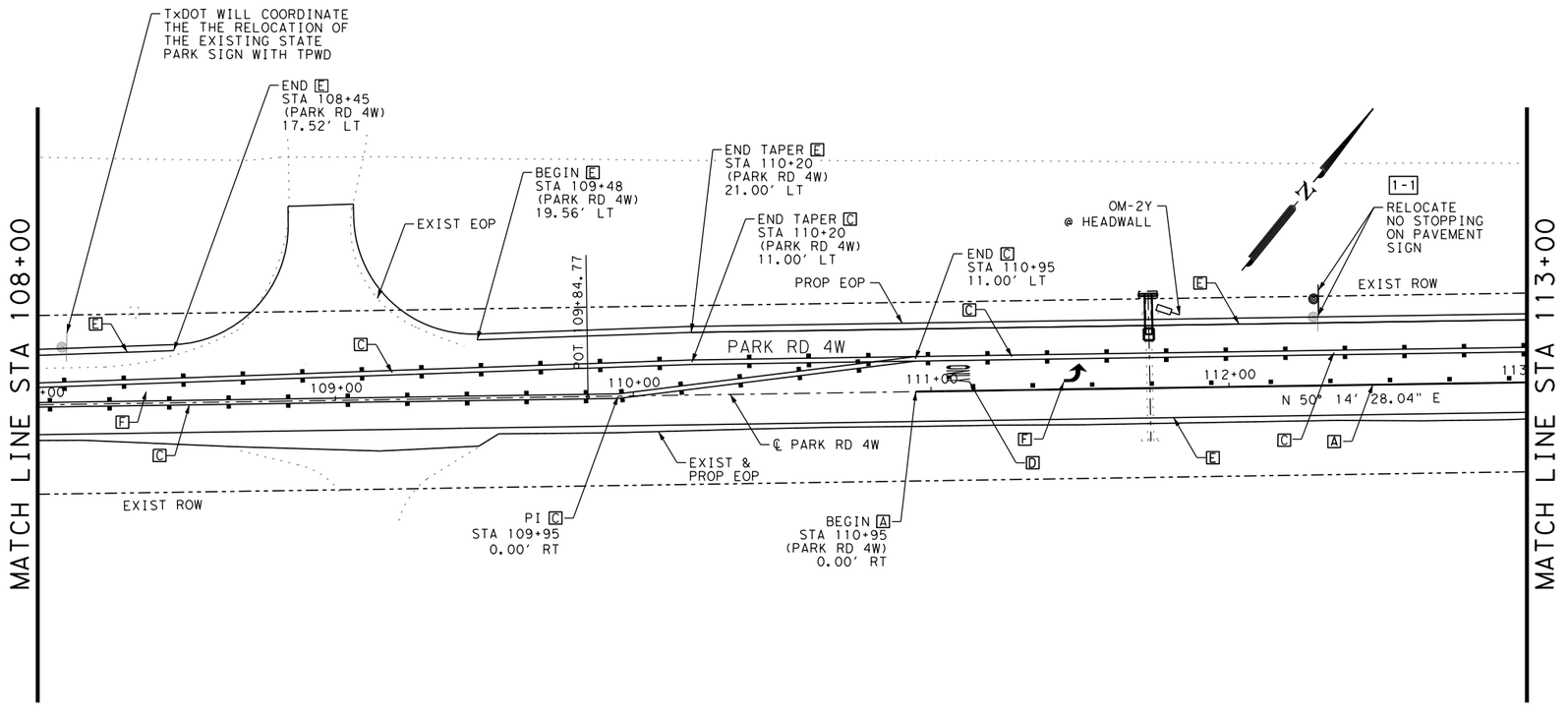
SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		79





LEGEND

- A — 8" SOLID WHITE STRIPE W/ TY I-C @ 20'
- B — 24" SOLID WHITE STRIPE
- C — 6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 20'
- D — WORDS
- E — 6" SOLID WHITE STRIPE
- F — ARROWS
- G — 12" SOLID YELLOW STRIPE
- H — 18" WHITE YIELD TRI
- I — 6" BROKEN WHITE STRIPE W/ TY I-C @ 40'
- J — 6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 40'
- OBJECT MARKER
- 1-1 — SMALL SIGN DESIGNATION
- PROP SIGN
- EXIST SIGN
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT

① STOP R1-1 30"x30"	② ONLY R3-5R 30"x36"	③ SPEED LIMIT 15 R2-1 18"x24"	④ RIGHT LANE MUST TURN RIGHT R3-7R 30"x30"	⑤ DO NOT ENTER R5-1 30"x30"
⑥ ONE WAY R6-1L 36"x12"	⑦ ONE WAY R6-1R 36"x12"	⑧ STOP HERE FOR R1-5L 36"x36"	⑨ R4-7 18"x24"	

NOTES

1. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.
3. ALL REFLECTIVE PAVEMENT MARKINGS SHALL RECEIVE A TY I AND TY II APPLICATION.
4. ALL DIMENSIONS ARE TO FACE OF CURB AND/OR CENTER OF PAVEMENT MARKINGS, UNLESS OTHERWISE INDICATED.

STATE OF TEXAS · DENNIS K. SEAL · 80287 · LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75

SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SIGNING AND PAVEMENT MARKINGS

BEGIN TO STA 113+00

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	80

Plotted on: 1/27/2023
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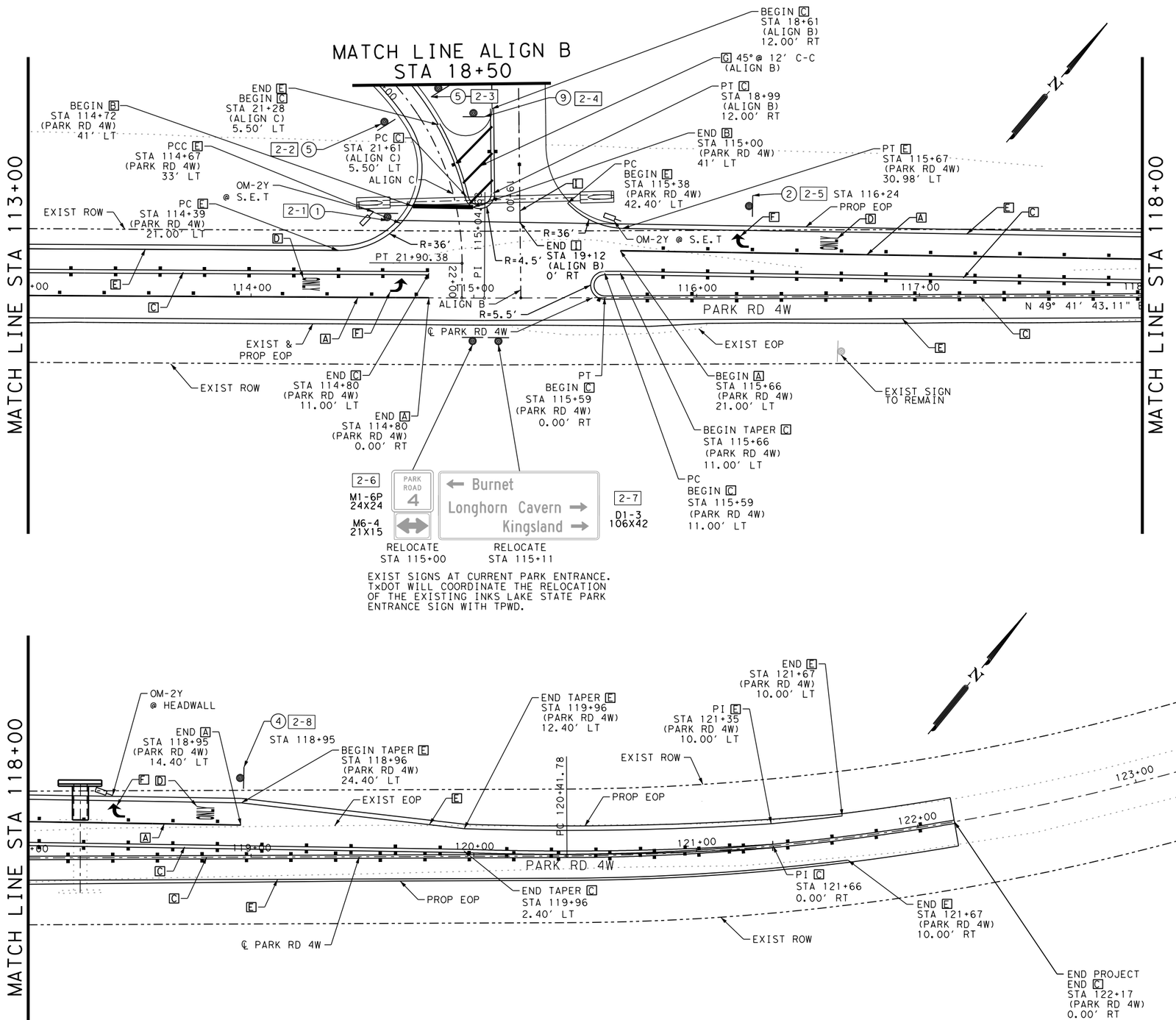

LEGEND

A	8" SOLID WHITE STRIPE W/ TY I-C @ 20'	B	24" SOLID WHITE STRIPE
C	6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 20'	D	WORDS
E	6" SOLID WHITE STRIPE	F	ARROWS
G	12" SOLID YELLOW STRIPE	H	18" WHITE YIELD TRI
I	6" BROKEN WHITE STRIPE W/ TY I-C @ 40'	J	6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 40'
	OBJECT MARKER		PROP SIGN
1-1	SMALL SIGN DESIGNATION		
	EXIST SIGN		
	LIMITS OF TPWD CONSTRUCTION AND PAYMENT		

① R1-1 30"x30" STOP

② R3-5R 30"x36" ONLY

③ R2-1 18"x24" SPEED LIMIT 15

④ R3-7R 30"x30" RIGHT LANE MUST TURN RIGHT

⑤ R5-1 30"x30" DO NOT ENTER

⑥ R6-1L 36"x12" ONE WAY

⑦ R6-1R 36"x12" ONE WAY

⑧ R1-5L 36"x36" STOP HERE FOR

⑨ R4-7 18"x24"

NOTES

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STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SIGNING AND PAVEMENT MARKINGS

STA 113+00 TO END

SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	81

Plotted on: 1/27/2023

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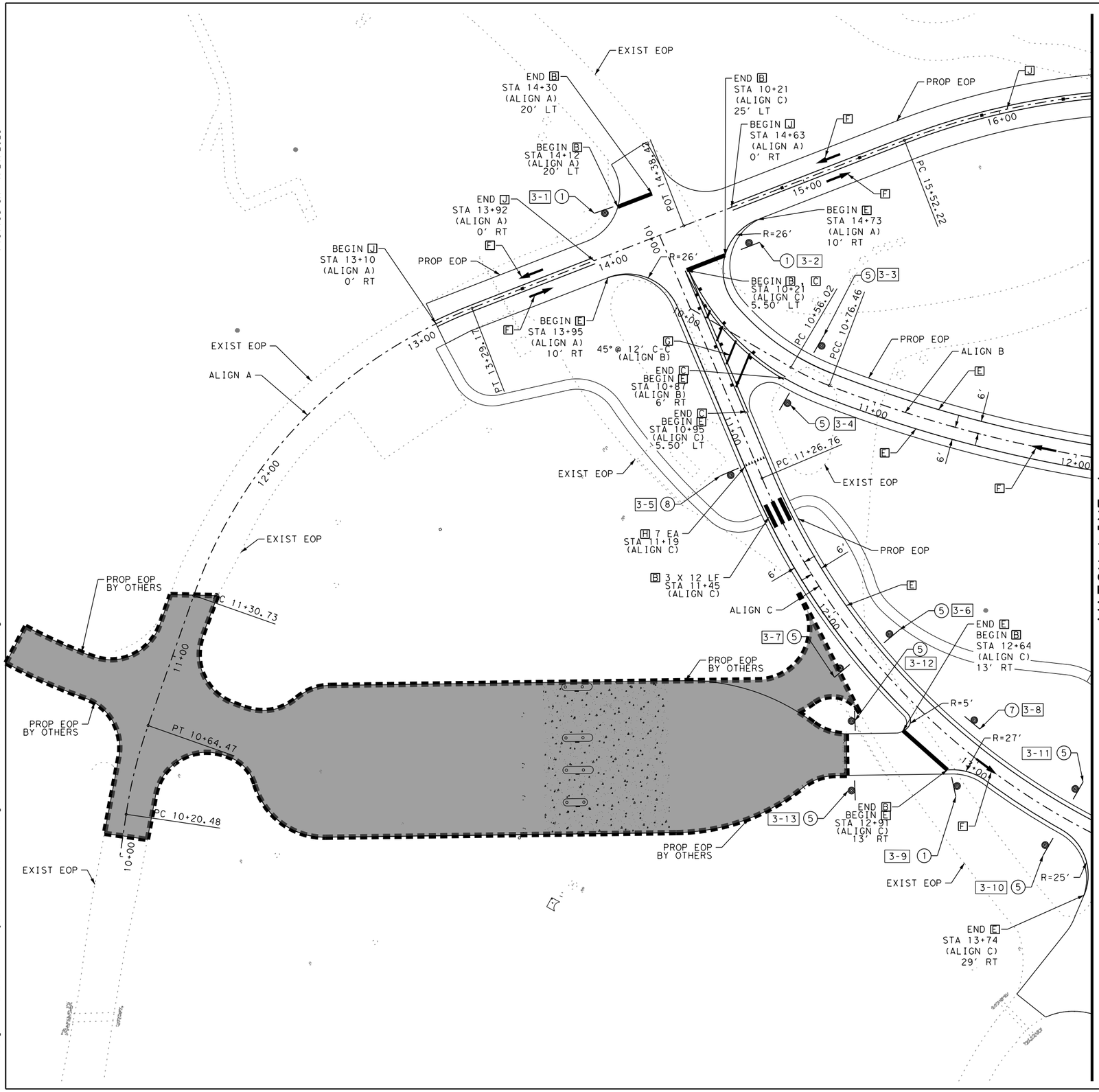

LEGEND

A	8" SOLID WHITE STRIPE W/ TY I-C @ 20'	B	24" SOLID WHITE STRIPE
C	6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 20'	D	WORDS
E	6" SOLID WHITE STRIPE	F	ARROWS
G	12" SOLID YELLOW STRIPE	H	18" WHITE YIELD TRI
I	6" BROKEN WHITE STRIPE W/ TY I-C @ 40'	J	6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 40'
	OBJECT MARKER		PROP SIGN
1-1	SMALL SIGN DESIGNATION		EXIST SIGN
	LIMITS OF TPWD CONSTRUCTION AND PAYMENT		

1	2	3	4	5
STOP	ONLY	SPEED LIMIT 15	RIGHT LANE MUST TURN RIGHT	DO NOT ENTER
R1-1 30"x30"	R3-5R 30"x36"	R2-1 18"x24"	R3-7R 30"x30"	R5-1 30"x30"

6	7	8	9
ONE WAY	ONE WAY	STOP HERE FOR	
R6-1L 36"x12"	R6-1R 36"x12"	R1-5L 36"x36"	R4-7 18"x24"

NOTES

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STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SIGNING AND PAVEMENT MARKINGS

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	82

Plotted on: 2/20/2023

Design Filename: H:\Projects\511\66.00\Design\Civil\Traffic\5116600_SPM04.dgn

MATCH LINE A

MATCH LINE ALIGN B STA 118+50

LEGEND

- A — 8" SOLID WHITE STRIPE W/ TY I-C @ 20'
- B — 24" SOLID WHITE STRIPE
- C — 6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 20'
- D — WORDS
- E — 6" SOLID WHITE STRIPE
- F — ARROWS
- G — 12" SOLID YELLOW STRIPE
- H — 18" WHITE YIELD TRI
- I — 6" BROKEN WHITE STRIPE W/ TY I-C @ 40'
- J — 6" SOLID DOUBLE YELLOW STRIPE W/ TY II-A-A @ 40'
- OBJECT MARKER
- 1-1 — SMALL SIGN DESIGNATION
- PROP SIGN
- EXIST SIGN
- LIMITS OF TPWD CONSTRUCTION AND PAYMENT

NOTES

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STATE OF TEXAS — DENNIS K. SEAL — 80287 — LICENSED PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 2/20/2023 DATE

0 25 50 75

SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS

10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711

TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SIGNING AND PAVEMENT MARKINGS

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	83

1 R1-1 30"x30" STOP
2 R3-5R 30"x36" ONLY
3 R2-1 18"x24" SPEED LIMIT 15
4 R3-7R 30"x30" RIGHT LANE MUST TURN RIGHT
5 R5-1 30"x30" DO NOT ENTER
6 R6-1L 36"x12" ONE WAY
7 R6-1R 36"x12" ONE WAY
8 R1-5L 36"x36" STOP HERE FOR
9 R4-7 18"x24"

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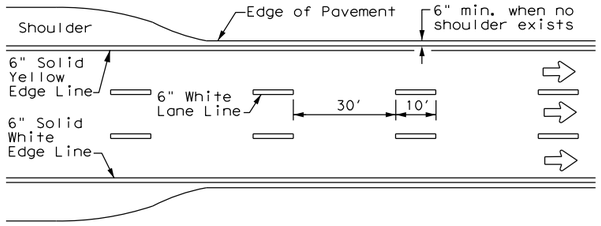
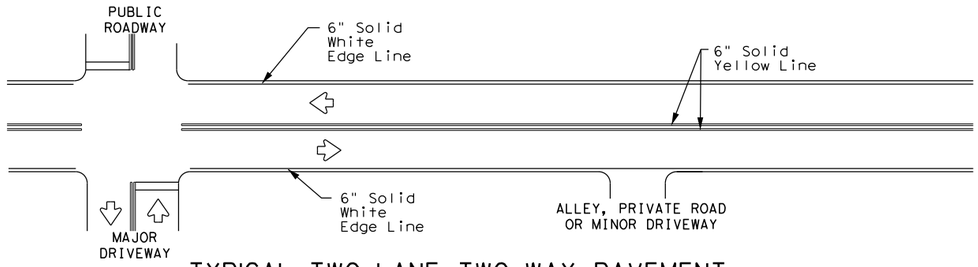
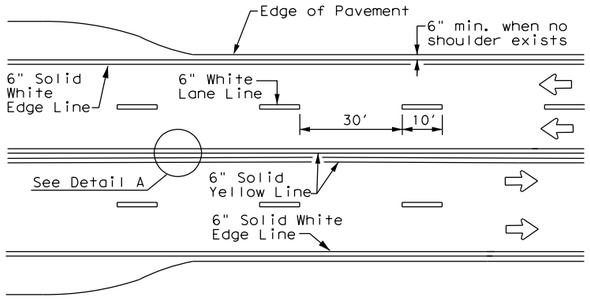
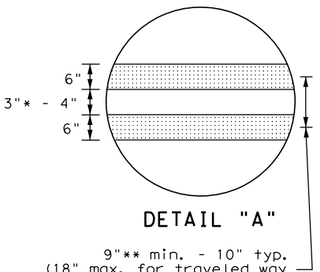


EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

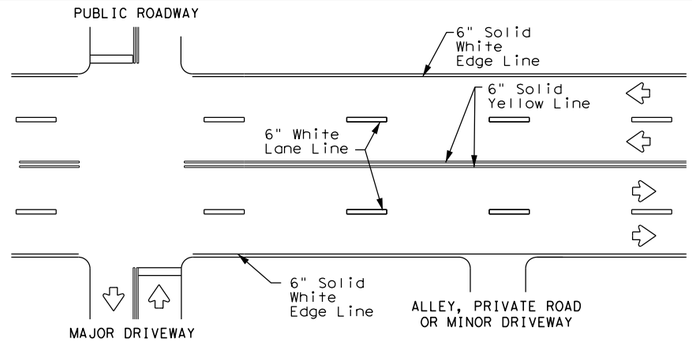




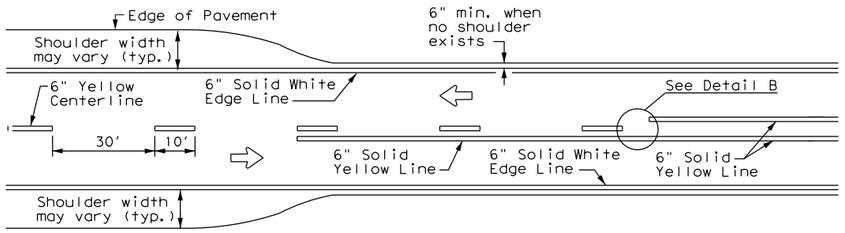
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

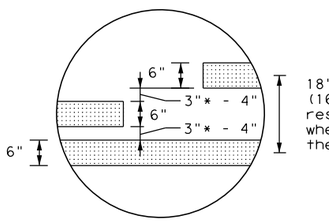
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS

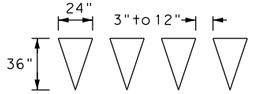


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



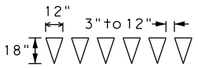
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

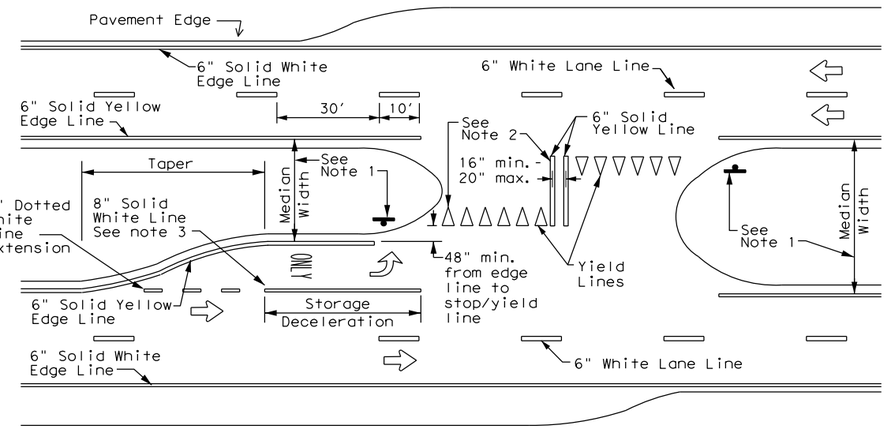


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

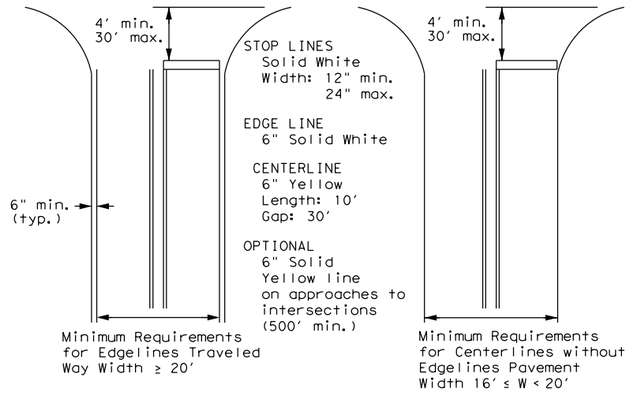
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths
for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

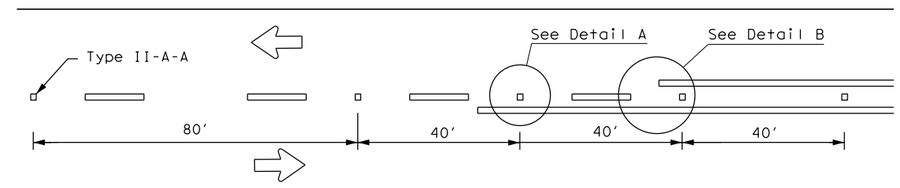
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

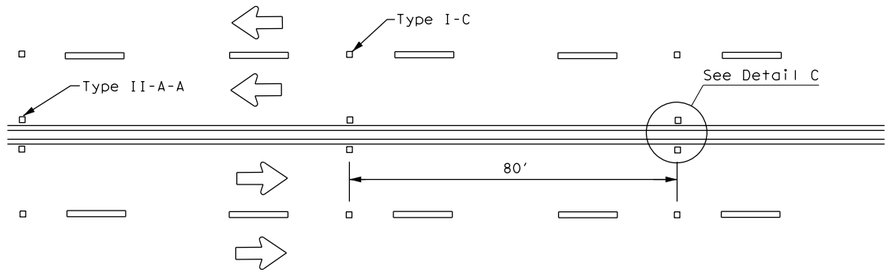
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	AUS	BURNET		84
5-00 2-12				

22A

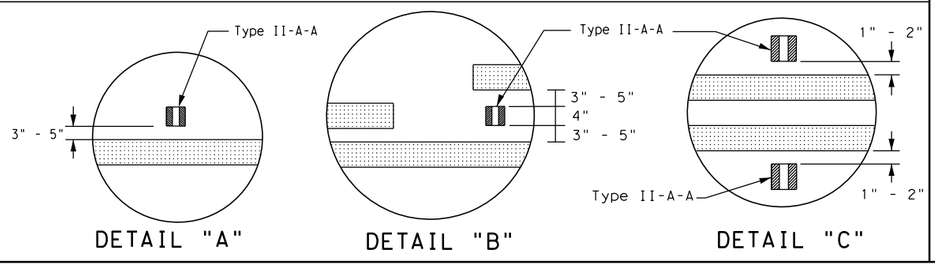
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



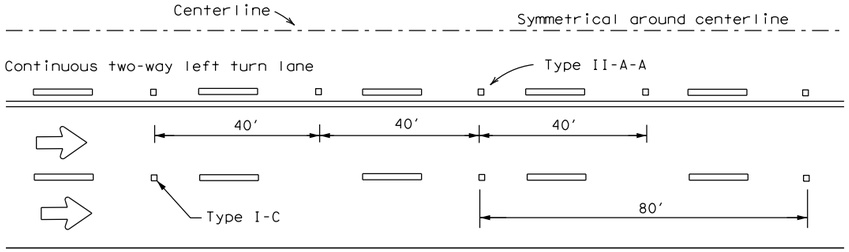
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



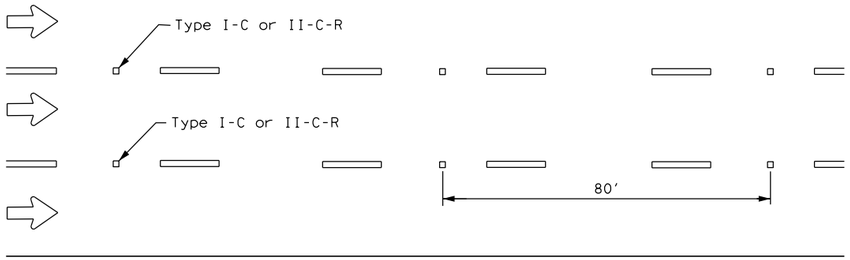
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



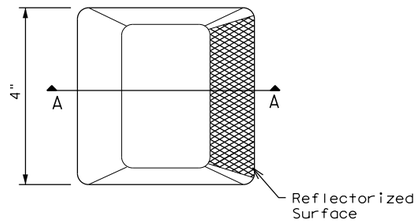
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

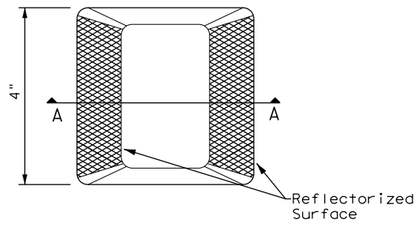
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

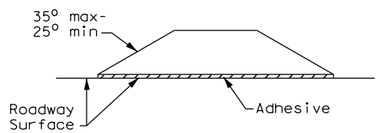
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

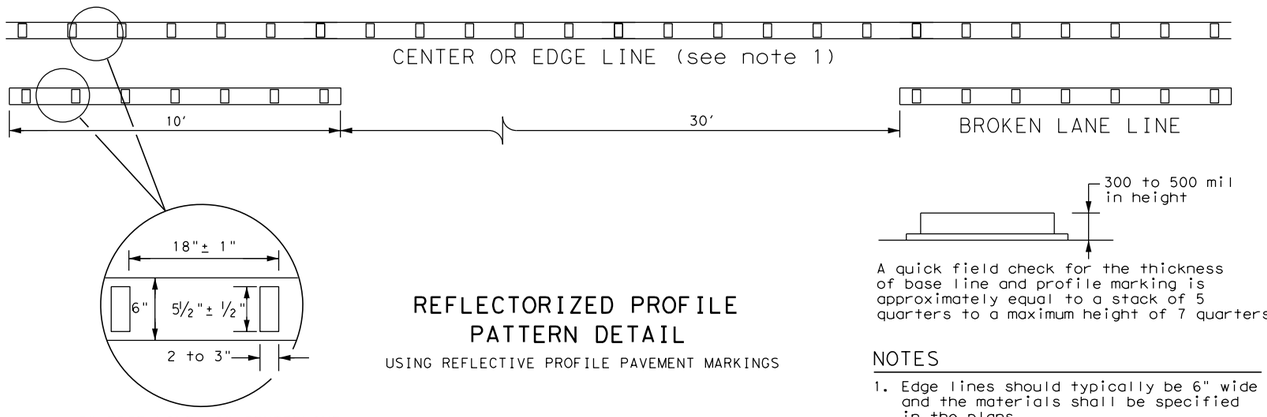


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

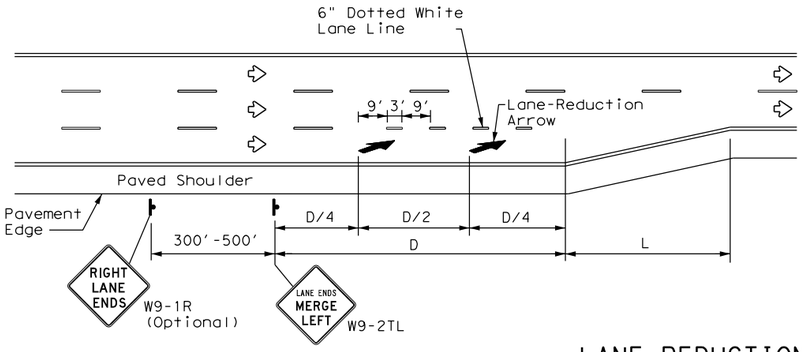
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
4-77 8-00 6-20	DIST	COUNTY		SHEET NO.
4-92 2-10 12-22	AUS	BURNET		85
5-00 2-12				

22B

DATE: 1/27/2023 17:47:14
FILE: H:\Projects\5115\66\00\Design\Civil\Standards\PavementMarkers\pm2-22.dgn

DATE: 1/27/2023 17:47:15
FILE: H:\Projects\511\66\00\Design\Civil\Standards\PavementMarkers\pm3-22.dgn



LANE REDUCTION

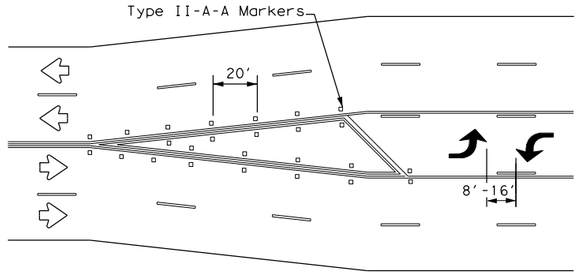
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

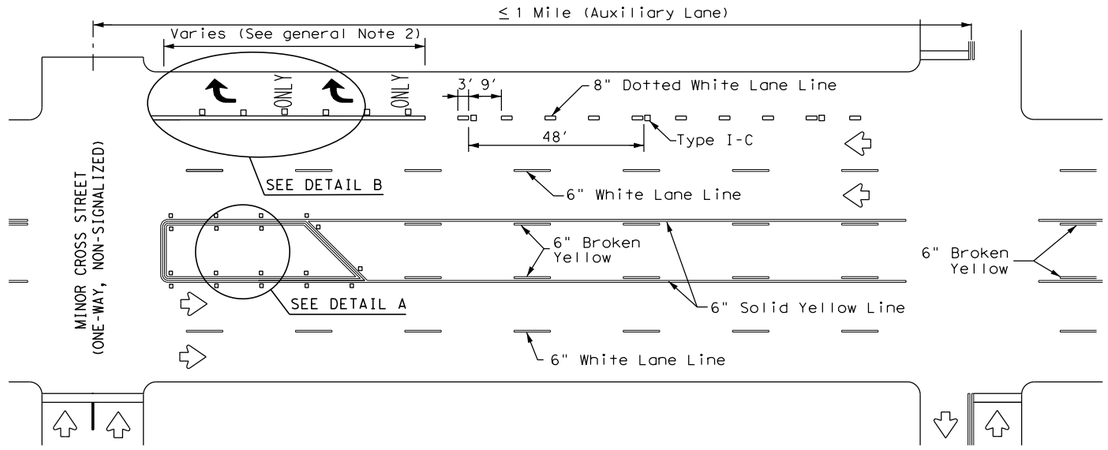


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

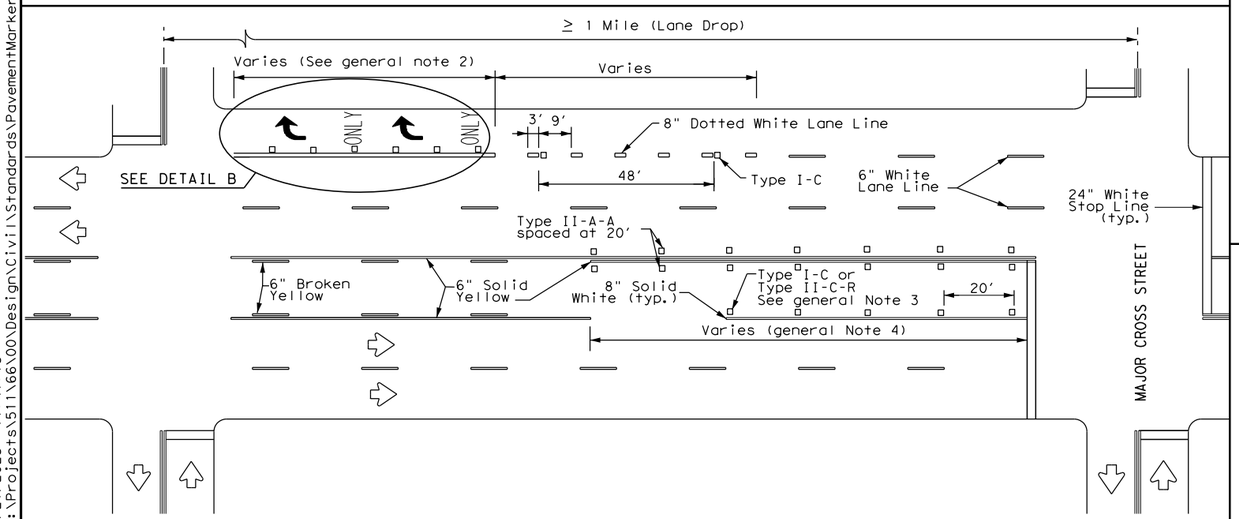
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

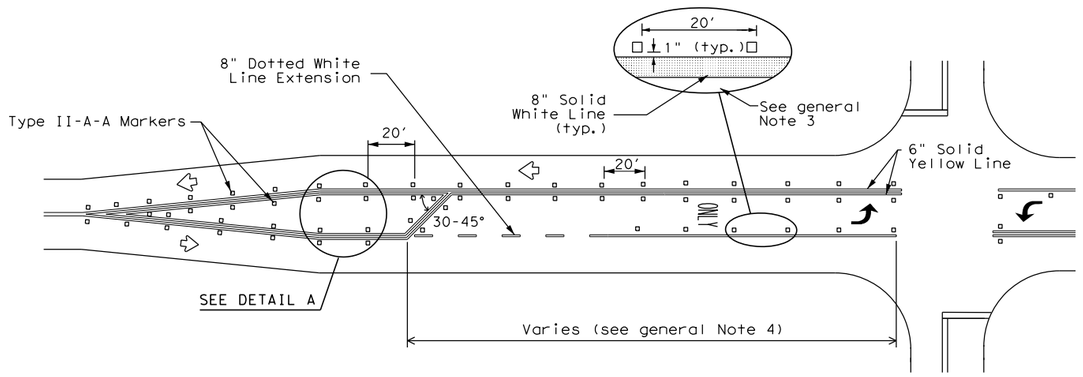
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



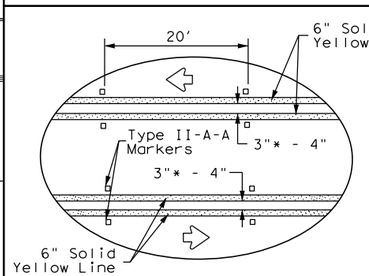
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



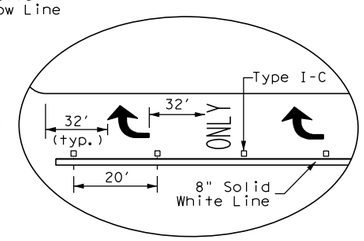
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
4-98 3-03 6-20	DIST	COUNTY		SHEET NO.
5-00 2-10 12-22	AUS	BURNET		86
8-00 2-12				

