FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	BR 1402(214)		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	12	532	WALTERS ST

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
SEE SHEET NO. 2	

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT

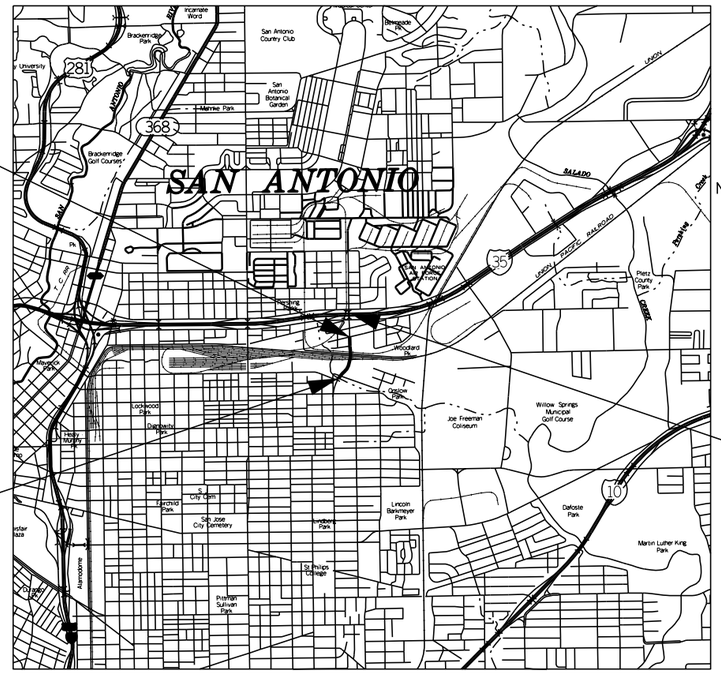
FUNCTIONAL CLASSIFICATION = URBAN MINOR ARTERIAL STREET
DESIGN SPEED = 30 MPH

AREA OF DISTURBED SOIL = 0.47 AC

ADT (2019) = 13,293
ADT (2049) = 19,993

PROJECT NO.:	BR 1402(214)
HIGHWAY:	WALTERS ST
COUNTY:	BEXAR
CSJ:	0915-12-532
NET LENGTH OF PROJECT:	1,440 FT = 0.273 MI
ROADWAY LENGTH:	434 FT = 0.082 MI
BRIDGE LENGTH:	1,006 FT = 0.191 MI
LIMITS:	N. WALTERS ST @ UPPR & LARRY STREET

FOR WORK CONSISTING OF REHAB
BRIDGE AND APPROACHES



N. T. S.

BEGIN PROJECT
CSJ 0915-12-532
STA. 15+60.00

END PROJECT
CSJ 0915-12-532
STA 30+00.00

DOT 848200E
RRMP 206.69, DEL RIO SUB

EXCEPTIONS = NONE
EQUATIONS = NONE
RAILROAD CROSSINGS = UPRR EAST YARD

FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED
IN ACCORDANCE WITH THE PLANS.

_____ _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

COUNTY_____ PROJ. NO._____
HWY NO._____ LETTING DATE:_____
DATE ACCEPTED_____

JACOBS®

2705 BEE CAVE ROAD, STE. 300
AUSTIN, TX 78746
512.314.3100
WWW.JACOBS.COM

FIRM REGISTRATION F-2966

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEM LISTED AS FOLLOWS SHALL GOVERN ON THIS PROJECT:
REQUIRED CONTRACT PROVISION FOR ALL FEDERAL AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012)

RECOMMENDED FOR LETTING DATE: ~~11/30/2021~~
DocuSigned by: Lauren J. Colbert, P.E.
DESIGN SUPPORT DIRECTOR

RECOMMENDED FOR LETTING DATE: ~~11/29/2021~~
DocuSigned by: Gregg Granato, P.E.
DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING DATE: ~~11/29/2021~~
DocuSigned by: Clayton Kipps
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING DATE: ~~11/30/2021~~
DocuSigned by: Gina Gallegos
DISTRICT ENGINEER

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3 - 4	TYPICAL SECTIONS
5,5A - 5E	GENERAL NOTES
6,6A - 6B	ESTIMATE AND QUANTITIES
7	QUANTITY SUMMARY
8	SUMMARY OF BRIDGE QUANTITIES
	TRAFFIC CONTROL SHEETS
9	TRAFFIC CONTROL PLAN NARRATIVE
10	TRAFFIC CONTROL PLAN SCHEDULE OF BARRICADES
11	TRAFFIC CONTROL PLAN TYPICAL SECTIONS
12 - 13	TRAFFIC CONTROL PLAN PHASE 1
14	TRAFFIC CONTROL PLAN N WALTERS STREET DETOUR
	TRAFFIC CONTROL STANDARDS
15 - 26	BC (1)-21 THRU BC (12)-21*
27	TCP(1-1)-18*
28	TCP(1-2)-18*
29	TCP(2-5)-18*
30	WZ(BRK)-13*
31	WZ(TD)-17*
32	WZ (RCD)-13*
	FIELD CONTROL
33	SURVEY CONTROL INDEX SHEET
34	HORIZONTAL AND VERTICAL CONTROL SHEET
	ROADWAY SHEETS
35	HORIZONTAL DATA
36 - 37	ROADWAY P&P
	ROADWAY STANDARDS
38	GF(31)-19*
39	GF(31)-TR TL2-19*
40	GF(31)DAT-19*
41	GF(31)MS-19*
42	BED-14*
43 - 45	PRD13(MOD)*
46	SGT(10S)31-16*
46A	SGT(11S)31-18*
	DRAINAGE SHEETS
47	DRAINAGE AREA MAP
48	HYDRAULIC DATA SHEET
49	DRAINAGE LAYOUT
	BRIDGE SHEETS: N WALTERS ST OVERPASS AT UPRR
50 - 52	BRIDGE LAYOUT
53	TYPICAL BRIDGE SECTIONS
54	ESTIMATED QUANTITIES
55 - 57	TEST HOLE DATA
58 - 62	BRIDGE DECK REPAIR DETAILS
63 - 64	CONCRETE REPAIR DETAILS
65	ELASTOMERIC BEARING PAD
66	AS BUILT C4 RAIL STANDARD
	BRIDGE STANDARDS
67	BRIDGE NBI NUMBER STENCIL (MOD)*
68	CRR*
69 - 71	TYPE T402*
72	TRF*

SHEET NO.	DESCRIPTION
	SIGNING AND PAVEMENT MARKINGS
73	SIGNING AND PAVEMENT MARKINGS LAYOUT
74	SUMMARY OF SMALL SIGNS
	SIGNING AND PAVEMENT MARKINGS STANDARDS
75	PM(1)-20*
76	PM(2)-20*
77	CPM(1)-14*
78	SMD(GEN)-08*
79	SMD(BR-1)-14*
80	SMD(BR-2)-14*
81	SMD(BR-3)-14*
82	D&OM(1)-20*
83	D&OM(2)-20*
84	D&OM(3)-20*
85	D&OM(6)-20*
86	D&OM(VIA)-20*
	RAILROAD SHEETS
87 - 88	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION
89	RAILROAD SCOPE OF WORK
	SW3P
90	ENVIRONMENTAL PERMITS ISSUES AND COMMITMENTS (EPIC)
91	STORM WATER POLLUTION PREVENTION PLAN (SW3P)
92	SW3P LAYOUT
	SW3P STANDARDS
93	EC(1)-16*
94	EC(3)-16*
95 - 97	EC(9)-16*
	UTILITY SHEETS
98	EXISTING UTILITY LEGEND
99	EXISTING UTILITY LAYOUT

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

SCOTT L. WALLACE, PE 12/21/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

INDEX OF SHEETS

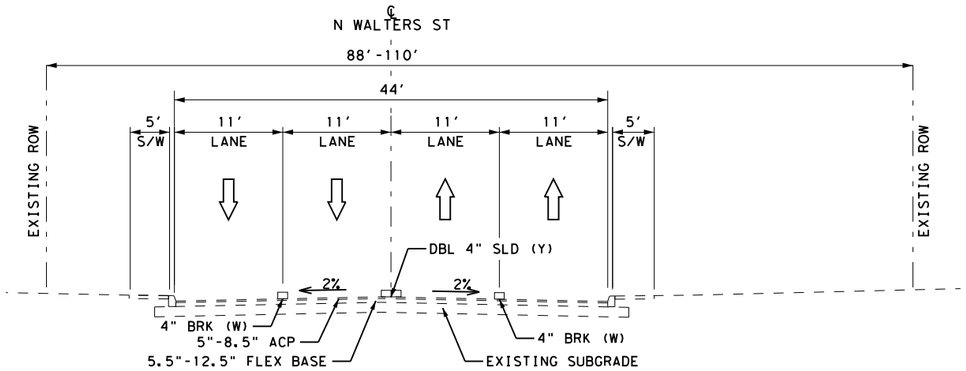
PRINT DATE: 12/21/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	2
SAT	BEXAR		N WALTERS ST	