22C

DATE: 1/27/2023 17:47:16
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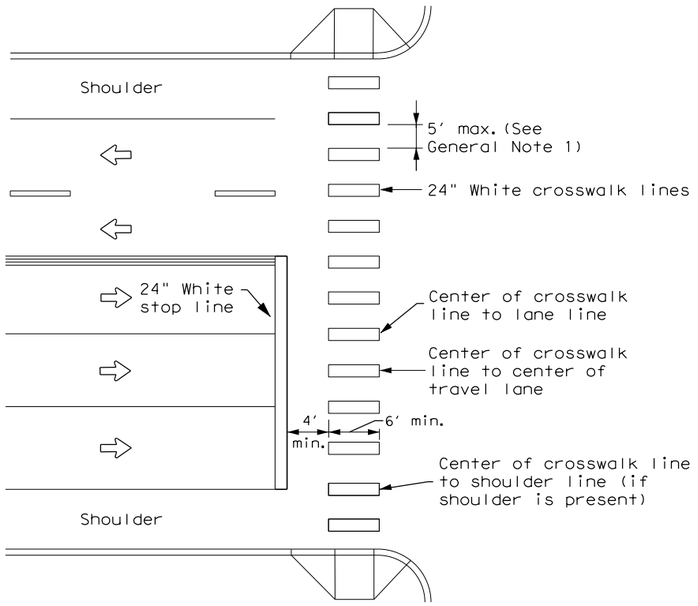


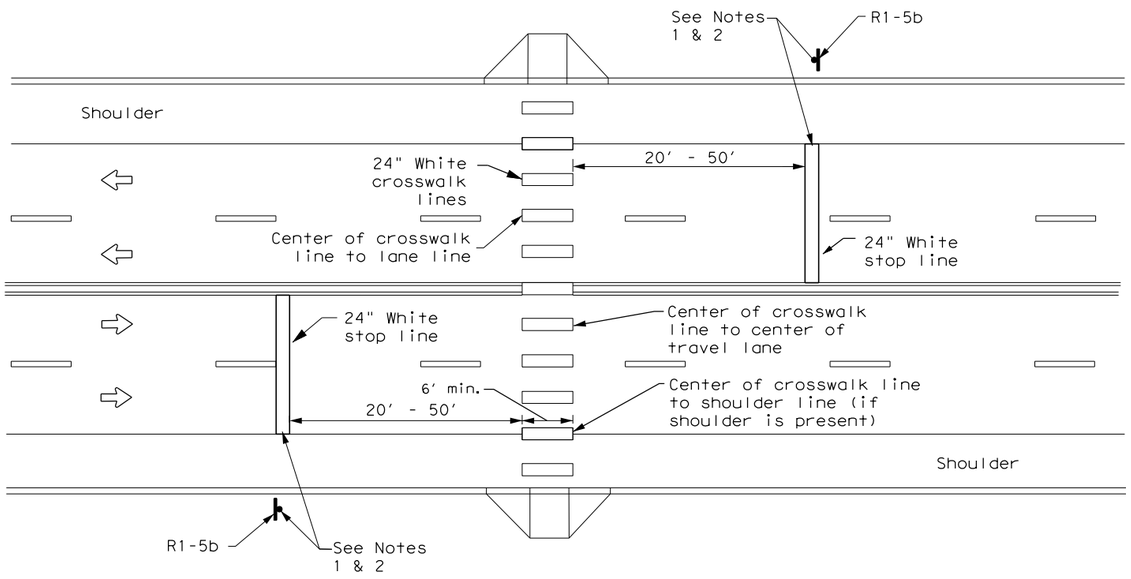
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
6-20	DIST	COUNTY		SHEET NO.
6-22	AUS	BURNET		87
12-22				
22D				

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

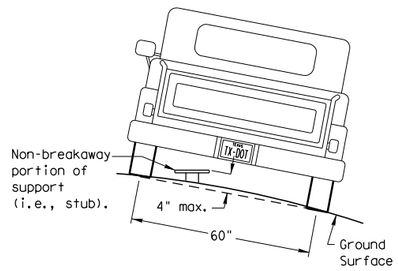
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

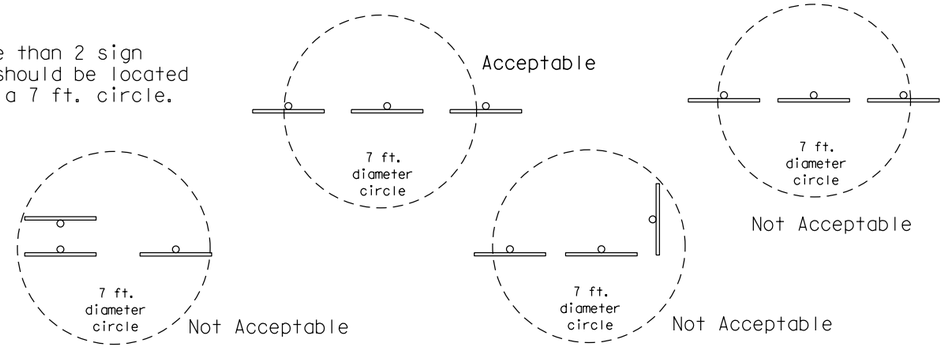
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



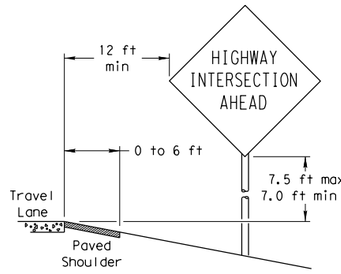
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



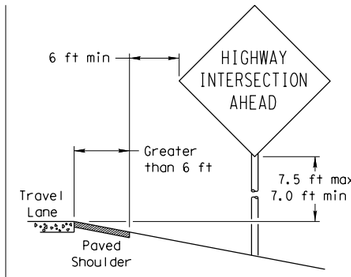
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

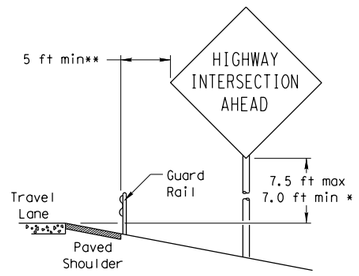
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



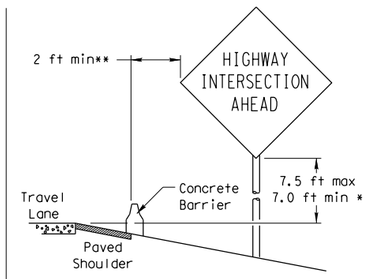
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



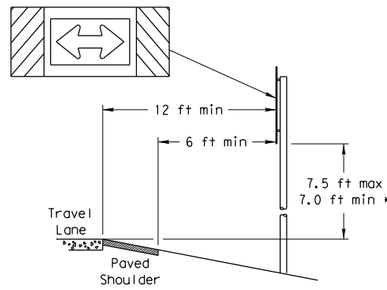
BEHIND GUARDRAIL



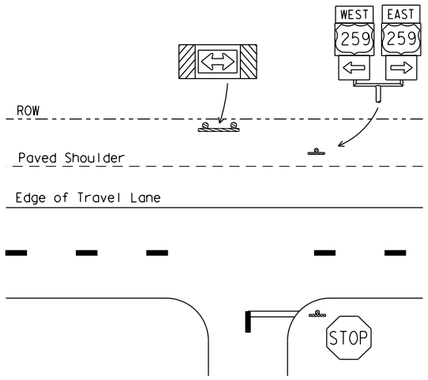
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

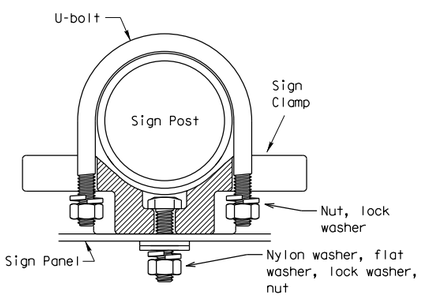
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

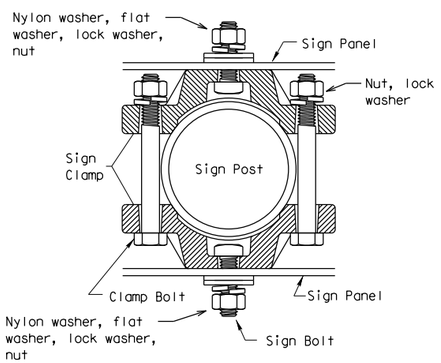


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

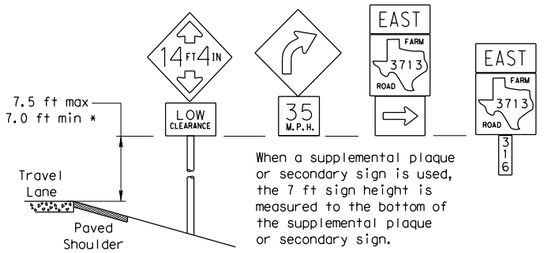
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



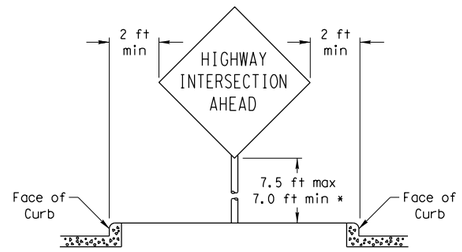
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



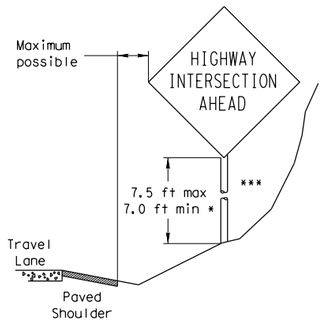
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0914	24	025	VA
DIST	COUNTY		SHEET NO.
AUS	BURNET		88

26A

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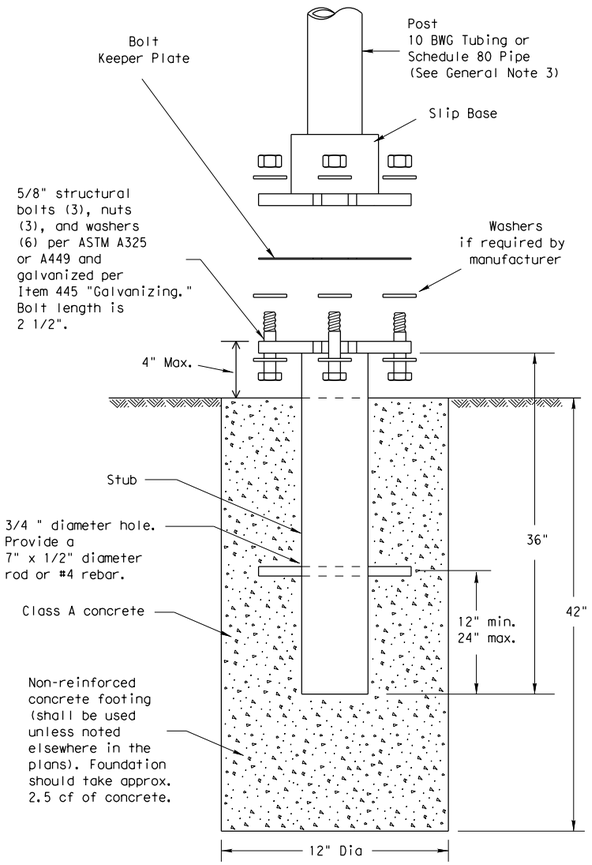
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

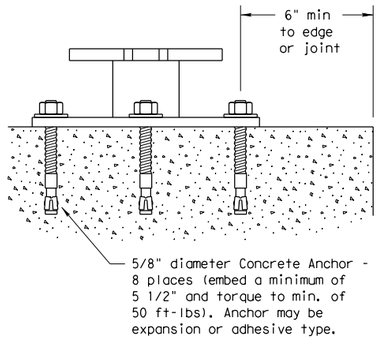
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		89

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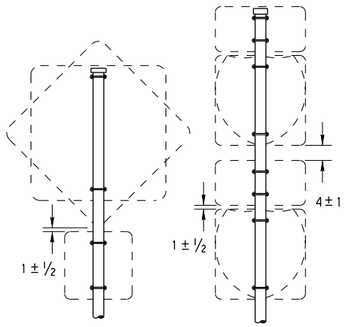

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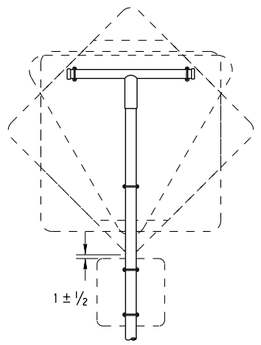

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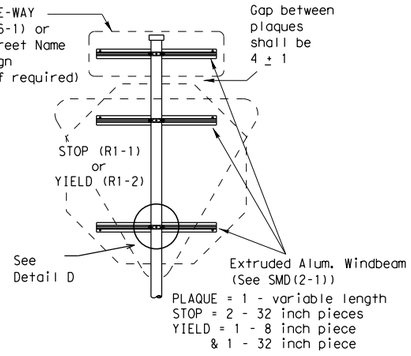

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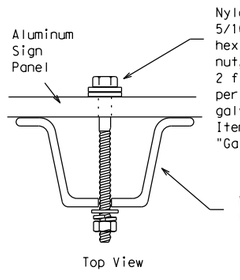
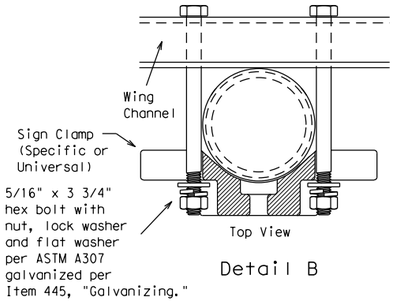
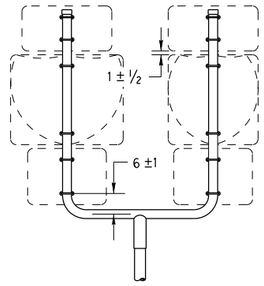


Detail A



Detail B



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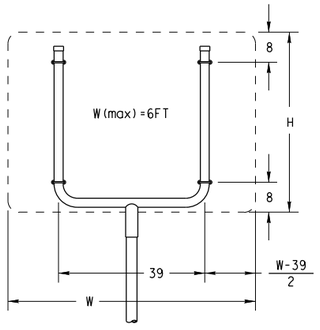

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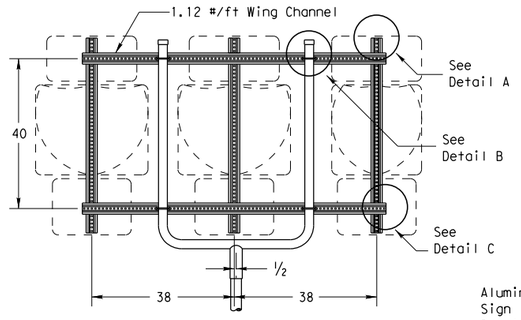
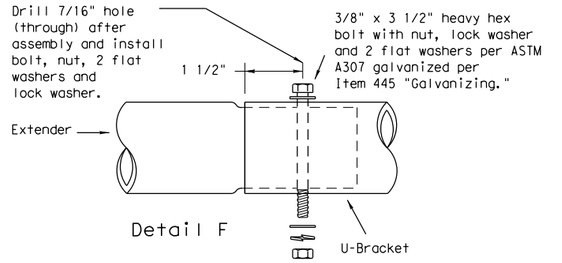
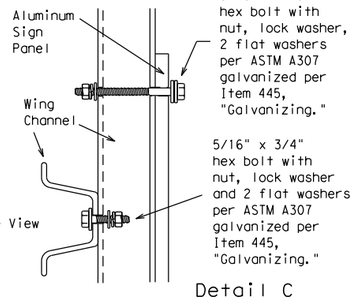


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



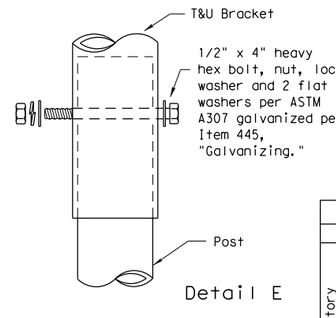
Detail F

Splices shall only be allowed behind the sign substrate.

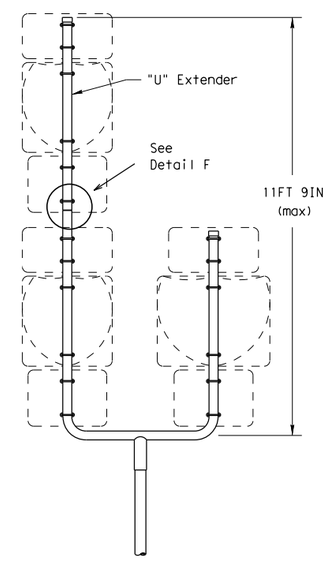


SIDE VIEW

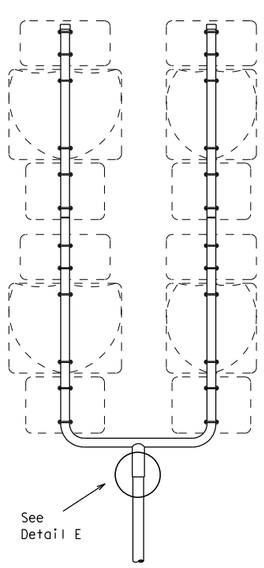
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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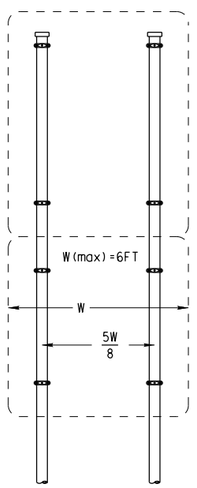

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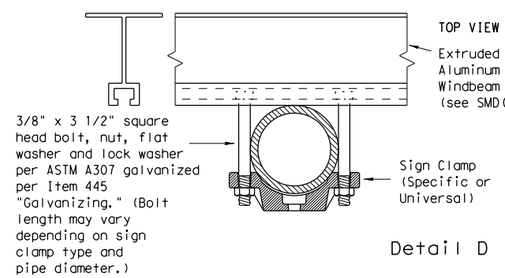
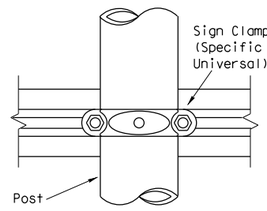
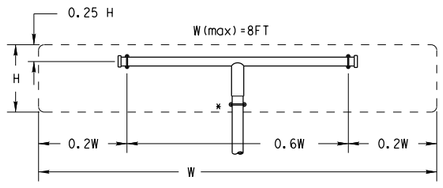


Detail D

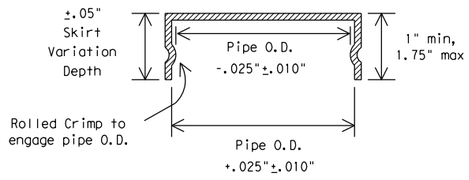




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
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26C

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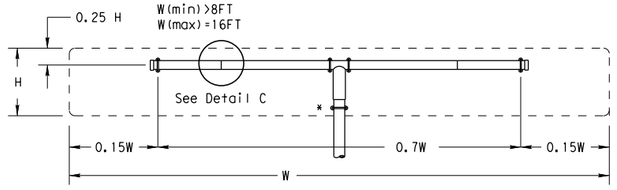
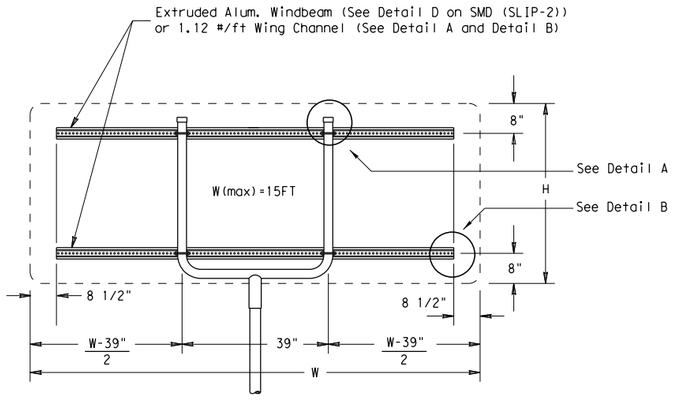
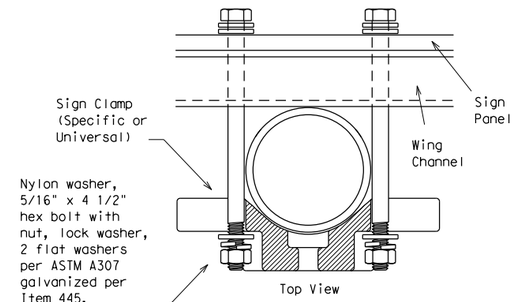


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

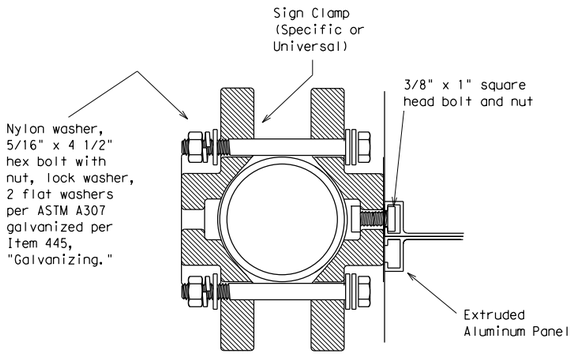
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

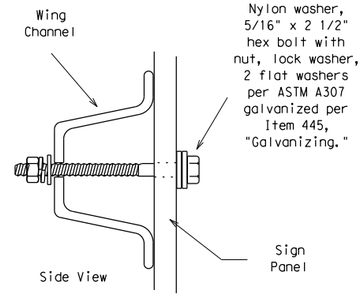


Detail A

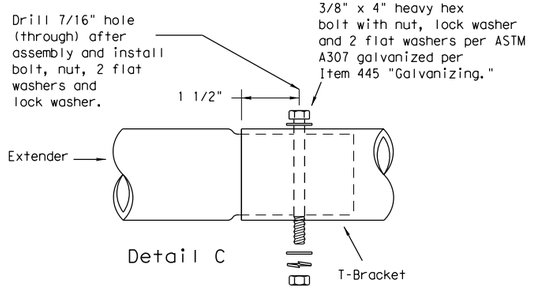


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

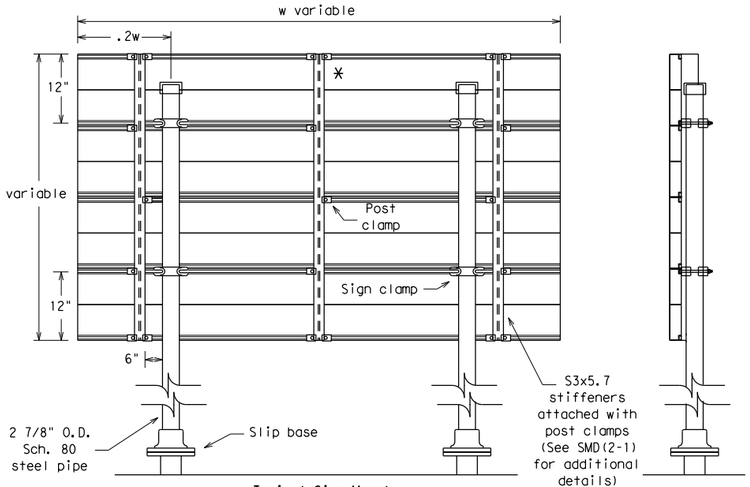


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

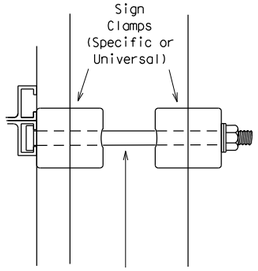


Typical Sign Mount

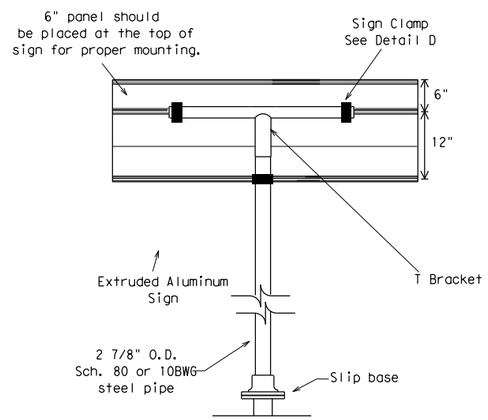
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

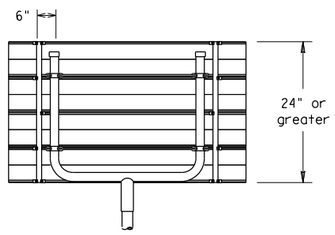
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	BURNET		91

DATE: 1/27/2023 17:47:20
FILE: H:\Projects\511\66\00\Design\Civil\Standards\Signing\smds3.dgn

DATE: 1/27/2023 17:47:21
FILE: H:\Projects\511\66\00\Design\Civil\Standards\Signing\tsr3-13.dgn

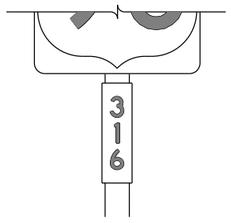
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

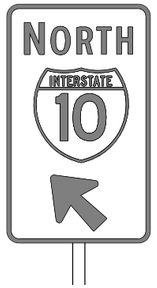
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING





TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

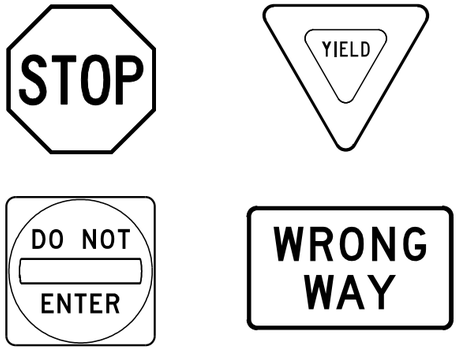
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	BURNET		92

DATE: 1/27/2023 17:47:22
FILE: H:\Projects\511\66\00\Design\Civil\Standards\Signing\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

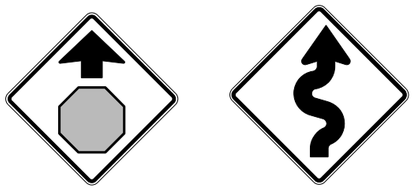
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

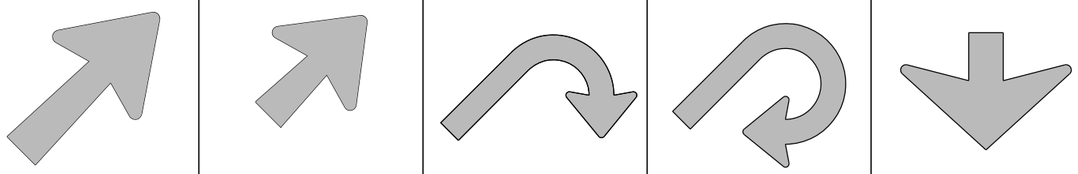
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	AUS	BURNET		93

DATE: 1/27/2023 17:47:23
FILE: H:\Projects\5i\66\00\Design\Civil\Standards\Signing\tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

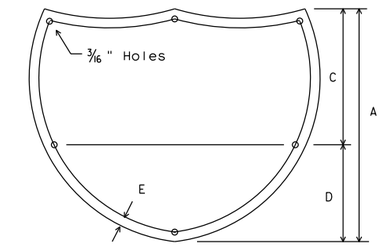
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

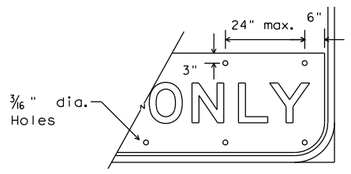
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

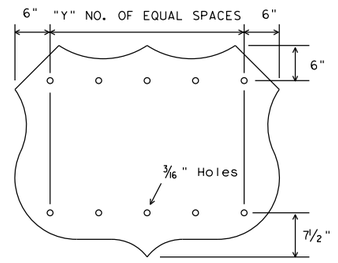


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

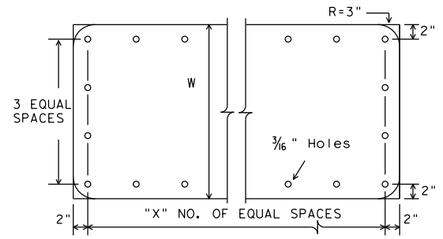


EXIT ONLY PANEL



U.S. ROUTE MARKERS

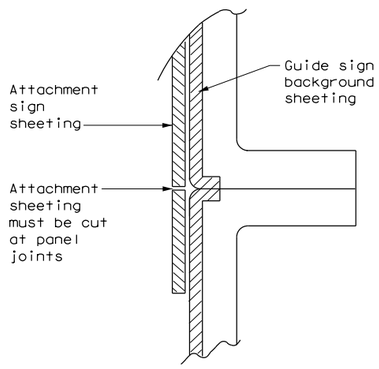
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

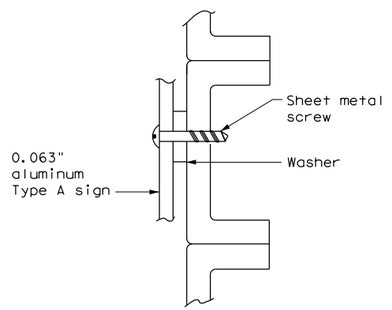
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



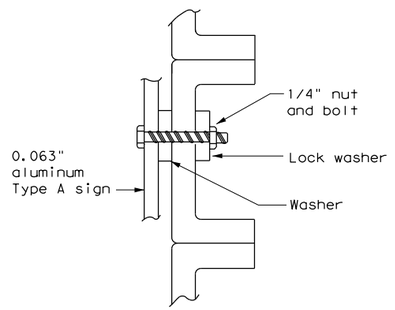
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



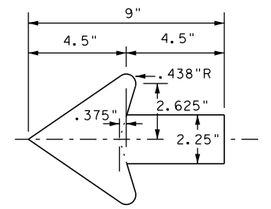
NUT/BOLT ATTACHMENT

NOTE:

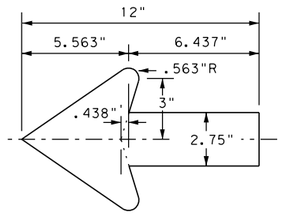
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

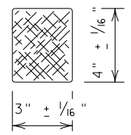
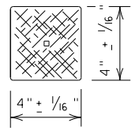
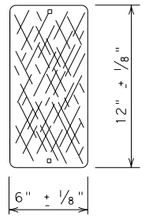
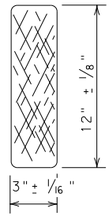
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

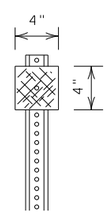
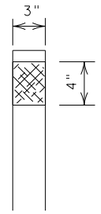
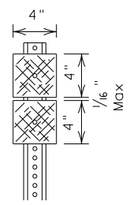
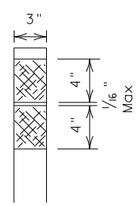
TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	BURNET		94

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
- If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

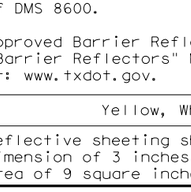
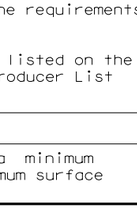
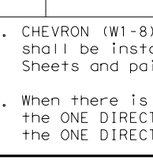
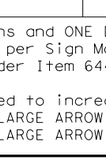
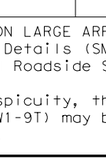
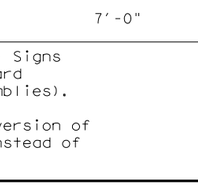
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- WFLX = White Flexible Post
- TWT = Thin Walled Tubing

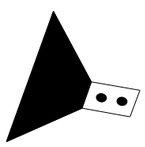
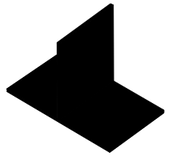
TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
- If Required
- BI = Bi-Directional

OBJECT MARKERS

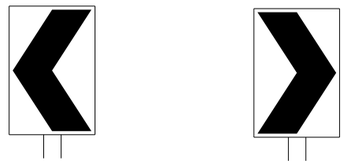
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

ONE DIRECTION LARGE ARROW

DEVICE

W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE

1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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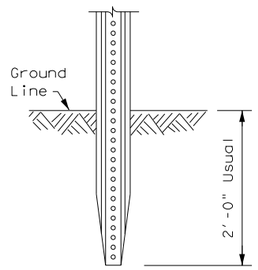
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

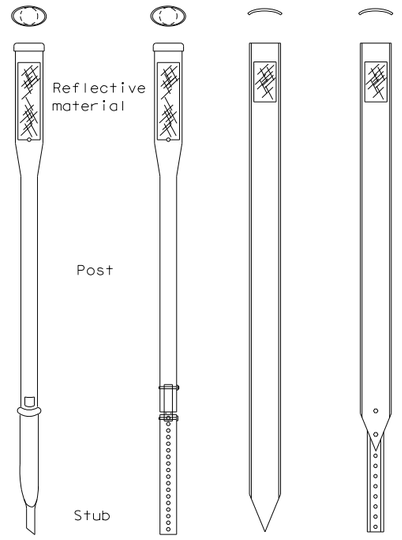


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

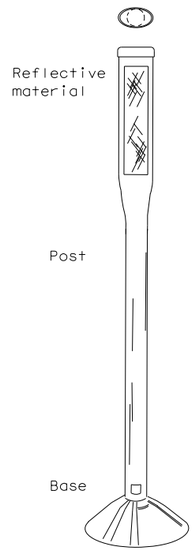
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



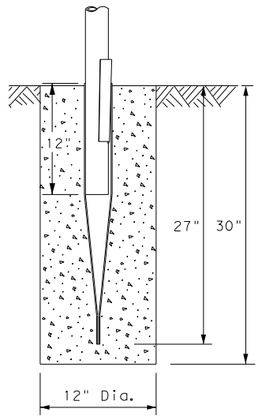
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

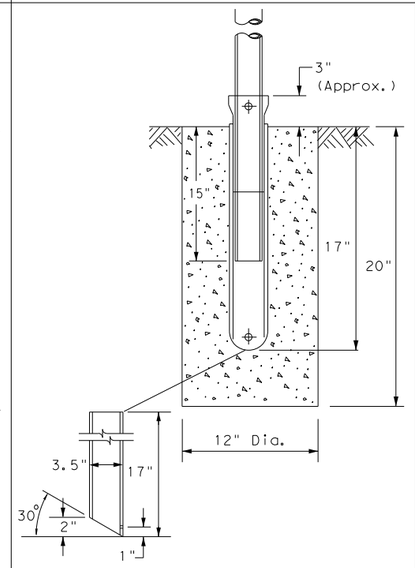
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

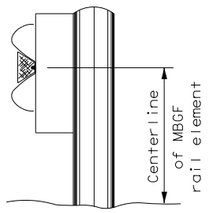
NOTE

1. Install per manufacturer's recommendations.

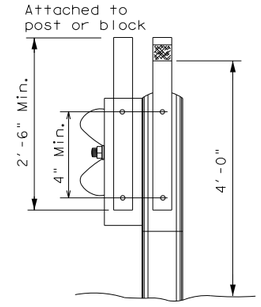
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

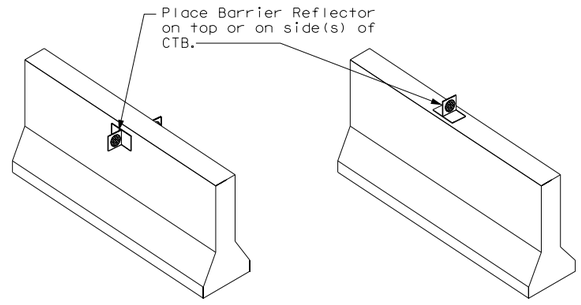
GF1



GF2



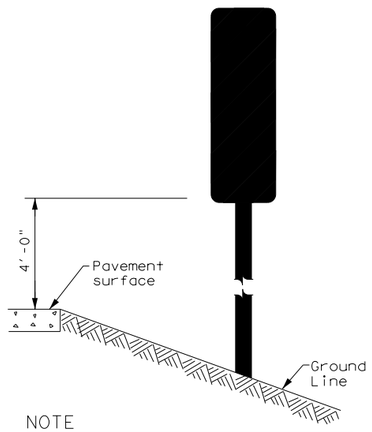
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

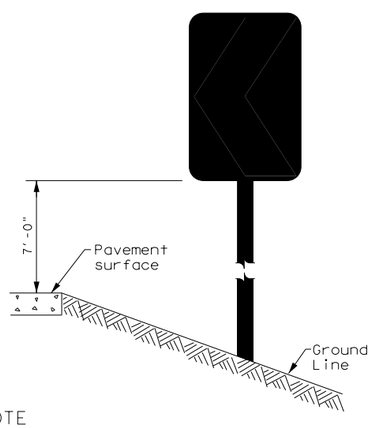
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