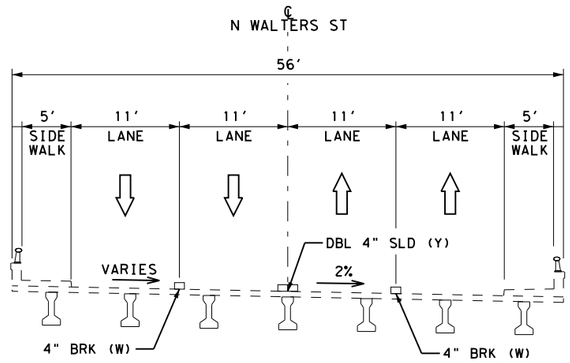
...\SHT\GENRL\5301 INDEX 01.dgn
12/21/2021 6:19:38 PM

NOTES:

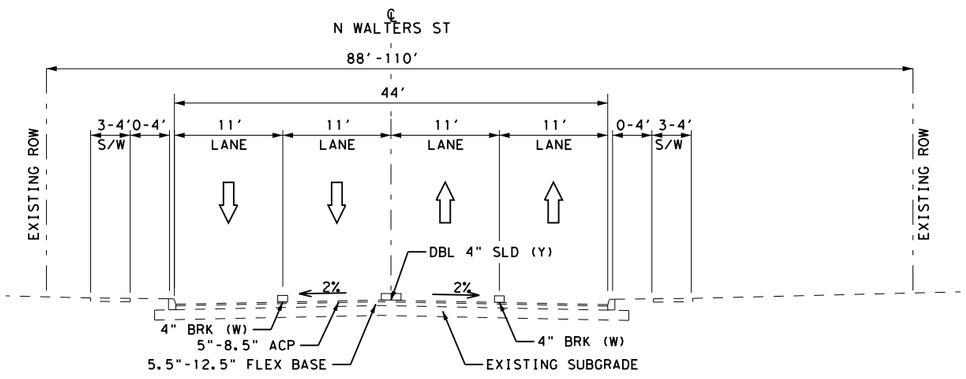
1. PAVEMENT SUBSTRUCTURE INFORMATION IS BASED ON BORINGS.



EXISTING TYPICAL SECTION
℄ WALTERS STA 17+03.36 TO 17+53.36



EXISTING TYPICAL SECTION
℄ WALTERS STA 17+53.36 TO 27+59.36



EXISTING TYPICAL SECTION
℄ WALTERS STA 27+59.36 TO 31+94.93

DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

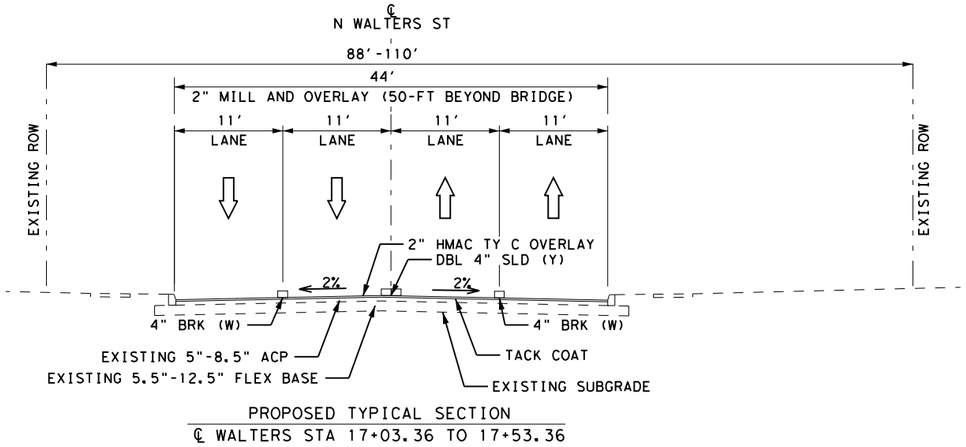
N WALTERS ST

TYPICAL SECTIONS EXISTING

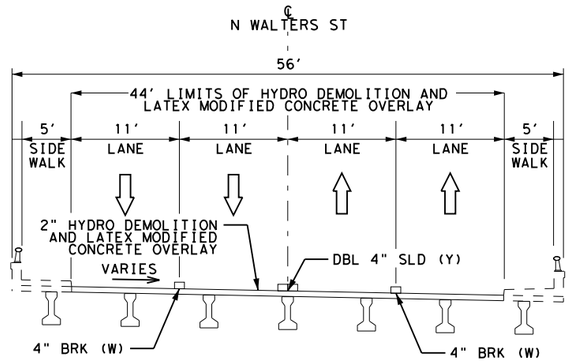
PRINT DATE: 11/12/2021 SHEET 1 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	3
SAT	BEXAR		WALTERS ST	

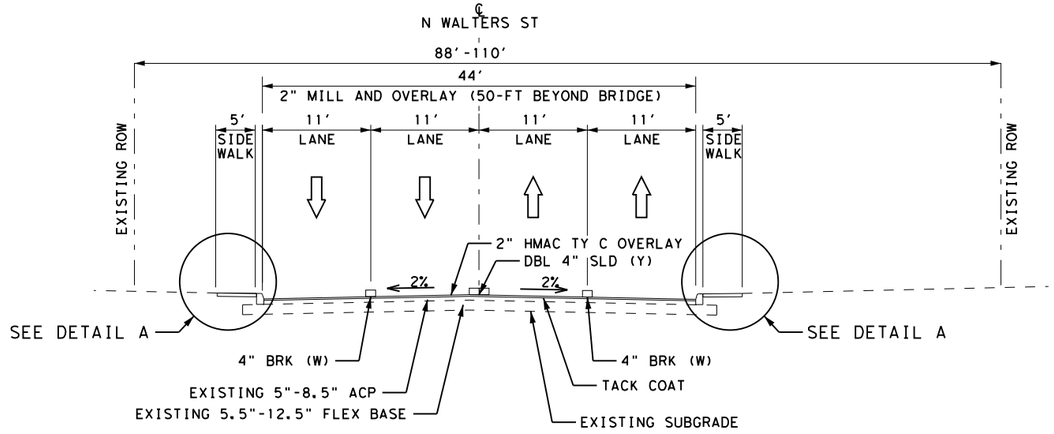
...\SHT\GENRL\0534_EXTY01.dgn
11/12/2021 10:46:59 AM



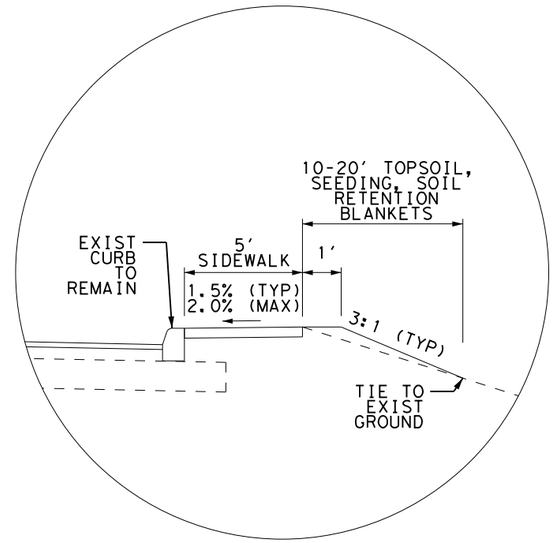
PROPOSED TYPICAL SECTION
℄ WALTERS STA 17+03.36 TO 17+53.36



PROPOSED TYPICAL SECTION
℄ WALTERS STA 17+53.36 TO 27+59.36



PROPOSED TYPICAL SECTION
℄ WALTERS STA 27+59.36 TO 31+94.93



DETAIL A

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/29/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

TYPICAL SECTIONS PROPOSED

NTS

PRINT DATE: 11/29/2021

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	4
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\GENRL\0534_PRTY01.dgn
11/29/2021 5:00:28 PM

**********GENERAL NOTES**********
2014 Specification Book

========== Basis of Estimate ==========

Item	Description	Rate/Area	Quant-Unit
164-6007	Broadcast Seed	4840 SY/AC	906 SY
164-6009	Broadcast Seed	4840 SY/AC	453 SY
164-6011	Broadcast Seed	4840 SY/AC	453 SY
168-6008	Vegetative Watering	0.02 MG/SY	37 MG

========== Asphalt Concrete Pavement ==========

Type	Location	Depth	Rate/Area	Quant-Tons
TY-C	Walters St	2”	110 lbs/sy/in	54

The following State, District, Local and/or Utility Standards have been modified: PRD 13 (MOD), BRIDGE NBI NUMBER STENCIL (MOD).

Remove existing raised pavement markings as the work progresses or as approved. This work is subsidiary to the various bid items. Properly dispose materials removed.

To better fit field conditions, the cross sections may be varied when approved.

If there are waste areas or material source areas, follow the Texas Aggregate Quarry and Pit Safety Act requirements.

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Properly dispose unsalvageable materials in accordance with local, state, and federal regulations. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stock piles, etc. cannot be placed over these valves or covers.

Adjust or construct all manholes and valves to final pavement elevations prior to the final mat of ACP. If, between the final elevation adjustment and the final mat of ACP, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the ACP work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

The Contractor should be aware that the "City Public Service" (CPS) will be consulted by the Engineer in matters concerning the execution of the work, materials and testing related to the CPS work. As such; a CPS employee may be observing the construction and related operations as they progress.

If a sanitary sewer overflow (SSO) occurs:

1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.
3. Call SAWS at (210) 233-2015.