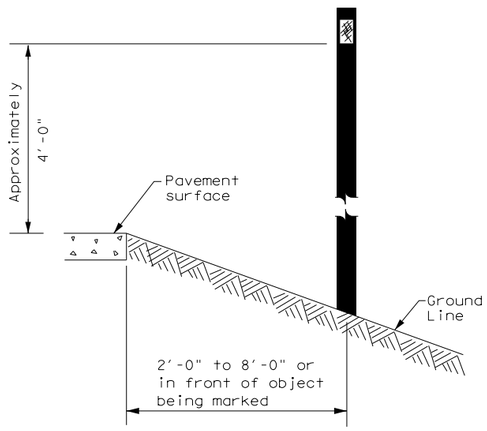
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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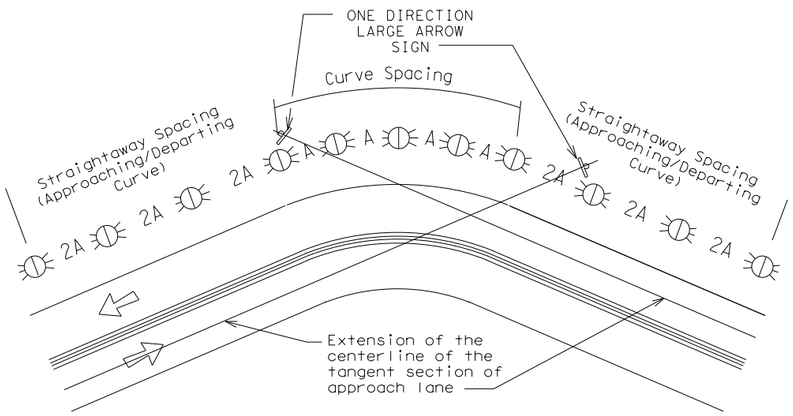
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

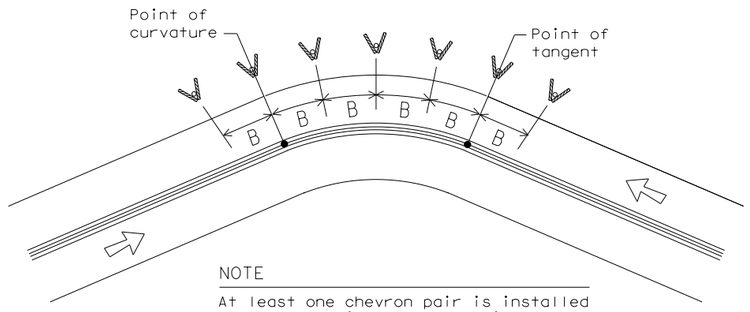
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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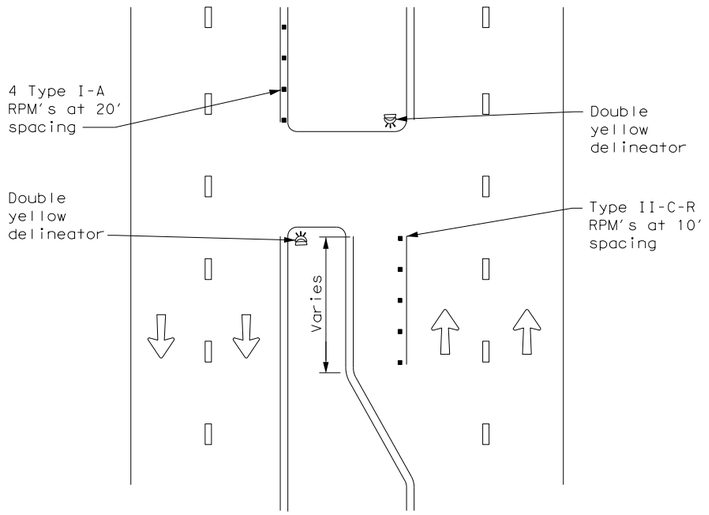
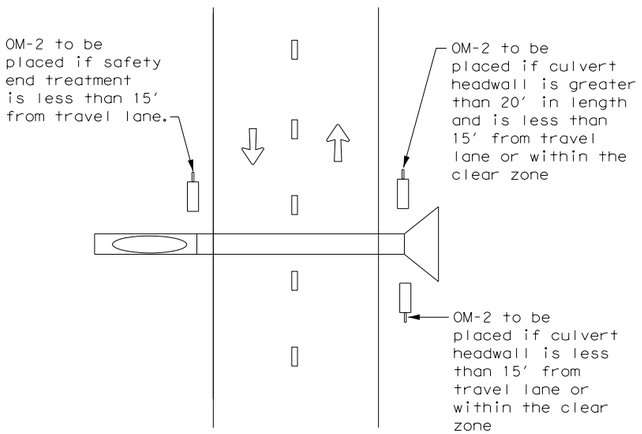
CROSSOVERS



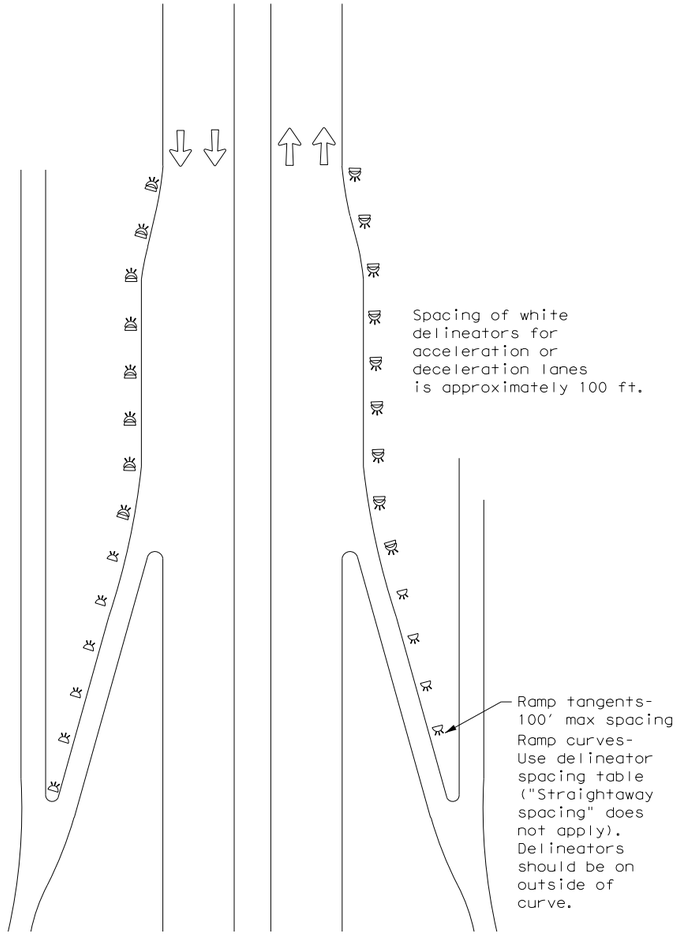
DETAIL 1

FOR CULVERTS WITH MBGF



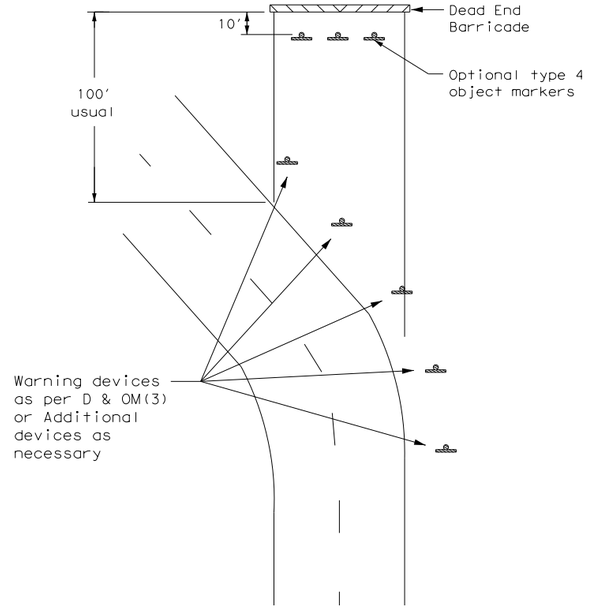
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



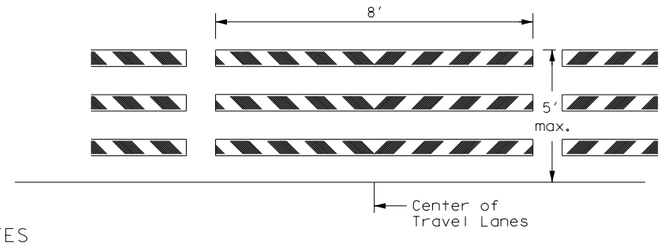
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

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Plotted on: 1/27/2023

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A. GENERAL SITE AREA

1. PROJECT LIMITS:
PARK RD 4W FROM STA 104+20 TO STA 122+16 INCL INKS LAKE STATE PARK HEADQUATERS ROADS

2. PROJECT SITE MAPS:
Project Latitude N 30° 44' 24.41" Project Longitude W 98° 21' 50.40"
Project Location Map: See Title Sheet (Sheet 1)
Approx. Slopes Anticipated After Gradings and Areas of Soil Disturbance: See Typical Sections Sheets
Major Controls and Locations of Stabilization Practices: See SW3P Sheets

3. PROJECT DESCRIPTION: *FOR THE CONSTRUCTION OF STATE PARK IMPROVEMENTS CONSISTING OF ROADWAYS, PARKING, DRAINAGE, AND STRUCTURES FOR THE NEW STATE PARK HEADQUARTERS*

4. MAJOR SOIL DISTURBING ACTIVITIES:

1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*

2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/ approved by the Engineer.*

3. *Soil disturbing activities will include widening, grading, excavation and embankment for roadway widening, drainage structure extensions and metal beam guard fence installation.*

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

Description of existing vegetative cover: Sparse Native Grasses with small trees and shrubs, cacti
Description of soils: Keese-Ligon-Rock Outcrop - gravelly sandy clay loam weathered bedrock (Ap, BAt, Bt1, Bt2, Bt3, BCt, Cr)
Percentage of existing vegetative cover: 95%
Existing vegetative cover: (mark one) Patchy ground cover

6. TOTAL PROJECT AREA: (TXDOT R.O.W.) *8.1 ACRES*

7. TOTAL AREA TO BE DISTURBED: *7.1 ACRES*

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: *0.34*
AFTER CONSTRUCTION: *0.34*

9. NAME OF RECEIVING WATERS:
Storm water drainage will be sheet flowed and channeled along existing swales, draining into the Colorado River.

10. PROJECT SW3P FILE:
FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN A SW3P FILE AT THE PROJECT FIELD OFFICE WHICH CONTAINS THE FOLLOWING: INDEX SHEET, TCEQ N.O.I., TCEQ SIGNATURE AUTHORITY, TCEQ FEE PAYMENT FORM, TPDES STORM WATER PROGRAM OR CONSTRUCTION SITE NOTICE, TPDES PERMIT COVERAGE NOTICE, SW3P INSPECTOR QUALIFICATION STATEMENTS, INSPECTION AND MAINTENANCE REPORTS, REQUIRED LOCATION MAPS, STORED MATERIALS LIST SPECIFYING ASSOCIATED CONTROL MEASURES, THE APPENDIX WHICH CONTAINS THE TPDES CONSTRUCTION GENERAL PERMIT LANGUAGE, AND THE CONTRACTOR'S PSL PERMIT, N.O.I. AND CONSTRUCTION SITE NOTICE SHALL BE POSTED IN AN AREA THAT IS ACCESSIBLE TO THE GENERAL PUBLIC.

11. FOR TXDOT ENGINEER/INSPECTOR USE:

P.S.L.	*YES*_____	*NO*_____
PARTY NOTIFIED IN WRITING	*YES*_____	*NO*_____
IDENTIFY OTHER AREA(S) TO BE DISTURBED (PLANTS PROVIDING SUPPORT TO CONSTRUCTION SITE AUTHORIZED UNDER THIS PERMIT WITHIN ONE MILE OF PROJECT)	*ACRES* _____	
ADJACENT DEVELOPMENT/CONSTRUCTION (OTHER THAN TXDOT'S CONTRACTORS)	*YES*_____	*NO*_____
PARTY NOTIFIED IN WRITING	*YES*_____	*NO*_____

B. EROSION AND SEDIMENT CONTROL

1. SOIL STABILIZATION PRACTICES:
(SELECT T = TEMPORARY OR P = PERMANENT AS APPLICABLE)

T	TEMPORARY SEEDING	P	PRESERVATION OF NATURAL RESOURCES
_____	MULCHING *(HAY OR STRAW)*	_____	FLEXIBLE CHANNEL LINER
_____	BUFFER ZONES	_____	RIGID CHANNEL LINER
_____	PLANTING	P	SOIL RETENTION BLANKET
P	SEEDING	_____	COMPOST MANUFACTURED TOPSOIL
_____	SODDING	_____	SOIL TACKIFIER
		_____	OTHER:

2. STRUCTURAL PRACTICES:
(SELECT T = TEMPORARY OR P = PERMANENT AS APPLICABLE)

T	SILT FENCES
_____	HAY BALES
T	ROCK FILTER DAMS
_____	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
_____	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
_____	DIVERSION DIKE AND SWALE COMBINATION
_____	PIPE SLOPE DRAINS
_____	PAVED FLUMES
_____	ROCK BEDDING AT CONSTRUCTION EXIT
_____	TIMBER MATTING AT CONSTRUCTION EXIT
_____	CHANNEL LINERS
_____	SEDIMENT TRAPS
_____	SEDIMENT BASINS
_____	STORM INLET SEDIMENT TRAP
_____	STONE OUTLET STRUCTURES
P	CURBS AND GUTTERS
_____	STORM SEWERS
_____	VELOCITY CONTROL DEVICES
T	OTHER: Bio Logs

3. STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY EXISTING GRASS "V" DITCHES WHICH WILL PROVIDE NATURAL FILTRATION.
THIS SYSTEM WILL CARRY DRAINAGE WITHIN THE RIGHT OF WAYS TO EXISTING DRAINAGE OUTFALLS.

4. STORM WATER MANAGEMENT ACTIVITIES: (SEQUENCE OF CONSTRUCTION)

PRE-CONSTRUCTION:
STORM WATER DRAINAGE WILL BE PROVIDED BY EXISTING GRASS "V" DITCHES WHICH WILL PROVIDE NATURAL FILTRATION.

DURING- CONSTRUCTION
SILT FENCE ALONG ROW THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY SHEET FLOW OFF OF TxDOT ROW.
ROCK FILTER DAMS AND EROSION CONTROL LOGS ACROSS DITCHES AND CULVERT OUTFALLS.

POST- CONSTRUCTION
PERMANENT SOIL RETENTION BLANKETS.

5. NON-STORM WATER DISCHARGES:

NON-STORM WATER DISCHARGES SHOULD BE FILTERED, OR HELD IN RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION WATER AND/OR FOOTING DRAIN WATER, AND WATER FOR DUST CONTROL. PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
ALL EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT SHALL BE PERFORMED AT THE EARLIEST DATE POSSIBLE BUT NO LATER THAN 7 CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT. DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITIES HAVE CEASED, TEMPORARILY OR PERMANENTLY, SHALL BE STABILIZED WITHIN 14 CALENDAR DAYS UNLESS THEY ARE SCHEDULED TO AND DO RESUME WITHIN 21 CALENDAR DAYS. THE AREAS ADJACENT TO CREEKS AND DRAINAGE-WAYS SHALL HAVE PRIORITY FOLLOWED BY DEVICES PROTECTING STORM SEWER INLETS.

2. INSPECTION:
INSPECTIONS SHALL BE PERFORMED BY A TXDOT INSPECTOR ONCE EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS AFTER EVERY 0.5 INCHES OR MORE OF RAIN. AN INSPECTION AND MAINTENANCE REPORT SHALL BE FILED FOR EACH INSPECTION. BASED ON THE INSPECTION RESULTS, THE CONTROLS SHALL BE REVISED AS PER THE INSPECTION REPORT.

3. WASTE MATERIALS:
ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER SHALL MEET ALL STATE AND LOCAL CITY SOLID WASTE MANAGEMENT REGULATIONS. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER SHALL BE EMPTIED AS NECESSARY OR AS REQUIRED BY LOCAL REGULATIONS, AND HAULED TO A LOCAL APPROVED LANDFILL SITE. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):
AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS AND WILL NEED PROPER STORAGE: FUEL, PAINT, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR SHOULD BE CONTACTED IMMEDIATELY. WASH WATER AND CONCRETE WILL NOT BE ALLOWED TO ENTER ANY STORM DRAIN OR WATERWAY. LIKEWISE, WASHOUT OF CONCRETE TRUCKS SHALL NOT BE PERFORMED ONSITE WITHOUT A SYSTEM OF CONTAINMENT. THESE DISCHARGES ARE CONSIDERED NON-ALLOWABLE. NON-STORM WATER DISCHARGES. CONCRETE TRUCKS SHALL NOT DUMP INTO STORM DRAINS OR SANITARY SEWERS.

5. SANITARY WASTE:
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATIONS BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

6. OFFSITE VEHICLE TRACKING:
THE CONTRACTOR SHALL BE REQUIRED, ON A REGULAR BASIS OR AS MAY BE DIRECTED BY THE ENGINEER, TO DAMPEN HAUL ROADS FOR DUST CONTROL, STABILIZE AND MAINTAIN CONSTRUCTION ENTRANCE/EXIT. PROVIDE FOR A MOTORIZED BROOM OR A VACUUM TYPE SWEEPER TO BE AVAILABLE ON A WEEKLY BASE OR AS MAY BE DIRECTED BY THE ENGINEER TO REMOVE SEDIMENT FROM PAVED ROADWAYS ABUTTING OR TRAVERSING THE PROJECT SITE.

7. MANAGEMENT PRACTICES:
1. DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED.
2. CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS.
3. ALL WATERWAYS SHALL BE CLEARED AS SOON AS PRACTICABLE OF TEMPORARY EMBANKMENT, DEBRIS, AND OR OTHER OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS THAT ARE NOT A PART OF THE FINISHED WORK.
4. SEDIMENT MUST BE REMOVED FROM TRAPS AND PONDS NO LATER THAN DESIGN CAPACITY HAS BEEN REDUCED BY 50%.