Contractor questions on this project are to be addressed to the following individual(s):
Area Engineer: Sergio Garcia, Sergio.Garcia@ TxDOT.gov
Assistant Area Engineer: Danny Gallegos, Danny.Gallegos@TxDOT.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/
All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Reference all existing striping and other pavement markings to allow these markings to be re-established. Ensure the markings (lane lines, edge lines, ramp gores, etc.) are in line with signs, TMS arrows, etc. located on overhead sign supports.

Taper ACP placed at curb inlets, traffic inlets and slotted drains.

Prior to letting, bidders may obtain a free computer diskette or a computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the cross-sections in addition to, or instead of, the CD are requested, they will be available at the Engineer's office for borrowing by copying companies at the bidder's expense.

When working near aerial electrical lines or utility poles, comply with Federal, State and local regulations. A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines in order to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and backfeed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds

must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures:

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows. This work is subsidiary to the various bid items.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

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 https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. 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.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

--Item 7--
The project's total disturbed area is 0.47 AC. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1._4:_Standard-work week (with San Antonio District rain days).

Create and maintain a CPM schedule.

The CPM schedule shall be created and maintained using software fully compatible with version 6.1 of Primavera Project Planner.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at

signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.
Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers in order to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case by case basis.

--Item 100--
Begin clearing operations after trees and other areas of vegetation to be protected have been identified and approved. Install fencing around features to be protected as shown in the plans or directed. Coordinate all right of way clearing operations with the SW3P.

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. 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 12 ft. vertical clearance under all trees. This work is subsidiary.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

--Item 110--
Where excavation extends beyond a right of way fence, remove and replace the fence to a comparable condition. This work shall be considered subsidiary to the bid item.

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during “Broadcast Seeding” operations, provided each component is applied at the specified rate.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--
There is no minimum PI requirement for this project.

--Item 320--
Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

--Item, 3076--
Table 10 in Item 3076 Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

The asphalt plant shall have truck scales as defined in Item 520. Give three weight tickets bearing the date, ticket number, the truck number, the gross, net & tare weights to the truck

driver for the State inspector at the spreading and finishing operation. Trucks may be required to weigh on public scales or portable platform scales to verify the weight of the ticket.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

Hold a pre-placement meeting one month prior to the placement of the hot mix.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

The Contractor may substitute HMA Ty B for the HMA Ty C near each abutment with approval of the Engineer.

With the approval of the Engineer, paving operations can occur in November as long as temperature requirements are met.

--Item 354--
Retain planed material.

Take precaution to avoid damage to existing bridge decks and armor joints. Repair any damage to the bridge decks and/or armor joints as approved. This work will not be paid directly, but will be performed at the Contractor’s expense.

--Item 420--
Restrict large aggregate size to ¾” maximum for class “C” concrete used in aesthetic details requiring form liners.

--Item 421--
Use an automated ticket that contains the same information as TxDOT's ticket. Submit the ticket for approval prior to use. The concrete producer will contact the District Laboratory or the Engineer’s Office (outside the San Antonio area) to inform TxDOT of scheduled structural

concrete batching. Structural concrete includes bridge drill shafts, columns, caps, abutments, deck or top slabs of direct traffic culverts.

Entrained air is allowed for Class P and Class HES concrete only. Air content testing is waived for all classes of concrete.

Poly-fiber reinforced concrete may be used as an option, with the approval by the Engineer, for riprap, sidewalk, curb/gutter, and mow strip. Use a TxDOT approved manufacturer or producer for the poly-fiber. The poly-fibers shall be combined with the concrete in proportions as recommended by the manufacturer. A concrete mix design must be approved by the Engineer.

--Item 432--
In all riprap slopes, provide 3 inch diameter weep holes at 10 foot maximum spacing and backed with loose graded gravel or crushed stone and galvanized hardware cloth.

In areas where guard fence posts are to be placed in riprap, the riprap shall have an 18 inch +/- blocked out area (round or square). After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

Match the slope of the Riprap (Mow Strip) to the slope of the adjacent roadway.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
Place standard markings no later than 14 days after surface treatment operations are completed.

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

Treat the pavement drop-offs as shown in the TCP.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance. Failure to make corrections as noted may result in payment for this item being withheld.

Moving an existing sign to a temporary location is subsidiary to this Item. Installations with permanent supports at permanent locations will be paid for under the applicable bid item (s).

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. Unless shown in the TCP, no lane, ramp, connector, etc. closures are allowed during special events. At least one lane has to remain open at all times. Lane closures will not be allowed if this reporting requirement is not met.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9:00 AM to 4:00 PM (Monday through Friday), and at least one lane has to remain open at all times.

Avoid placing stockpiles within the roadway's horizontal clear zone. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

If Nighttime work is required and work is not behind positive barrier then full TY 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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 504--
A Type D Structure (Asphalt Mix Control Laboratory) is required for all projects that do not have a previously approved laboratory structure for TxDOT's exclusive use.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 540--
MBGF posts shall be round with domed tops, and not painted. If 10 or less timber posts are needed, they may be purchased locally and will be accepted by visual inspection.

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) block out in the concrete. After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

--Item 542--
Salvage all undamaged/acceptable radius guardrail and deliver to the TxDOT maintenance section yard.

--Item 585--
Ride quality requirements are waived.

--Item 662--
Raised reflective pavement markings are required when using work zone reflective pavement markings for lane lines as shown in the standards. The raised reflective pavement markings must be placed during the same operation for installation of the work zone reflective pavement markings and placed before the roadway is open to traffic. These raised reflective pavement markings will be subsidiary to work zone pavement markings.

--Item 666--
Use TY II material (vs. an acrylic or epoxy) as the sealer for the TY I markings, place the TY II a minimum of 14 calendar days (to provide adequate curing) before placing the TY I markings.

Failure to provide the retroreflectometer testing data within the time specified in the specifications will result in non-payment of the bid item.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 4171--
Install bridge identification numbers shown below for each of the following listed bridges in accordance to the special specification and San Antonio District Standard. Install the bridge identification number on two locations as shown on the plans, or as directed. For bridges in a two-way condition, install the bridge identification number on each outside beam on the upstream side of traffic. For bridges in a one-way condition, install the bridge identification number on each side, opposite corners on each outside beam. For culverts less than 5 ft. in height, install the bridge identification number on the headwall on upstream and downstream location. For culverts greater than 5 ft. in height, install the bridge identification number inside the first barrel on the upstream side of traffic and inside the last barrel on the opposite corner in the direction of traffic.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-532 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY WALTERS

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0915-12-532**			
		PROJECT ID		**A00039777**			
		COUNTY		**Bexar**			
		HIGHWAY		**WALTERS**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	18.000		18.000	
	104-6010	REMOVING CONC (RIPRAP)	CY	77.000		77.000	
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	228.000		228.000	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	178.000		178.000	
	110-6001	EXCAVATION (ROADWAY)	CY	167.000		167.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	16.000		16.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	906.000		906.000	
	164-6007	BROADCAST SEED (PERM) (URBAN) (CLAY)	SY	906.000		906.000	
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	453.000		453.000	
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	453.000		453.000	
	168-6001	VEGETATIVE WATERING	MG	37.000		37.000	
	169-6003	SOIL RETENTION BLANKETS (CL 1) (TY C)	SY	906.000		906.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	20.000		20.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	481.000		481.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	2.700		2.700	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	200.000		200.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	77.000		77.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	13.000		13.000	
	434-6002	ELASTOMERIC BEARING (LAMINATED)	EA	140.000		140.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	536.000		536.000	
	439-6007	LATEX - MODIFIED CONC OVERLAY (2 IN)	SY	4,919.000		4,919.000	
	450-6010	RAIL (TY T402)	LF	20.000		20.000	
	450-6051	RAIL (HANDRAIL)(TY E)	LF	142.000		142.000	
	483-6007	HYDRO-DEMOLITION (2 IN)	SY	4,919.000		4,919.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		7.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	80.000		80.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	80.000		80.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	1,339.000		1,339.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	1,339.000		1,339.000	
	531-6001	CONC SIDEWALKS (4")	SY	322.000		322.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	39.000		39.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)	EA	4.000		4.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	178.000		178.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1.000		1.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0915-12-532 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY WALTERS

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0915-12-532**			
		PROJECT ID		**A00039777**			
		COUNTY		**Bexar**			
		HIGHWAY		**WALTERS**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	14.000		14.000	
	644-6066	IN SM RD SN SUP&AM (RAIL MOUNT)	EA	2.000		2.000	
	658-6080	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND	EA	12.000		12.000	
	662-6073	WK ZN PAV MRK REMOV (W)12"(SLD)	LF	140.000		140.000	
	666-6159	RE PV MRK TY I(BLACK)4"(SHADOW)(100MIL)	LF	553.000		553.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	553.000		553.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2,212.000		2,212.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	28.000		28.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	28.000		28.000	
	776-6046	REPAIR METAL RAIL (C4)	LF	100.000		100.000	
	784-6055	REP STL BRIDGE MEMBER (ROCKER)	EA	7.000		7.000	
	788-6001	CONCRETE BEAM REPAIR	EA	20.000		20.000	
	3076-6066	TACK COAT	GAL	97.000		97.000	
	3076-6074	D-GR HMA TY-C SAC-B PG70-22 (EXEMPT)	TON	54.000		54.000	
	4171-6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA	2.000		2.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000		4.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

TRAFFIC CONTROL PLAN SHEET NO.	LOCATION	0502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN	0662 6073 WK ZN PAV MRK REMOV (W)12"(SLD)
		MO	EA	LF
1 & 2	TCP PHASE 1	7	4	140
	PROJECT TOTALS:	7	4	140

* * * CONTRACTOR MAY SUBSTITUTE THE ASPHALT MIX TYPE WITH THE APPROVAL OF THE ENGINEER.

* * *

SUMMARY OF ROADWAY ITEMS

ROADWAY PLAN & PROFILE SHEET NO.	LOCATION	0100 6002 PREPARING ROW	0104 6036 REMOVING CONC (SIDEWALK OR RAMP)	0104 6054 REMOVING CONCRETE (MOW STRIP)	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL)(ORD COMP)(TY B)	3076 6066 TACK COAT	0351 6008 FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	0354 6045 PLANE ASPH CONC PAV (2")	3076 6074 D-GR HMA TY-C SAC-B PG70-22 (EXEMPT)	0432 6045 RIPRAP (MOW STRIP)(4 IN)	0450 6051 RAIL (HANDRAIL)(TY E)	0531 6001 CONC SIDEWALKS (4")	0540 6001 MTL W-BEAM GD FEN (TIM POST)	0540 6007 MTL BEAM GD FEN TRANS (TL2)	0540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	0542 6001 REMOVE METAL BEAM GUARD FENCE	0542 6002 REMOVE TERMINAL ANCHOR SECTION	0542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL	0544 6001 GUARDRAIL END TREATMENT (INSTALL)
		STA	SY	LF	CY	CY	GAL	SY	SY	TON	CY	LF	SY	LF	EA	EA	LF	EA	EA	EA
1	BEGIN PROJECT TO STA 24+00	10		178	8	12	49	10	241	27	6	142		26	2	1	178	1	1	1
2	STA 24+00 TO END PROJECT	8	228		159	4	48	10	240	27	7		322	13	2	1				1
	PROJECT TOTALS:	18	228	178	167	16	97	20	481	54	13	142	322	39	4	2	178	1	1	2

SUMMARY OF SW3P ITEMS

SW3P PLAN & PROFILE SHEET NO.	LOCATION	0160 6003 FURNISHING AND PLACING TOPSOIL (4")	0164 6007 BROADCAST SEED (PERM) (URBAN) (CLAY)	0164 6009 BROADCAST SEED (TEMP) (WARM)	0164 6011 BROADCAST SEED (TEMP) (COOL)	0168 6001 VEGETATIVE WATERING	0169 6003 SOIL RETENTION BLANKETS (CL 1) (TY C)	0506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	0506 6024 CONSTRUCTION EXITS (REMOVE)	0506 6042 BIODEG EROSN CONT LOGS (INSTL) (18")	0506 6043 BIODEG EROSN CONT LOGS (REMOVE)
		SY	SY	SY	SY	MG	SY	SY	SY	LF	LF
1	BEGIN PROJECT TO END PROJECT	906	906	453	453	37	906	80	80	1,339	1,339
	PROJECT TOTALS:	906	906	453	453	37	906	80	80	1,339	1,339

SUMMARY OF SIGNING & MARKING ITEMS

SIGNING & PAVEMENT MARKINGS SHEET NO.	LOCATION	0636 6001 ALUMINUM SIGNS (TY A)	0644 6066 IN SM RD SN SUP&AM (RAIL MOUNT)	0658 6080 INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND	0666 6159 RE PV MRK TY I (BLACK) 4" (SHADOW) (100MIL)	0666 6300 RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	0666 6315 RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	0672 6009 REFL PAV MRKR TY II-A-A	0672 6010 REFL PAV MRKR TY II-C-R
		SF	EA	EA	LF	LF	LF	EA	EA
1	BEGIN PROJECT TO END PROJECT	14	2	12	553	553	2,212	28	28
	PROJECT TOTALS:	14	2	12	553	553	2,212	28	28

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

QUANTITY SUMMARY

PRINT DATE: 12/21/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	7
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

BRIDGE SUMMARY

	104-6010	420-6066	429-6007	432-6001	434-6002	438-6001	439-6007	450-6010	483-6007	776-6046	784-6055	788-6001	SS 4171-6001
	REMOVING CONC (RIPRAP)	CL C CONC (RAIL FOUNDATION)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC) (4 IN)	ELASTOMERIC BEARING (LAMINATED)	CLEANING & SEALING EXISTING JOINTS	LATEX-MOD CONC OVERLAY (2 IN)	RAIL (TY 402)	HYDRO-DEMOLITION (2 IN)	REPAIR METAL RAIL (C4) ①	REP STL BRIDGE MEMBER (ROCKER)	CONC BEAM REPAIR	STENCILING STRUCTURE NUMBERS
	CY	CY	SF	CY	EA	LF	SY	LF	SY	LF	EA	EA	EA
N WALTERS ST OVERPASS AT UPRR TOTAL	77	2.7	200	77	140	536	4,919	20	4,919	100	7	20	2

① QUANTITIES OF RAIL REPAIR TO BE MEASURED IN THE FIELD.

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

SUMMARY OF
BRIDGE QUANTITIES

PRINT DATE: 11/30/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	8
SAT	BEXAR		N WALTERS ST	

...\700 CADD\SHT\BRG\5301BRSUM.dgn
11/30/2021 8:13:47 AM

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE STANDARD SPECIFICATIONS. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

1. GENERAL

(1) TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR AND PEDESTRIAN TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER.

(2) THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

(3) DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER TRAFFIC.

(4) THE CONTRACTOR WILL PROVIDE ADVANCE NOTIFICATION TO THE ENGINEER OF IMPENDING / UPCOMING LANE CLOSURES FOR ALL TEMPORARY AND / OR PERMANENT LANE, RAMP, CONNECTOR, FRONTAGE, SHOULDER, ETC. CLOSURES OR DETOURS. SEE GENERAL NOTES FOR NOTIFICATION REQUIREMENTS.

(5) ACCESS TO ADJOINING PROPERTY MUST BE MAINTAINED AT ALL TIMES.

(6) TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.

(7) AT NO TIME SHALL TWO CONSECUTIVE INTERSECTING ROADWAYS BE CLOSED AT ONE TIME DURING CONSTRUCTION.

(8) AT NO TIME SHALL TWO CONSECUTIVE RAMPS BE CLOSED AT ONE TIME DURING CONSTRUCTION OR OVERLAY OPERATIONS.

(9) UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, DAILY LANE CLOSURES SHALL BE LIMITED ACCORDING TO THE FOLLOWING RESTRICTIONS:
NIGHTTIME : NOTIFY AREA ENGINEER AND GET APPROVAL 48 HRS IN ADVANCE. (WITH UNIFORMED OFF DUTY LAW ENFORCEMENT OFFICERS)

WEEKEND CLOSURES WHEN APPROVED BY THE ENGINEER: NOTIFY AREA ENGINEER AND GET APPROVAL 48 HRS IN ADVANCE.

NO LANE CLOSURES WILL BE PERMITTED FOR THE FOLLOWING DATES:
BETWEEN DECEMBER 15 AND JANUARY 1.
FIESTA WEEK AND TAX FREE WEEKEND. (BEXAR COUNTY ONLY)
WEDNESDAY BEFORE THANKSGIVING THRU THE SUNDAY AFTER THANKSGIVING.
SATURDAY AND SUNDAY BEFORE MEMORIAL DAY AND LABOR DAY.
SATURDAY OR SUNDAY WHEN JULY 4 FALLS ON A FRIDAY OR MONDAY.
ELECTION DAYS (BEXAR COUNTY ONLY).
DURING EASTER WEEKEND.

(10) REMOVAL AND DISPOSAL OF EXISTING ABANDONED UTILITIES (EITHER PREVIOUSLY ABANDONED OR ABANDONED DURING THIS PROJECT) REQUIRED TO SUPPORT THIS PROJECT'S CONSTRUCTION SHALL BE PERFORMED UNDER THE OVERALL PREPARE RIGHT-OF-WAY ITEM (ITEM 100).

(11) COORDINATE WITH ADJACENT PROJECTS.

(12) COVER PERMANENT SIGNS IF NOT USED. THIS IS SUBSIDIARY TO ITEM 502.

(13) EXCAVATION WITHIN 5 FEET OF AN EXISTING CPS ENERGY POLE WILL REQUIRE POLE BRACING. CONTACT CPS ENERGY UTILTY COORDINATION TO REQUEST POLE BRACING (JOHN OFFER, JEOFFER@CPSENERGY.COM). THE ESTIMATED DURATION FOR THE POLE BRACING PROCESS IS APPROXIMATELY 6 TO 8 WEEKS.

(14) COORDINATE WITH THE CITY OF SAN ANTONIO OR TXDOT FOR SIGNAL TIMING REVISIONS, AS NECESSARY.

2. SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN 1 PHASE. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

(3) A BRIEF DESCRIPTION OF THE PHASE IS AS FOLLOWS:

PHASE 1

THE INTENT OF THIS PHASE IS TO REPAIR THE WALTERS STREET BRIDGE, RECONSTRUCT SIDEWALKS AND MBGF, AND MILL AND OVERLAY WALTERS STREET BRIDGE & APPROACH PAVEMENT.

1. INSTALL BARRICADES, SIGNS, PAVEMENT MARKINGS, AND ADVANCE WARNING DEVICES IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD), TXDOT BC, WZ, AND TCP STANDARDS AND AS SHOWN ON THE TRAFFIC CONTROL PLANS.

2. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS AS SHOWN ON THE EROSION CONTROL SHEETS.

3. THE CITY OF SAN ANTONIO TRANSPORTATION AND INFRASTRUCTURE MANAGEMENT CENTER SHALL BE NOTIFIED TWO WEEKS PRIOR TO IMPLEMENTATION OF THE DETOUR: (210) 207-8462.

INSTALL SIGNS AND CHANNELIZING DEVICES FOR WALTERS STREET DETOUR.

4. INSTALL HYDRO-DEMOLITION CONTAINMENT SYSTEM IN ACCORDANCE WITH THE APPROVED PLAN.

REMOVE EXISTING BRIDGE DECK BY HYDRO-DEMOLITION AND BEGIN BRIDGE REPAIR AS SHOWN ON THE PLANS. USE SHORT TERM LANE OR SHOULDER CLOSING TO COMPLETE ANY NECESSARY BRIDGE REPAIR WORK ABOVE LARRY ST.

5. MILL & OVERLAY EXISTING WALTERS STREET BRIDGE APPROACH PAVEMENT AS SHOWN ON THE PLANS. REMOVE PORTIONS OF EXISTING SIDEWALK & MBGF, INSTALL PROPOSED SIDEWALK, HANDRAIL, AND MBGF AS SHOWN ON THE PLANS.

6. INSTALL PAVEMENT MARKINGS.

7. REMOVE TEMPORARY EROSION AND SEDIMENTATION CONTROLS WHEN APPROVED AND DIRECTED BY THE ENGINEER.

8. REMOVE ALL BARRICADES, SIGNS, TEMPORARY PAVEMENT MARKINGS AND ADVANCE WARNING DEVICES AND OPEN WALTERS STREET TO NORMAL TRAFFIC WHEN APPROVED AND DIRECTED BY THE ENGINEER.

3. SAFETY

(1) THE CONTRACTOR WILL PROVIDE, CONSTRUCT AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC (1 - 12)-14. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS."

(2) BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS DIRECTED BY FIELD CONDITIONS, TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES.

(3) THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL.

(4) THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT OR OTHER MATERIALS DURING HAULING OPERATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS, WHEN DIRECTED BY THE ENGINEER, TO CLEAN THE ROADWAY TO THE SATISFACTION OF THE ENGINEER.

4. HAULING EQUIPMENT

(1) THE USE OF RUBBER-TIRED EQUIPMENT WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVEMENTED SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT. THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED / APPROVED BY THE ENGINEER.

(2) THROUGHOUT CONSTRUCTION OPERATIONS, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THEIR HAULING OPERATIONS IN A MANNER SUCH THAT VEHICLES WILL NOT HAUL OVER PREVIOUSLY RECOMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

5. FINAL CLEAN UP

UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A SMOOTH, NEAT AND SIGHTLY CONDITION.

6. PAYMENT

ALL BARRICADES, SIGNS, CHANNELIZING DEVICES, AND FLAGGERS SHALL BE SUBSIDIARY TO ITEM 502 BARRICADES, SIGNS AND TRAFFIC HANDLING. ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE PAID FOR UNDER ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS. ALL OTHER WORK AND MATERIALS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS UNLESS OTHERWISE INDICATED IN THE PLANS.

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

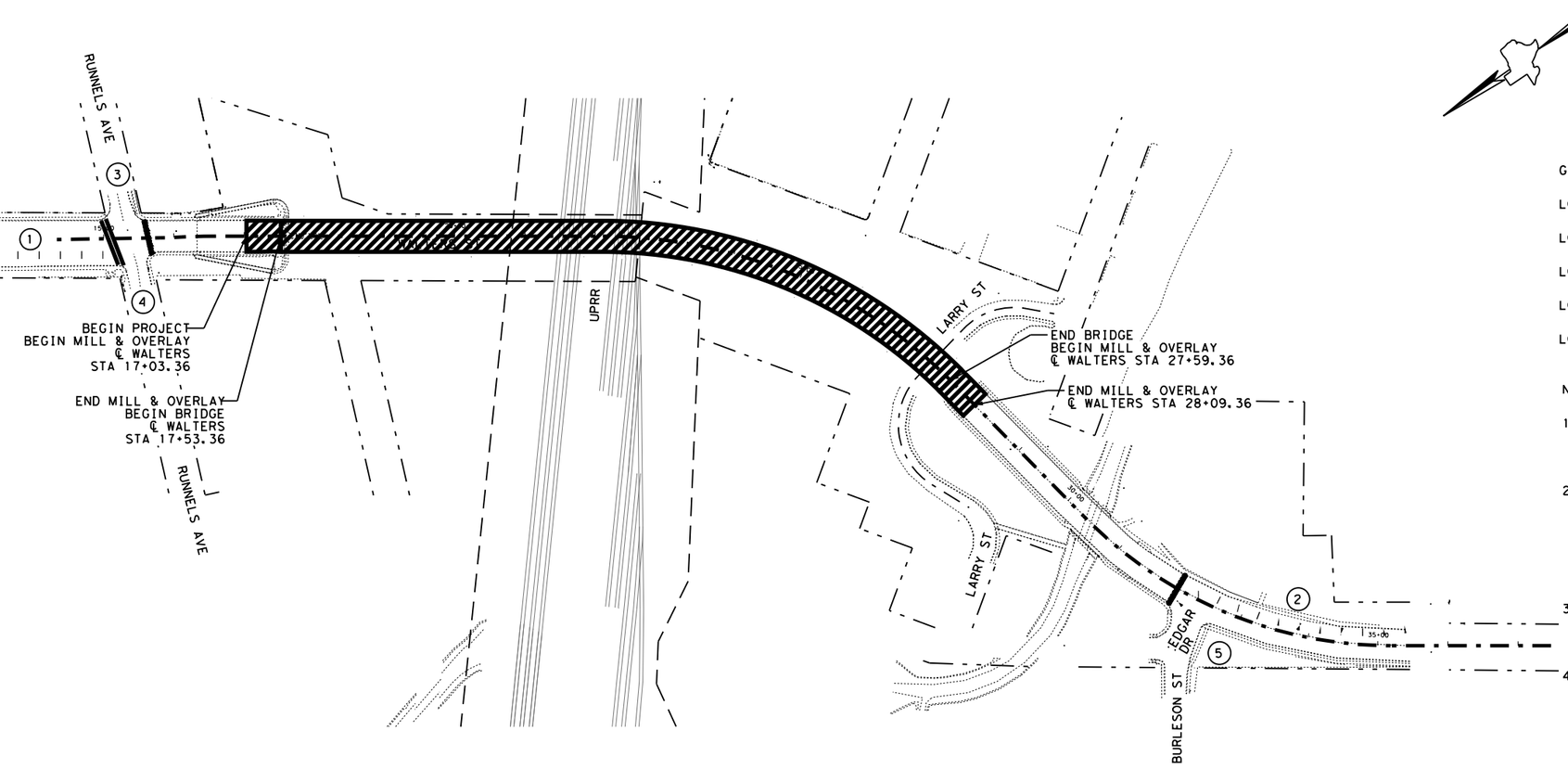
N WALTERS ST

TRAFFIC CONTROL PLAN NARRATIVE

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	9
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\TCP\0534_TCP_NAR.dgn
11/12/2021 10:53:27 AM



GENERAL NOTES - BARRICADES

LOCATION NO. (1) TO BE USED AT THE NORTH SIDE OF ROAD CLOSURE
LOCATION NO. (2) TO BE USED AT THE SOUTH SIDE OF ROAD CLOSURE
LOCATION NO. (3) TO BE USED AT RUNNELS AVE NORTH EAST APPROACH
LOCATION NO. (4) TO BE USED AT RUNNELS AVE NORTH WEST APPROACH
LOCATION NO. (5) TO BE USED THROUGHOUT THE COURSE OF THE PROJECT AS DIRECTED BY THE ENGINEER

NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP"
2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE MINIMAL CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. REQUIRED IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION
3. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS
4. IMPLEMENT DETOURS IN ACCORDANCE WITH TEXAS MUTCD

LOCATION	OBEY WARNING SIGNS STATE LAW	STAY ALERT TALK OR TEXT LATER	BEGIN WORK ZONE TRAFFIC FINES DOUBLE WHEN WORKERS ARE PRESENT	SPEED LIMIT XX	ROAD WORK AHEAD	BEGIN ROAD WORK NEXT X MILES	NAME ADDRESS CITY STATE CONTRACTOR	END ROAD WORK	RIGHT LANE CLOSED	XXX FT	ROAD CLOSED AHEAD	DETOUR AHEAD	ROAD CLOSED	SIDEWALK CLOSED	SIDEWALK CLOSED CROSS HERE	SIDEWALK CLOSED AHEAD CROSS HERE
	R20-3T	G20-10T	G20-9TP R20-5T R20-5aTP	R2-1	CW20-1D	G20-5T	G20-6T	G20-2	CW20-5TR	CW16-3aP	CW20-3D	CW20-2D	R11-2	R9-9	R9-11	R9-11A
(1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
(2)	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
(3)			X		X			X								
(4)			X		X			X								
(5)			X		X			X	X			X		X		