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TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

STORM POLLUTION PREVENTION PLAN (SW3P)

DN:	DW:
CK:	CK:

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
				99

STATE	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
	AUS	BURNET	0914	24	025	VA

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. NONE.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

*☒ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

* PCN REQUIRED FOR IMPACTS TO HISTORIC CULVERTS - NWP GENERAL CONDITION 20 PROJECT CONSTRUCTION CANNOT START BEFORE USACE ISSUES NWP-14 VERIFICATION LETTER.

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1. UNNAMED TRIBUTARY TO INKS LAKE - CULVERT B (30.740649,-98.363096)

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☒ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☒ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☒ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☐ No Action Required ☒ Required Action

Action No.

1. COORDINATION IS ONGOING. PRIOR TO COMMENCING WORK, CONFIRM CULTURAL RESOURCE COORDINATION HAS BEEN COMPLETED.
2. PARK ROAD 4 IS HISTORIC. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES TO HISTORIC MASONRY ELEMENTS AND SHALL MAKE REPAIRS AT OWN EXPENSE.
3. TWO SEPARATE HISTORIC CENTERLINE CULVERTS EXIST BENEATH PARK ROAD 4W. TO BE PRESERVED IN PLACE.
4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☒ Required Action

Action No.

1. SEE LOCATIONS OF PROTECTED TREES ON THE TREE PROTECTION PLAN (SHEET 105)

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

A. The contractor will avoid disturbances to migratory birds nesting in trees, ground, bridges, culverts, etc. Nesting season is normally between the months of March 1 to September 1. If the contractor needs to perform work within the right of way during these months, the Contractor shall conduct a survey to determine if bird nests are present. If nesting migratory birds are discovered, the Contractor shall notify the Project Engineer. Under the Migratory Bird Treaty Act, the contractor shall not disturb the bird nests until the young have fledged.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

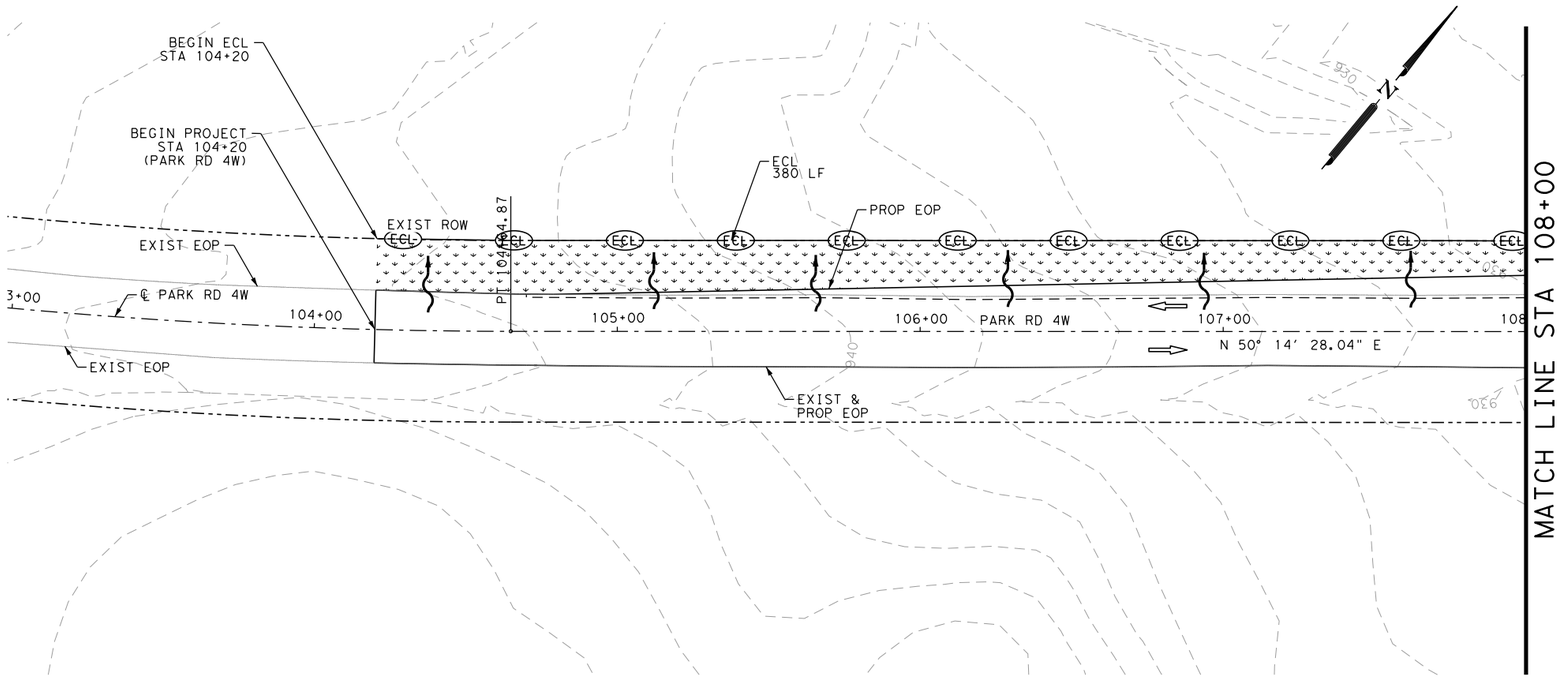
3.

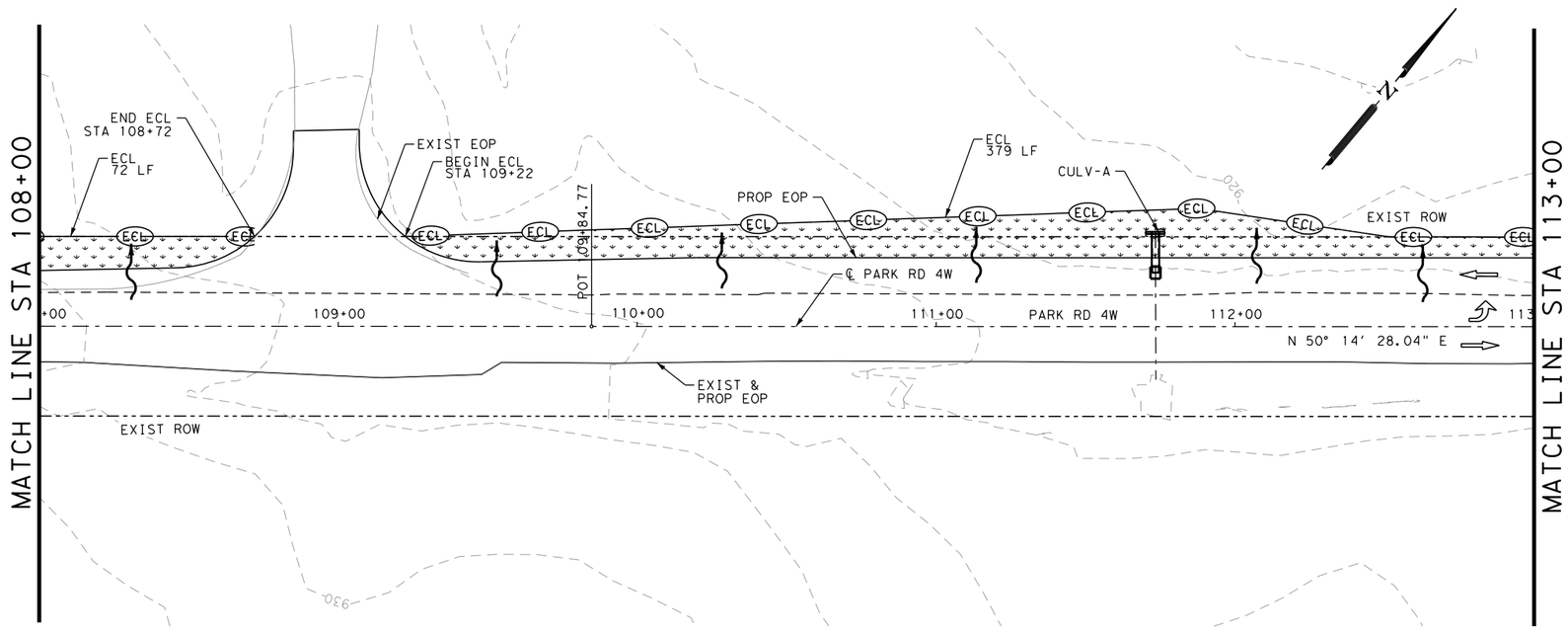
Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0914	24	025	VA	
	DIST	COUNTY		SHEET NO.	
	AUS	BURNET		100	





LEGEND

- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM TYPE 2
- FLOW DIRECTION
- BROADCAST SEED
- SOIL RETENTION BLANKET (CL II) (TY F)
- DIRECTION OF TRAFFIC
- 900 — EXISTING CONTOUR
- EXISTING ROW

NOTES:
1. REFER TO SW3P STANDARD SHEETS FOR INSTALLATION DETAILS.
2. SEE SW3P SUMMARY FOR ALL SW3P ITEMS AND QUANTITIES.
3. LOCATION OF SW3P CONTROLS TO BE PLACED AS NEEDED OR AS DIRECTED BY THE ENGINEER.
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6. CONSTRUCTION EXIT LOCATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SW3P LAYOUT

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SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	101

Plotted on: 1/27/2023

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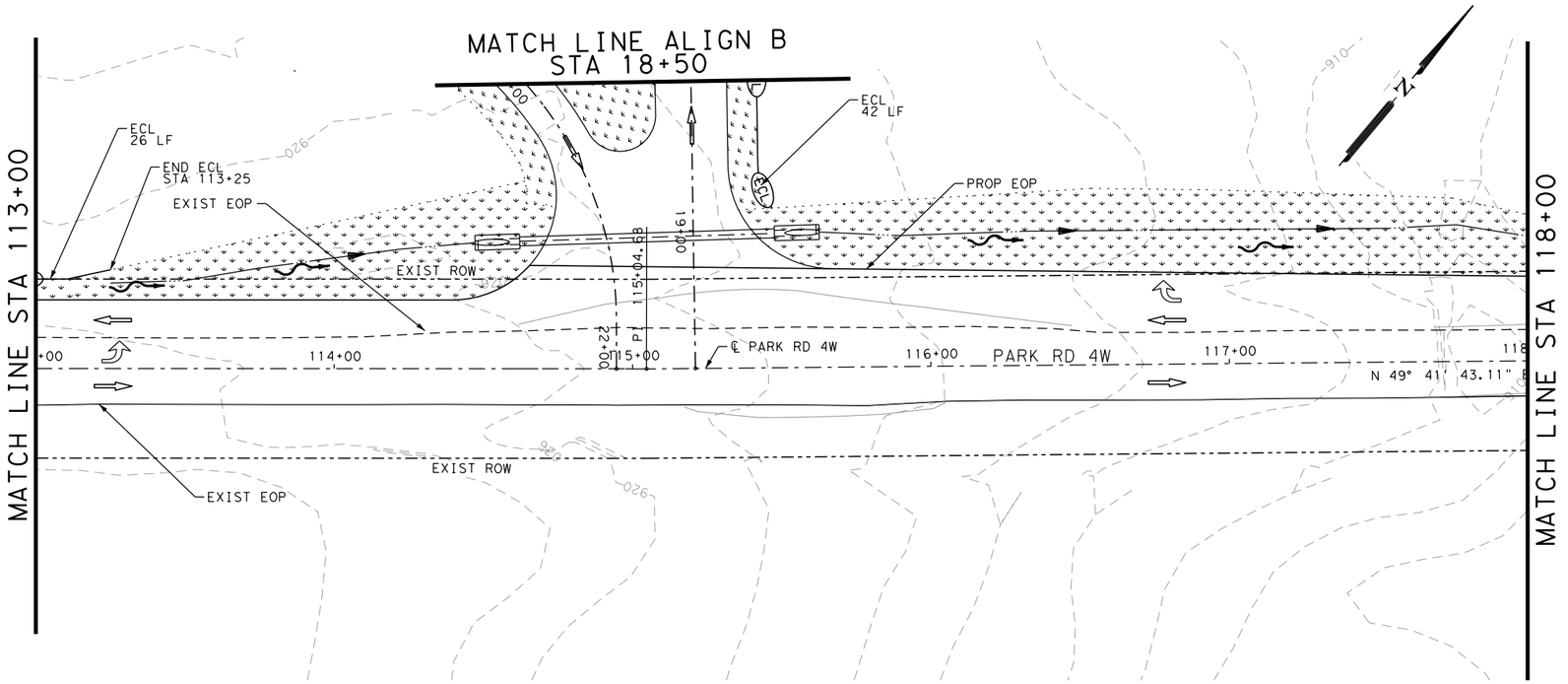

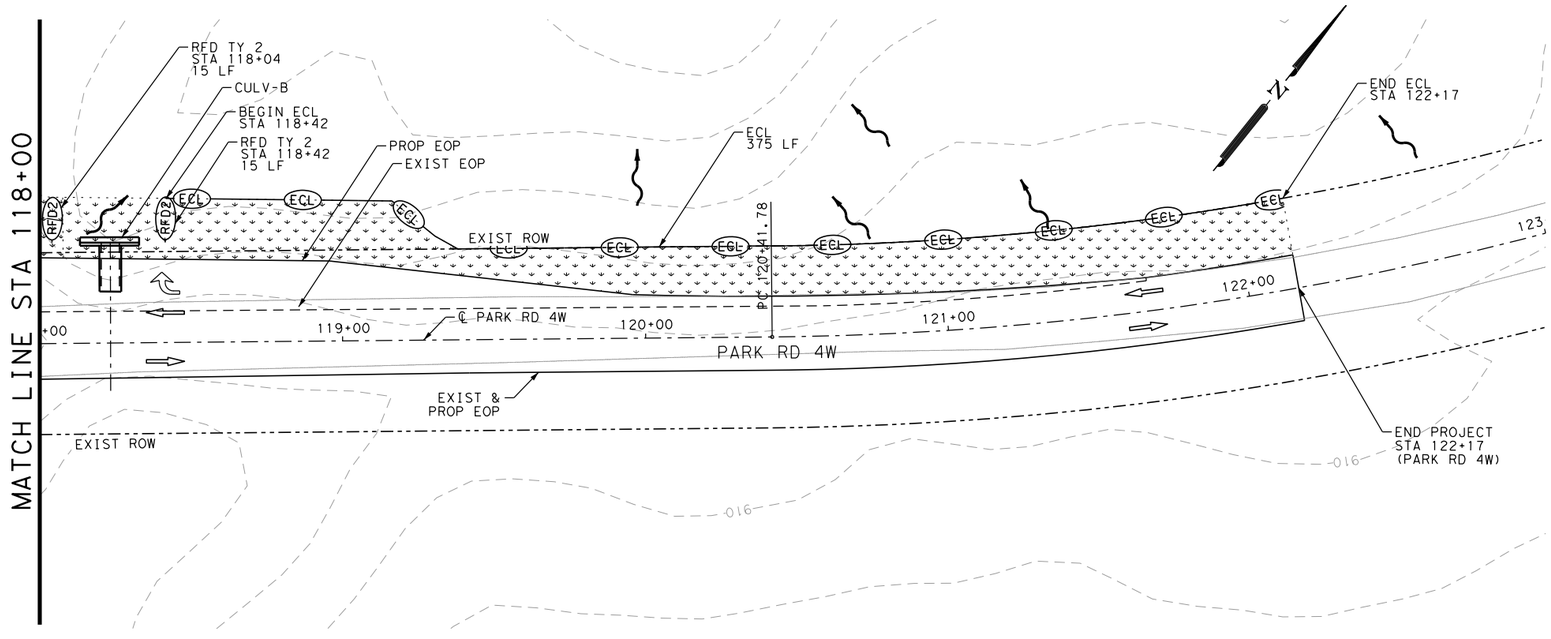

LEGEND

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STATE OF TEXAS
DENNIS K. SEAL
80287
LICENSED
PROFESSIONAL ENGINEER

DENNIS K. SEAL, P.E. — 1/27/2023 DATE

0 25 50 75
SCALE: 1"= 50'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
AUSTIN I SAN ANTONIO I HOUSTON I FORT WORTH I DALLAS
10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SW3P LAYOUT

STA 113+00 TO END

SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	102

Plotted on: 1/27/2023

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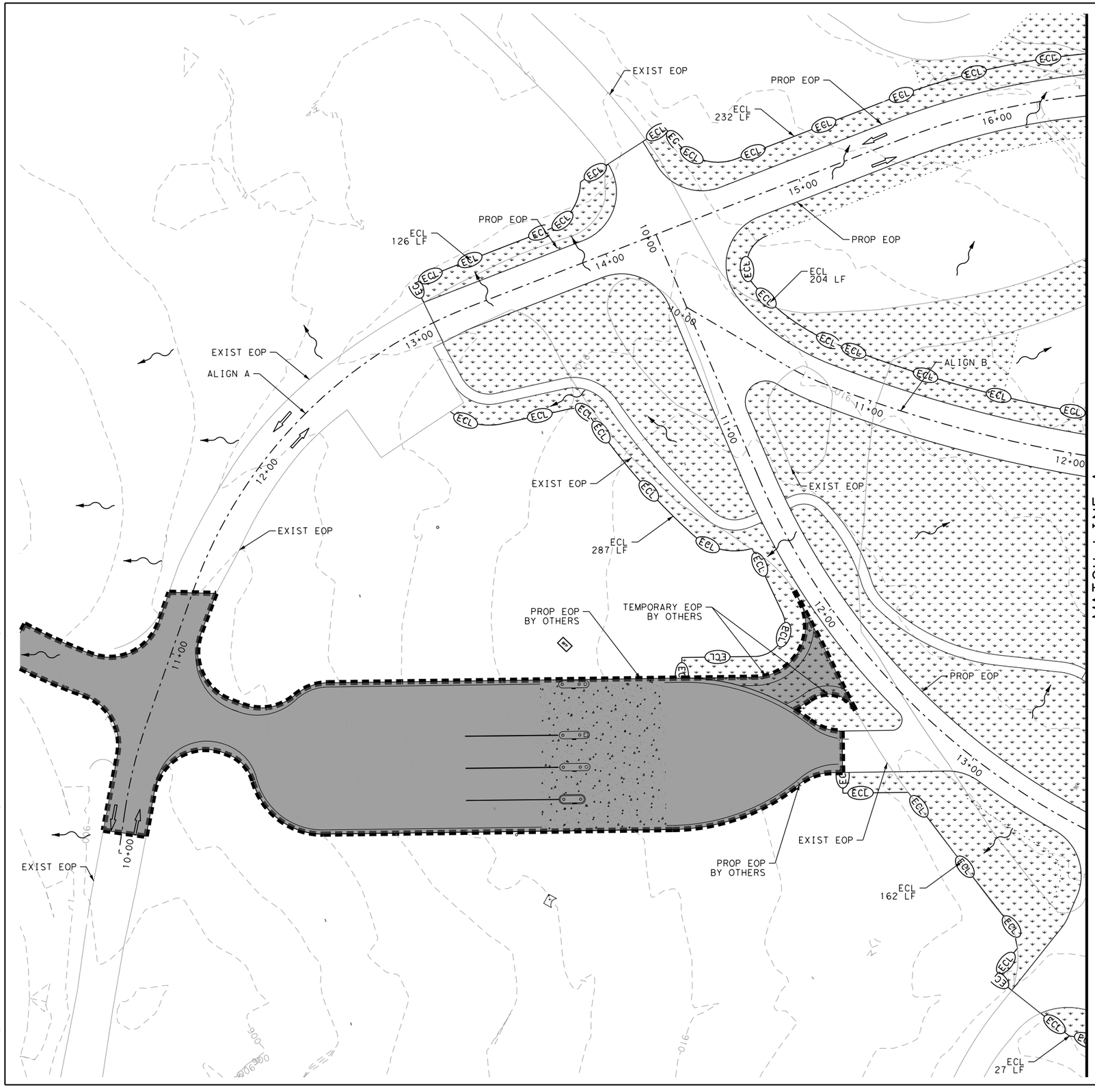