LOCATION	DETOUR XXX FT	N WALTERS ST	END DETOUR	DETOUR	DETOUR					ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY	CHANNELIZING DEVICES			
	CW20-2	M1-6F	M4-8A	M4-9L, R, S	M4-10L	R3-1	R3-2	M5-1L	M6-1	R11-3a				
(1)	X	X											X	
(2)		X			X	X							X	
(3)							X							
(4)														
(5)	X	X	X	X			X	X	X	X	X	X	X	X

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

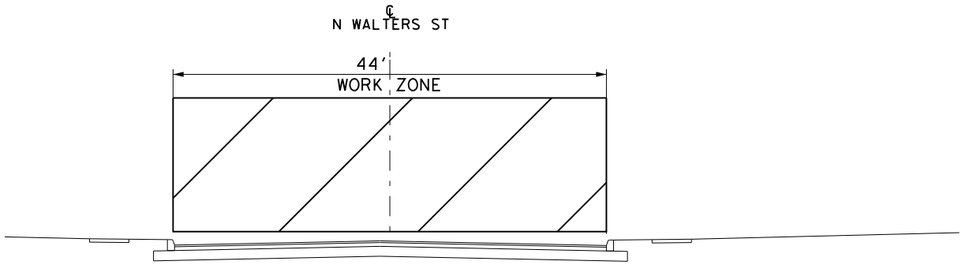
N WALTERS ST

TRAFFIC CONTROL PLAN SCHEDULE OF BARRICADES

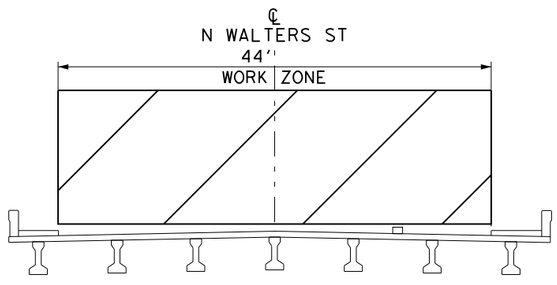
PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	10
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\0534_Schedule of Barricades.dgn
11/12/2021 10:53:40 AM



WALTERS ST TCP
PHASE 1
℄ WALTERS STA 17+03.36 - STA 17+53.36
℄ WALTERS STA 27+59.36 - STA 31+94.93



WALTERS ST TCP
PHASE 1
℄ WALTERS STA 17+53.36 - STA 27+59.36

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

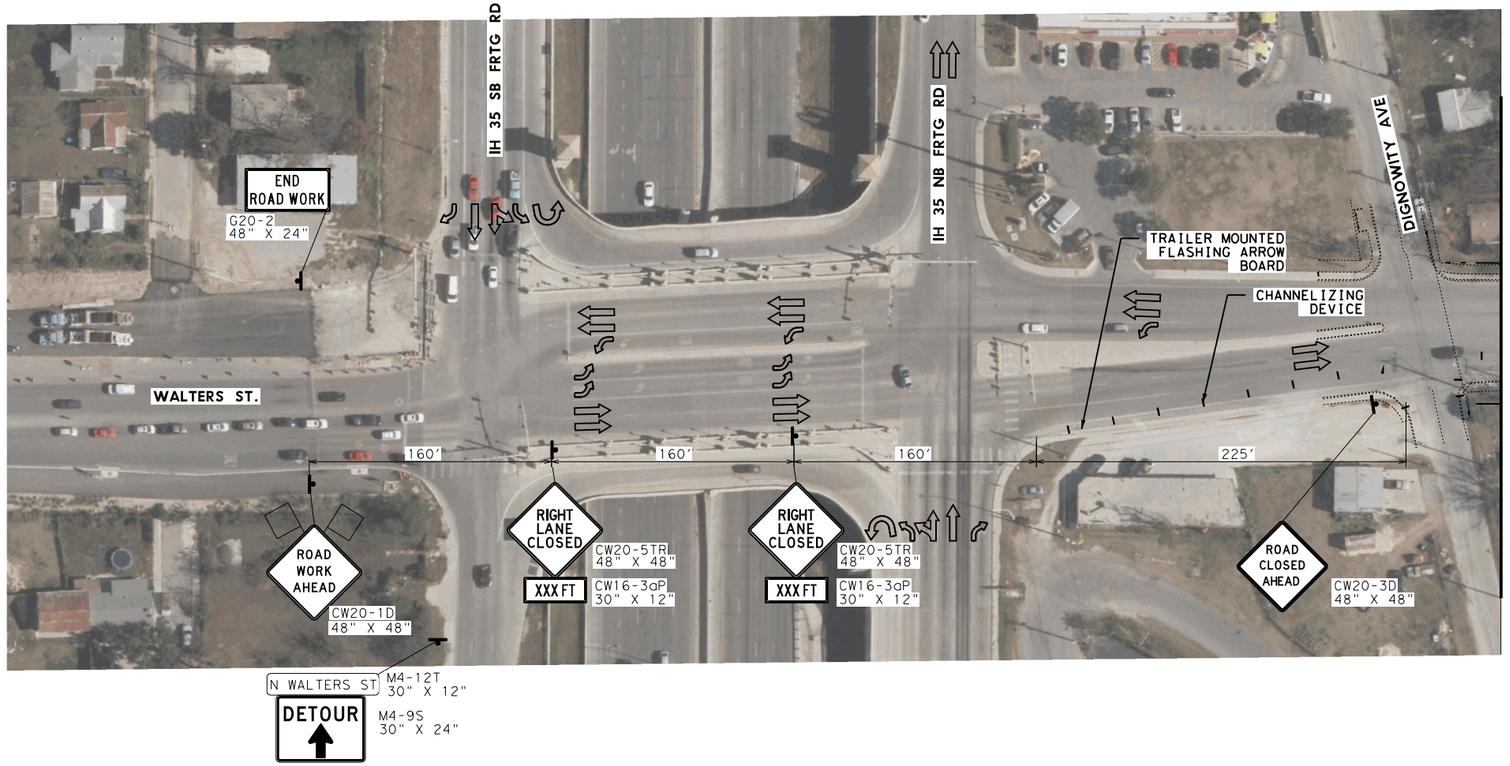
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
NTS

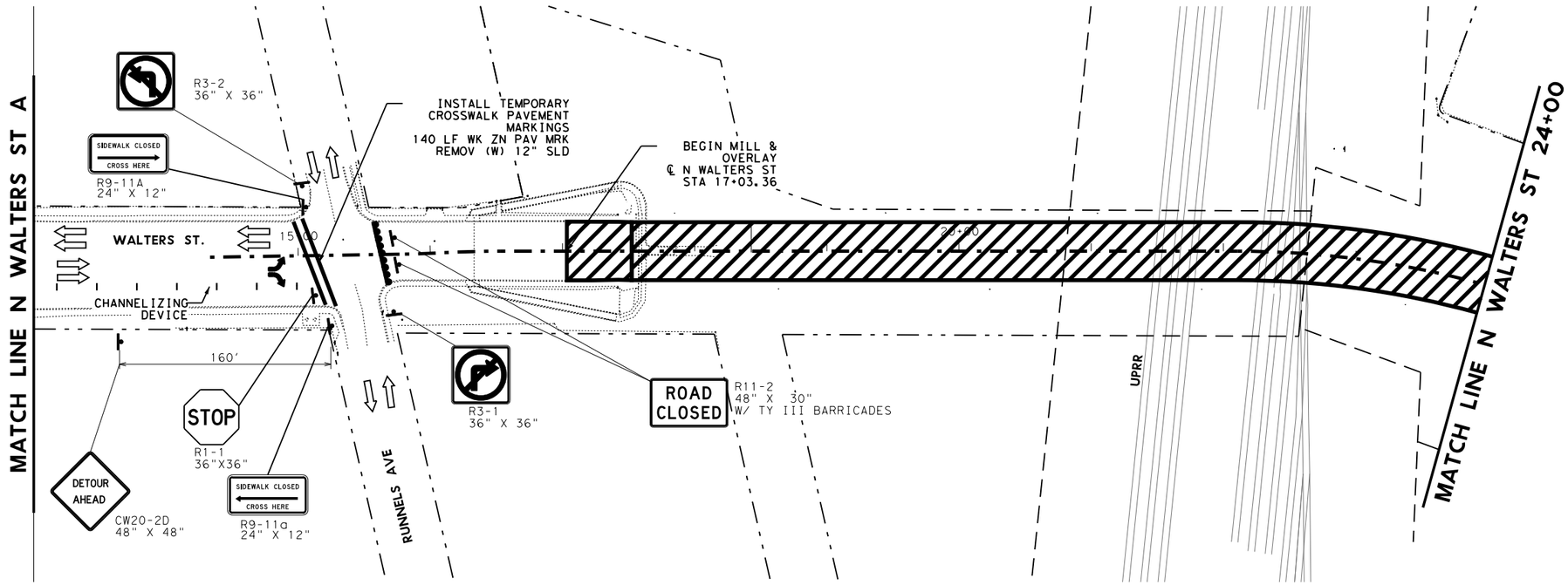
PRINT DATE: 11/12/2021 SHEET 1 OF 1

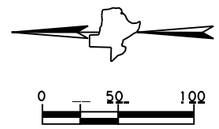
STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	11
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\TCP\0534_TCTYP01.dgn
11/12/2021 10:53:50 AM

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION
140		LF	WK ZN PAV MRK REMOV (W)12"(SLD)







LEGEND

- WORK THIS PHASE
- BARRICADE TY III
- CHANNELIZING DEVICES
- TRAFFIC DIRECTION

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P - 512.338.1704 F - 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

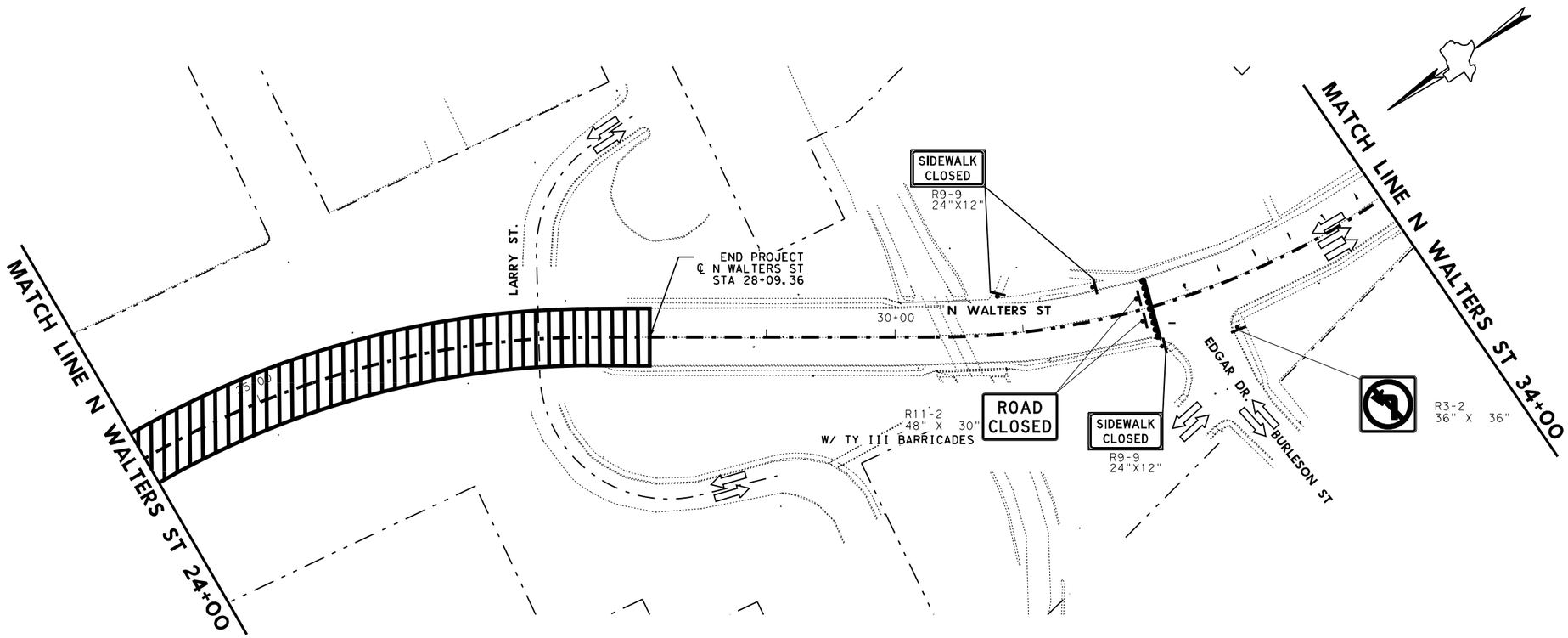
N WALTERS ST

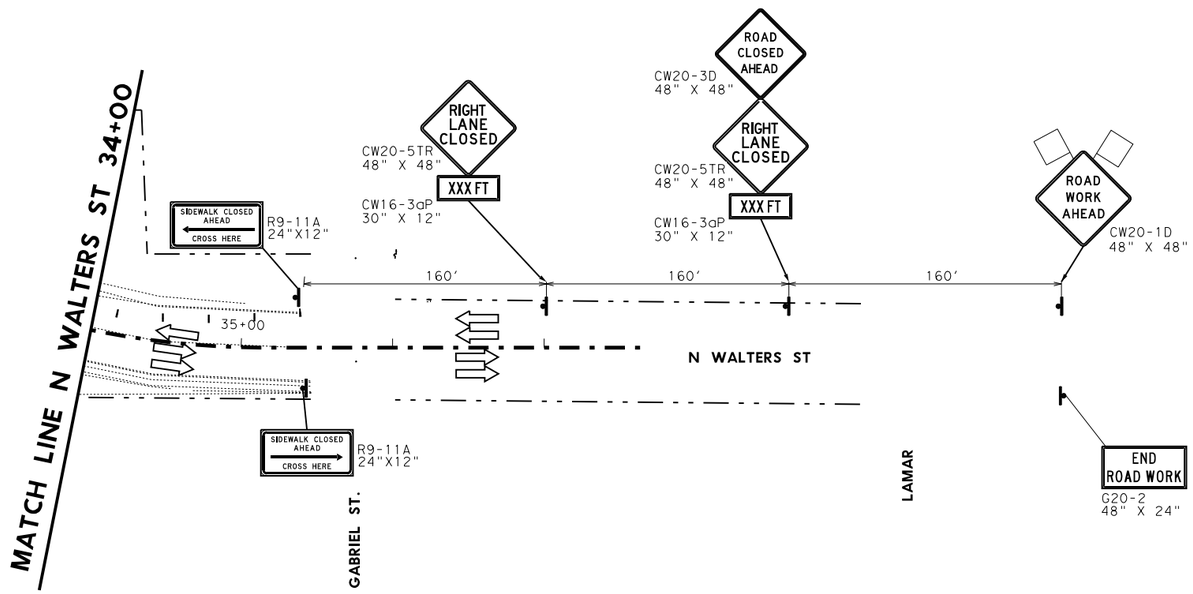
TRAFFIC CONTROL PLAN
PHASE 1
BEGIN PROJECT TO STA 24+00

PRINT DATE: 11/12/2021 SHEET 1 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	12
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\TCP\0534_TCp1s1.dgn
11/12/2021 10:55:02 AM





STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

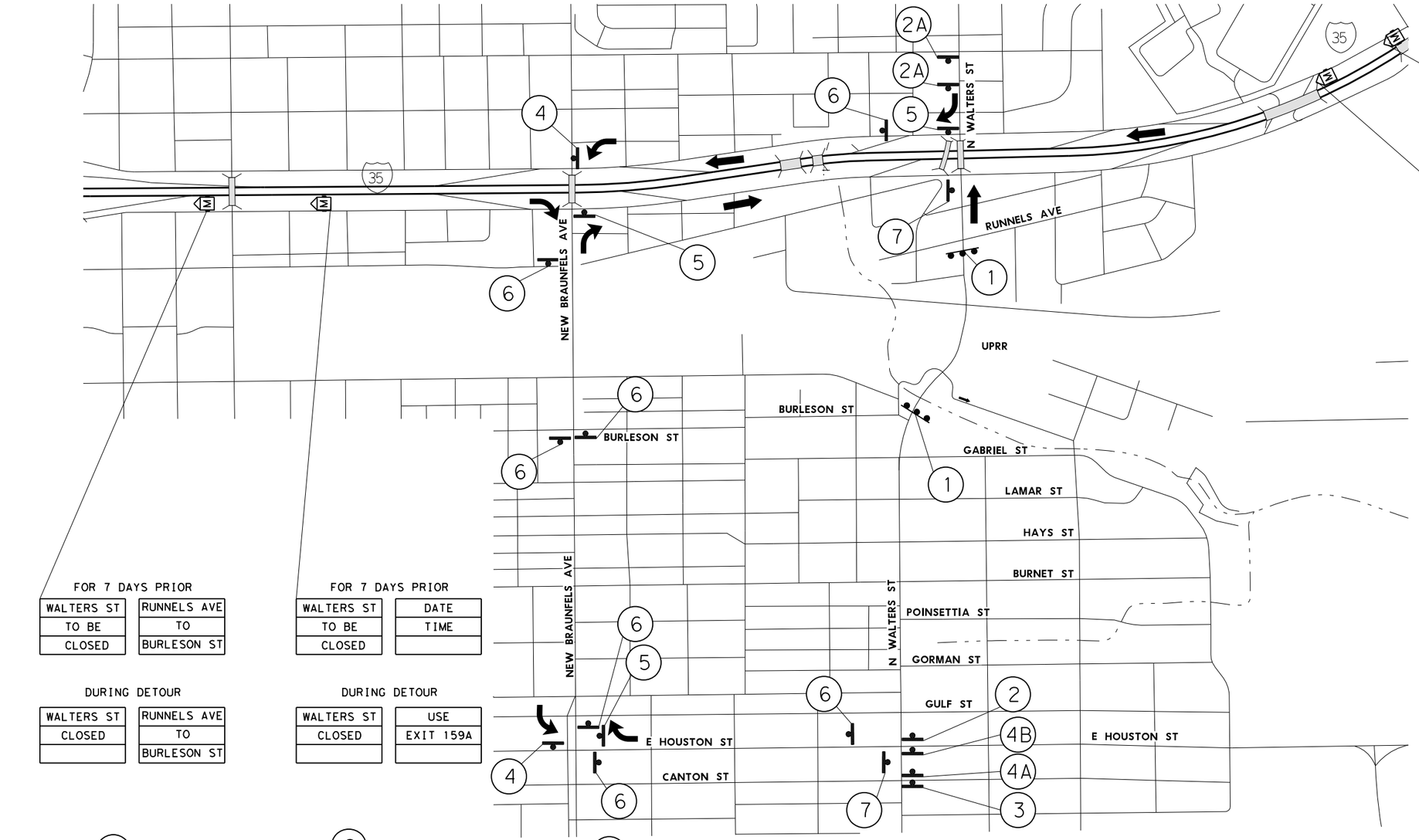
N WALTERS ST

TRAFFIC CONTROL PLAN
PHASE 1
STA 24+00 TO END PROJECT

PRINT DATE: 11/12/2021 SHEET 2 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	13
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\TCP\0534_TCp1s1-2.dgn
11/12/2021 10:55:15 AM