LEGEND

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10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SW3P LAYOUT

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	103

Plotted on: 1/27/2023

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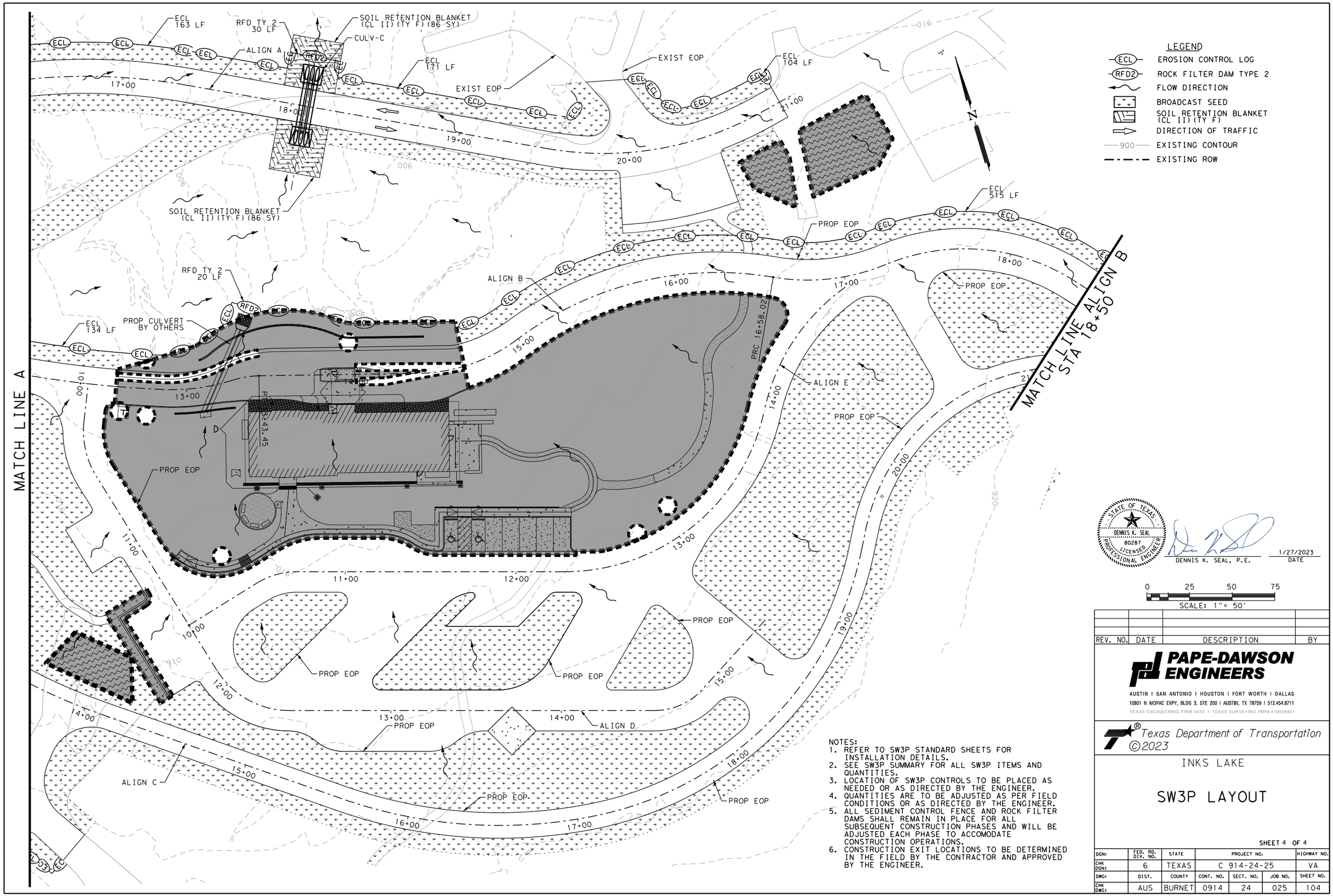

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10801 N MOPAC EXPY, BLDG 3, STE 200 I AUSTIN, TX 78759 I 512.454.8711
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028801

INKS LAKE

SW3P LAYOUT

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	C 914-24-25			VA
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	AUS	BURNET	0914	24	025	104

Plotted on: 1/27/2023
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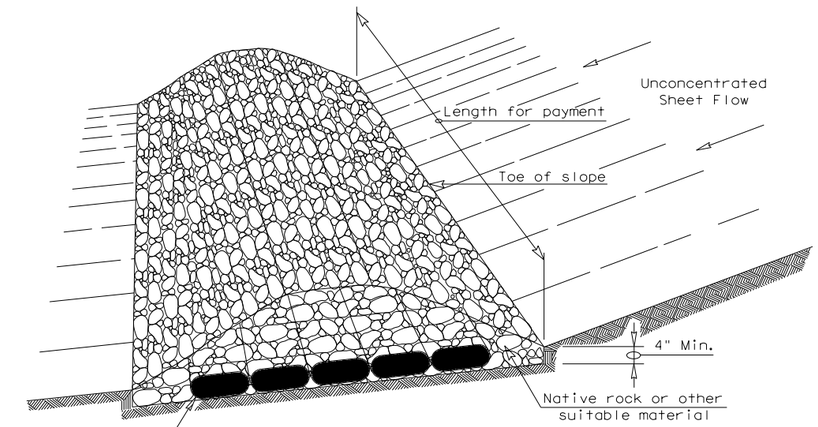
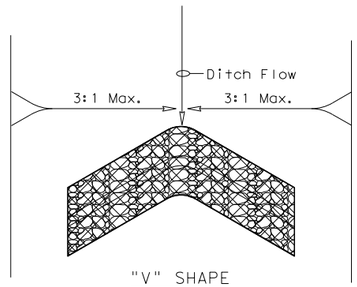
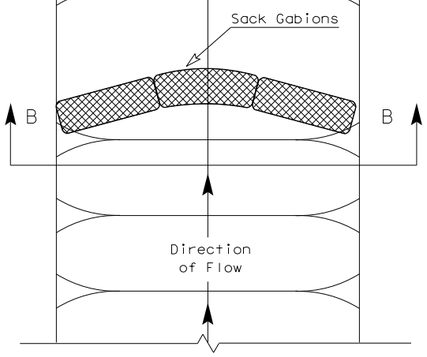


FILTER DAM AT TOE OF SLOPE

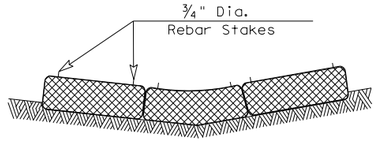
RFD1



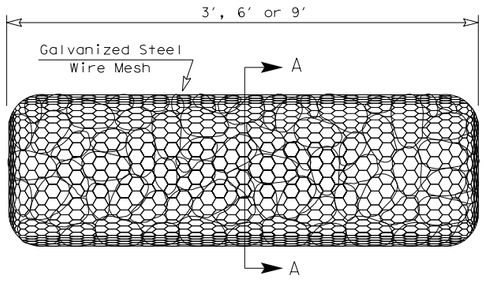
"V" SHAPE
PLAN VIEW



PLAN VIEW

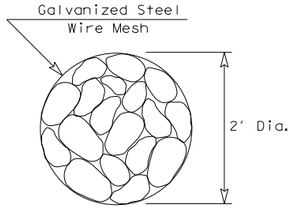


SECTION B-B



TYPE 4 (SACK GABIONS)

RFD4



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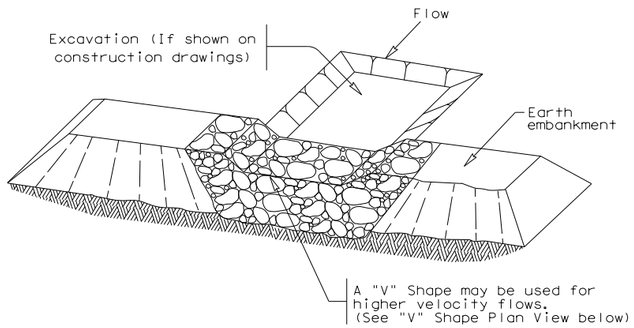
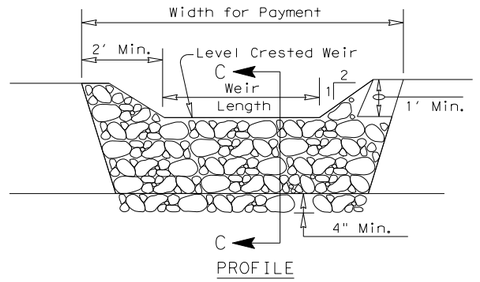
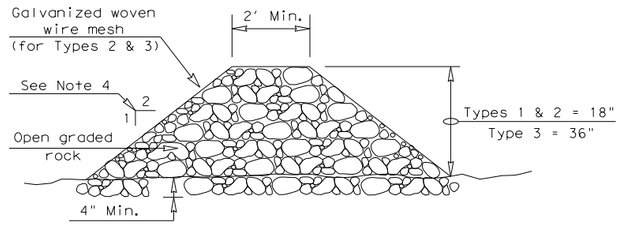


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

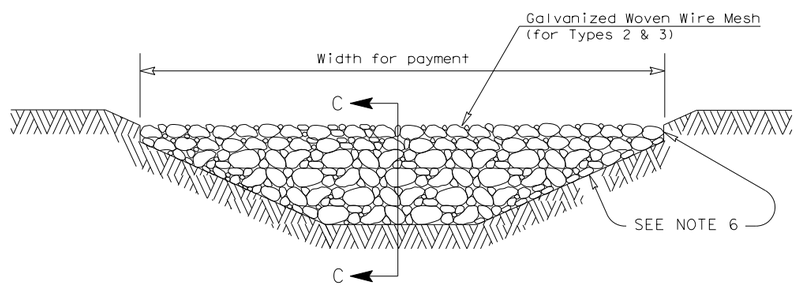
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3
Type 4 Rock Filter Dam — RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		105

DATE: 1/27/2023
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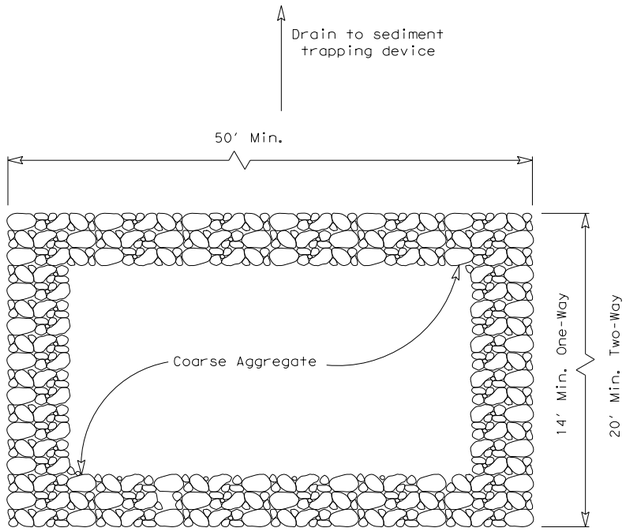
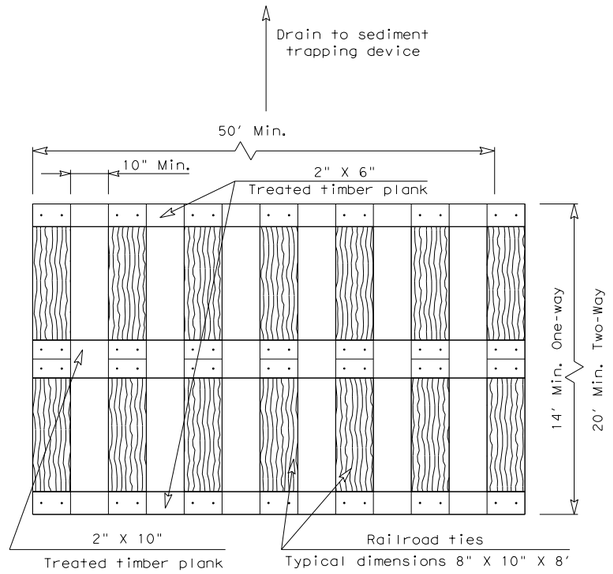
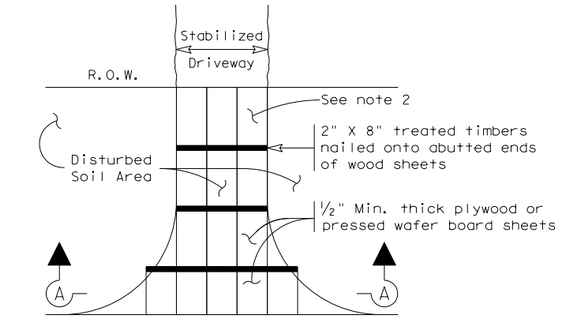


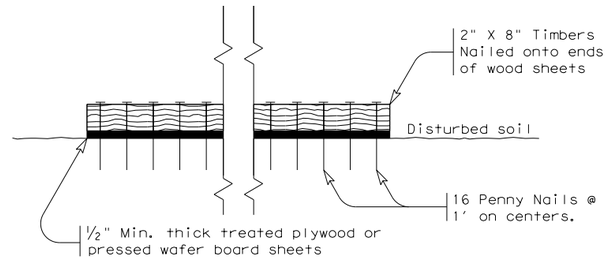
PLAN VIEW



PLAN VIEW



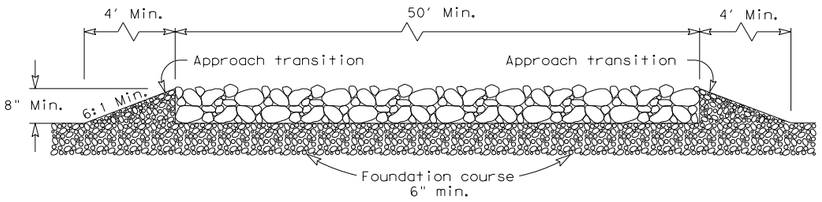
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

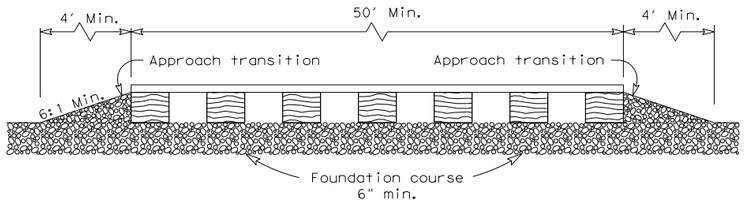
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
	DIST	COUNTY		SHEET NO.
	AUS	BURNET		106

DATE: 1/27/2023
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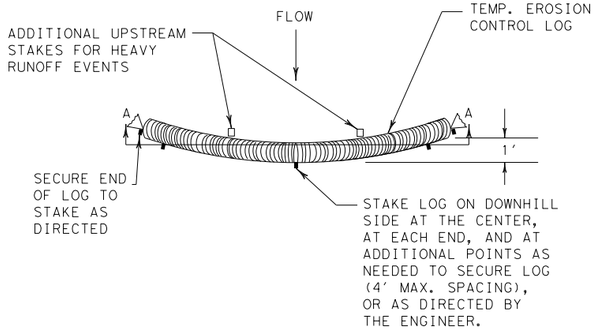
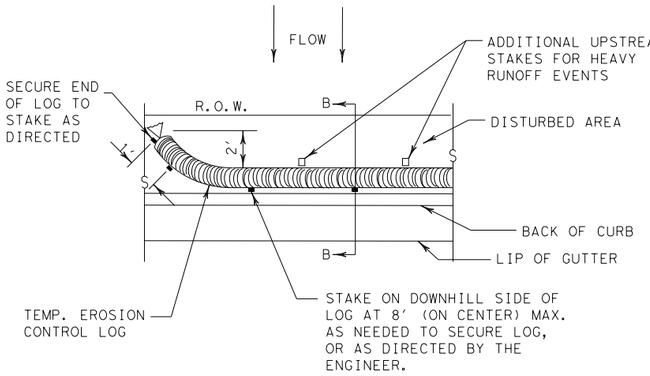
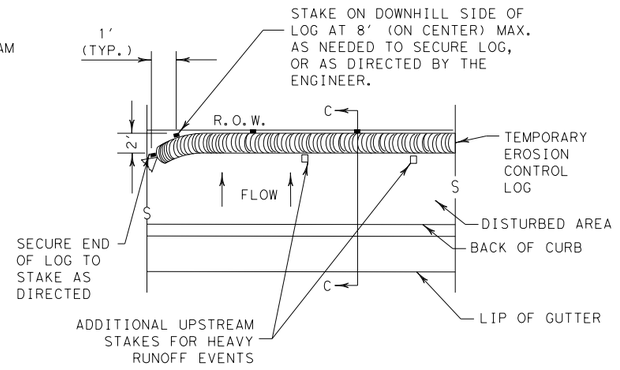


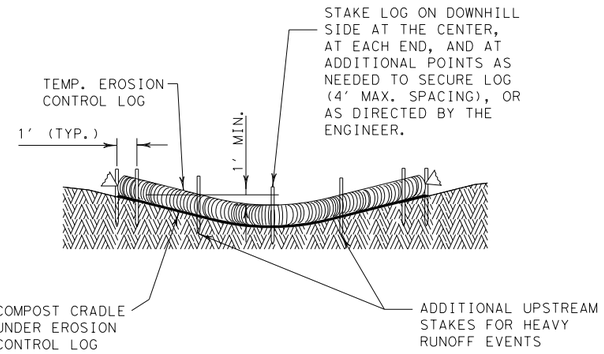
PLAN VIEW



PLAN VIEW



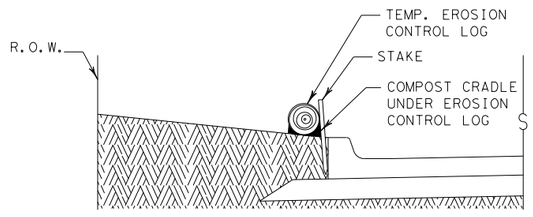
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

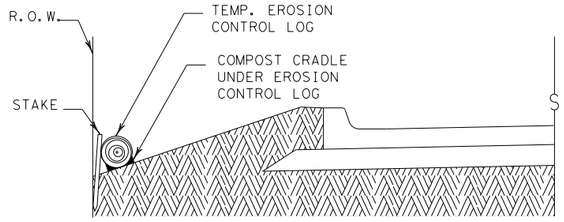
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

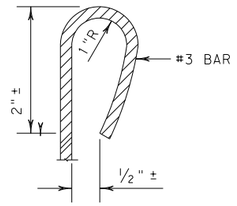
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



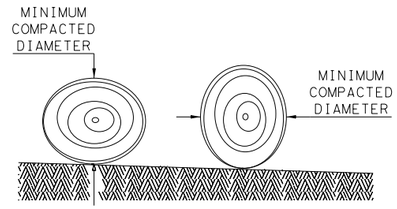
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
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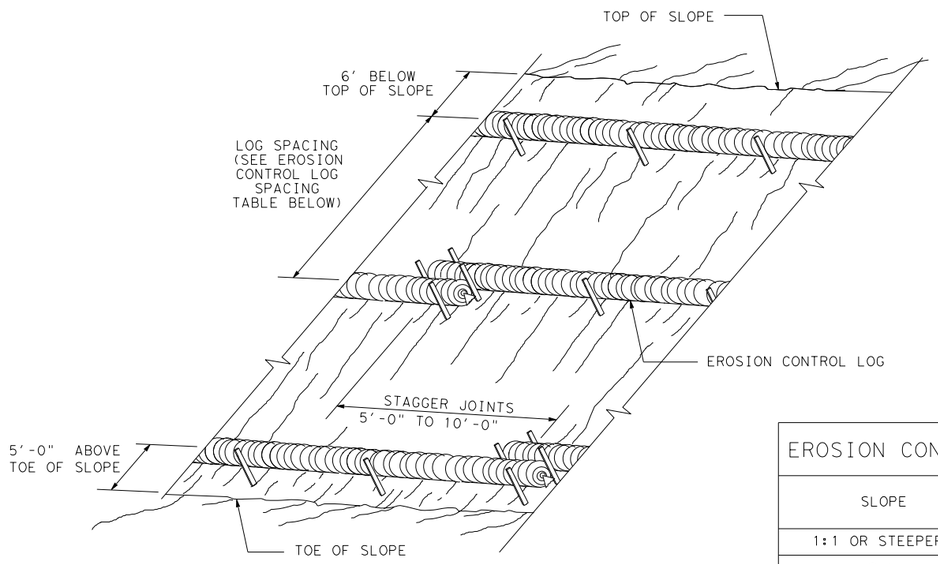
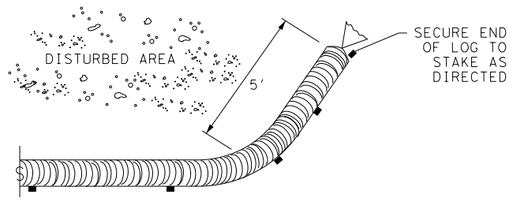
	AUS	BURNET		107



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

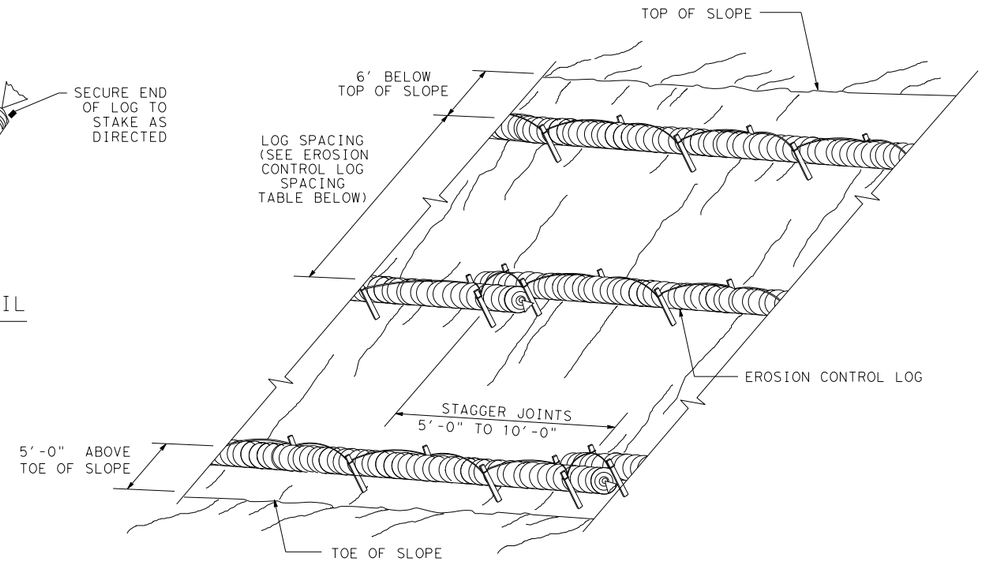
CL-SST



END SECTION RAP DETAIL

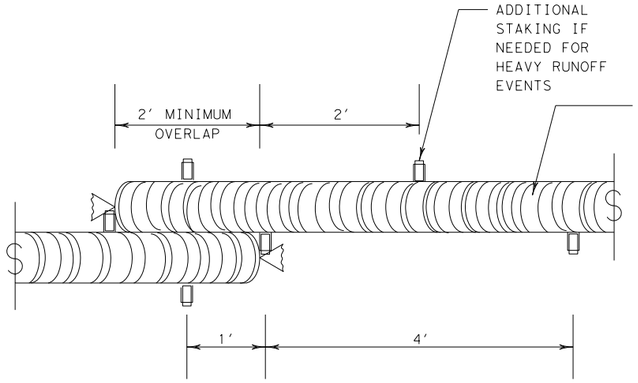
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

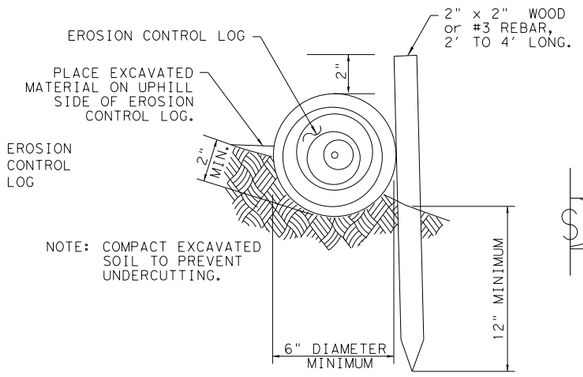
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

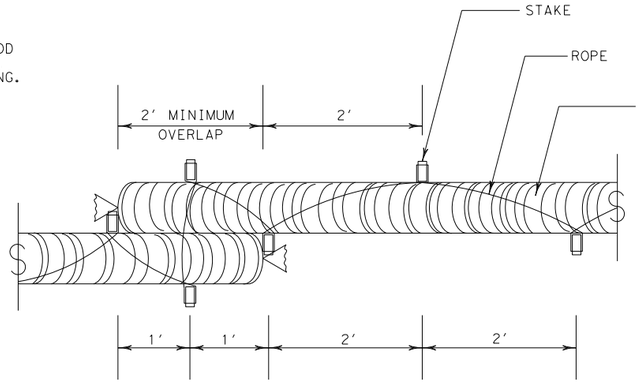


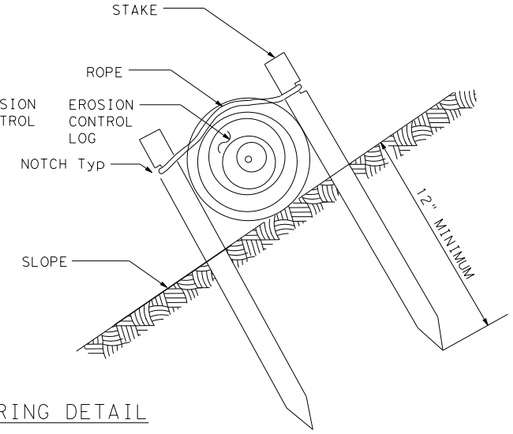


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

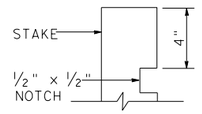
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	BURNET		108

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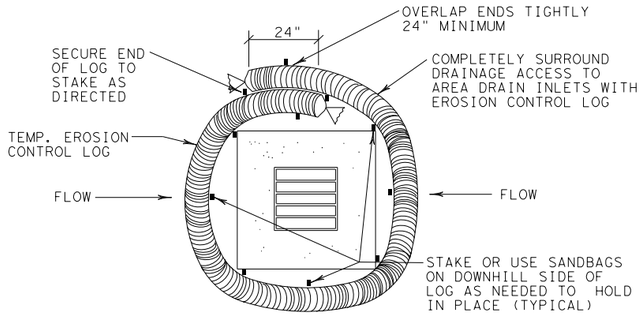
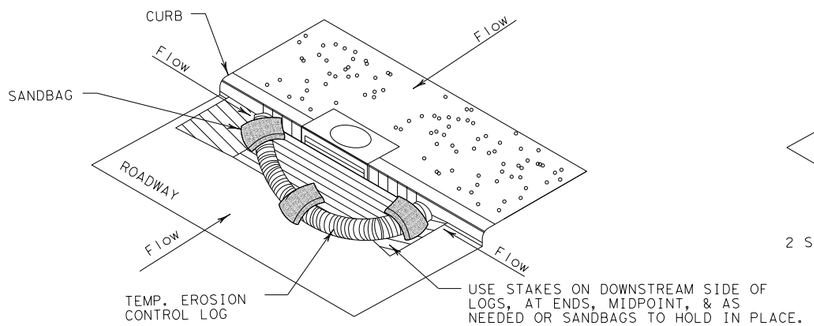


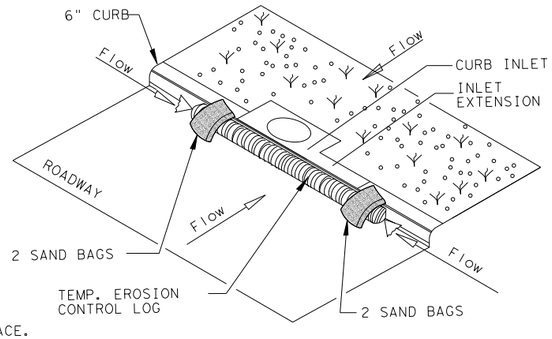
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

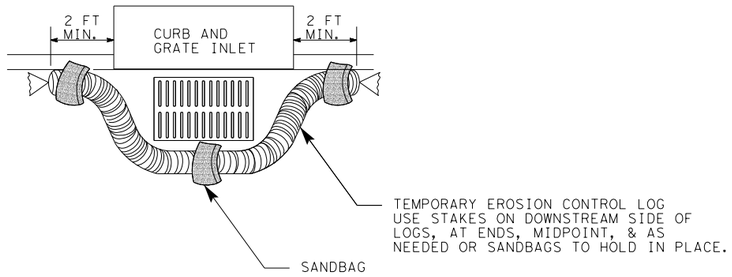
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

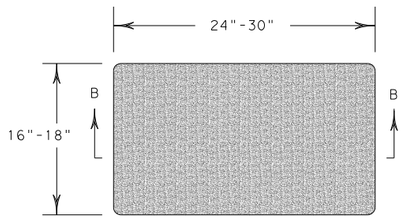
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
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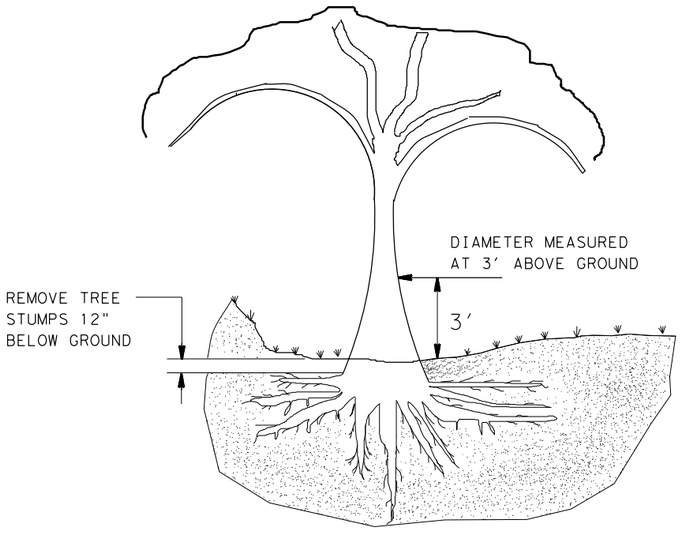
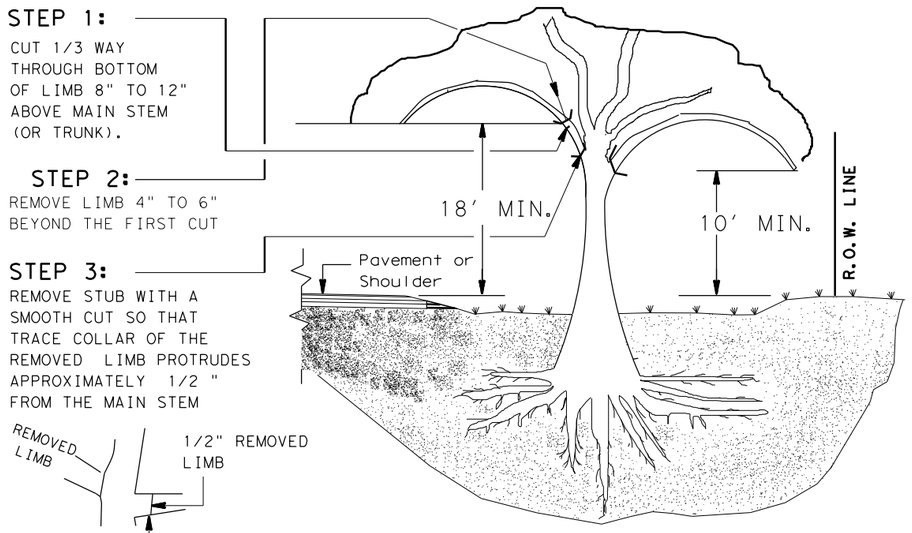
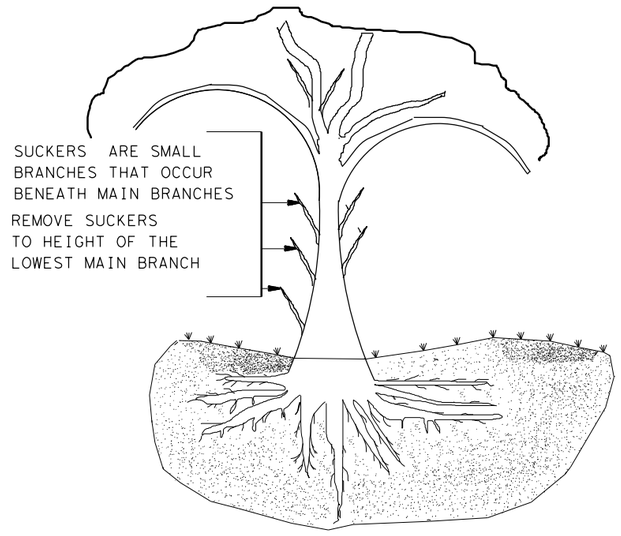


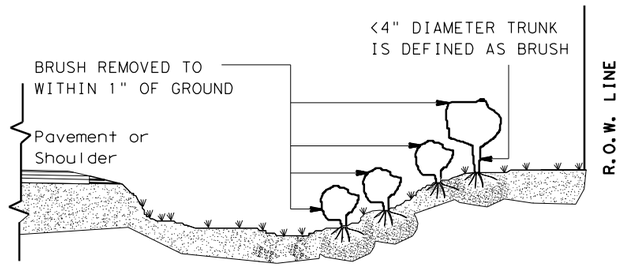
TREE REMOVAL



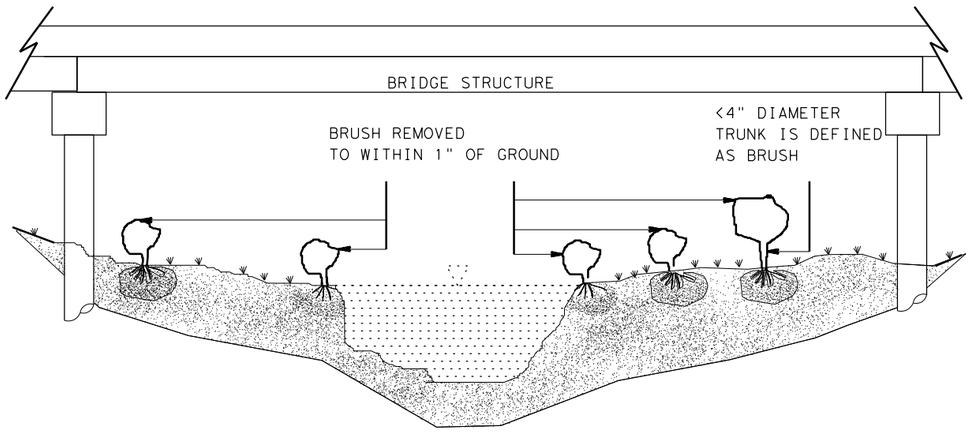
TREE TRIMMING



STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.
2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.
4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

TABLE 1
TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT

PAY ITEM	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

*SEE GENERAL NOTE #3.

Texas Department of Transportation — Maintenance Division Standard

TREE AND BRUSH REMOVAL

TRB-15(1)

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0914	24	025	VA
Revised table 1 to 2014 Specification	DIST	COUNTY		SHEET NO.
	AUS	BURNET		110

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