FOR 7 DAYS PRIOR

WALTERS ST	DATE
TO BE	TIME
CLOSED	

DURING DETOUR

WALTERS ST	USE
CLOSED	EXIT 159A

FOR 7 DAYS PRIOR

WALTERS ST	RUNNELS AVE
TO BE	TO
CLOSED	BURLESON ST

DURING DETOUR

WALTERS ST	RUNNELS AVE
CLOSED	TO
	BURLESON ST

NOTE: THE CITY OF SAN ANTONIO TRANSPORTATION AND INFRASTRUCTURE MANAGEMENT CENTER SHALL BE NOTIFIED TWO WEEKS PRIOR TO IMPLEMENTATION OF THE DETOUR: (210) 207-8462.

NOT TO SCALE

FOR 7 DAYS PRIOR

WALTERS ST	RUNNELS AVE
TO BE	TO
CLOSED	BURLESON ST

DURING DETOUR

WALTERS ST	RUNNELS AVE
CLOSED	TO
	BURLESON ST

FOR 7 DAYS PRIOR

WALTERS ST	DATE
TO BE	TIME
CLOSED	

DURING DETOUR

WALTERS ST	USE
CLOSED	EXIT 159A

(1) **ROAD CLOSED** — R11-2, 48" X 30"
WITH TY III BARRICADES

(2) **ROAD CLOSED** / XX MILES AHEAD / LOCAL TRAFFIC ONLY — R11-3a, 60" X 30"
DETOUR — R11-3a, 60" X 30"

(2A) N WALTERS ST — M4-12T, 30" X 12"
DETOUR XXX FT — CW20-2, 36" X 36"

(3) **DETOUR 1500 FT** — CW20-2A, 48" X 48"

(4) N WALTERS ST — M4-12T, 30" X 12"
DETOUR — M4-9L, 30" X 24"

(4A) **DETOUR** — M4-8, 24" X 12"
N WALTERS ST — M4-12T, 30" X 12"
M5-1L, 21" X 15"

(5) N WALTERS ST — M4-12T, 30" X 12"
DETOUR — M4-9R, 30" X 24"

(4B) **DETOUR** — M4-8, 24" X 12"
N WALTERS ST — M4-12T, 30" X 12"
M6-1, 21" X 15"

(6) N WALTERS ST — M4-12T, 30" X 12"
DETOUR — M4-9S, 30" X 24"

(7) **END DETOUR** — M4-8A, 24" X 18"

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

TRAFFIC CONTROL PLAN

N WALTERS ST DETOUR

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	14
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\TCP\0534_DET01.dgn
11/12/2021 10:55:25 AM

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

DATE:
FILE:

SHEET 1 OF 12

Texas Department of Transportation

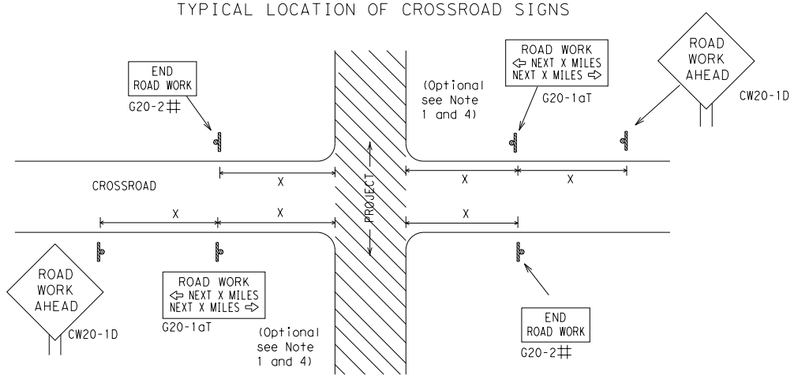
Traffic Safety Division Standard

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 9-07 8-14 5-10 5-21	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		15

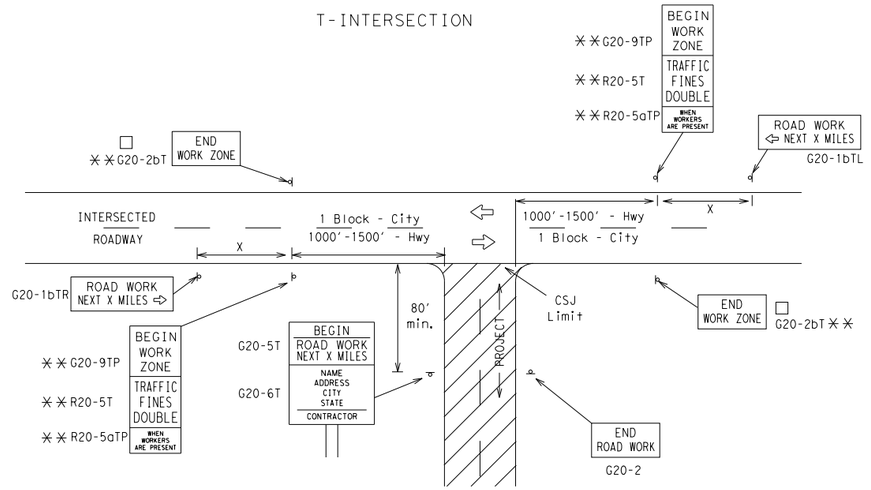
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

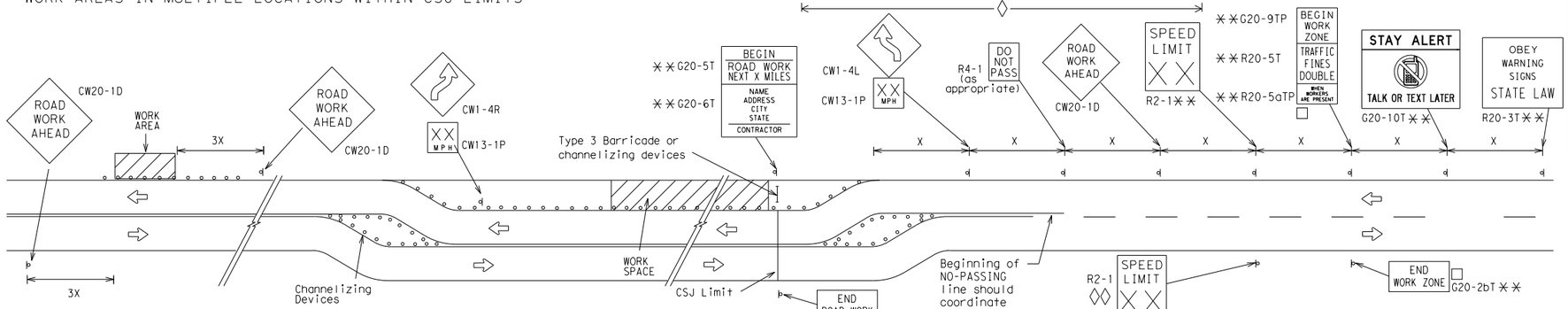
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

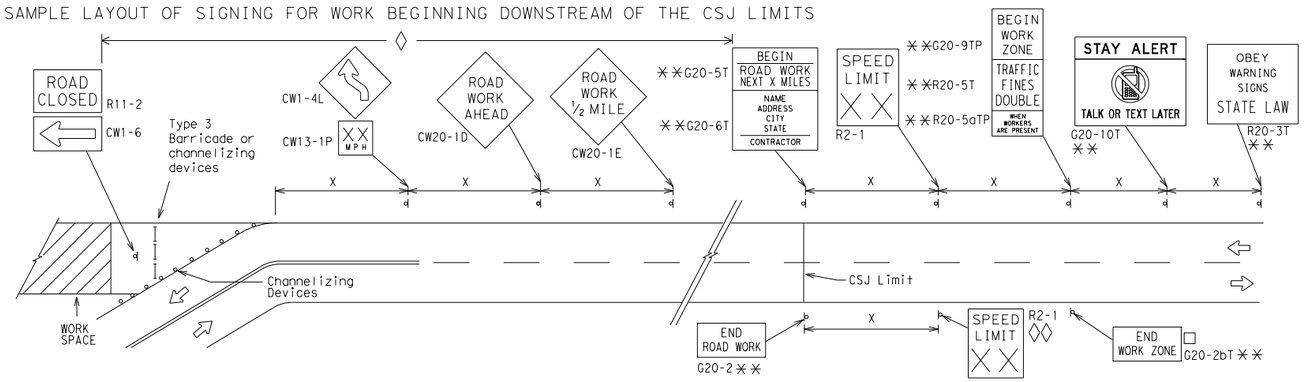
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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



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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		16

DATE:
FILE:

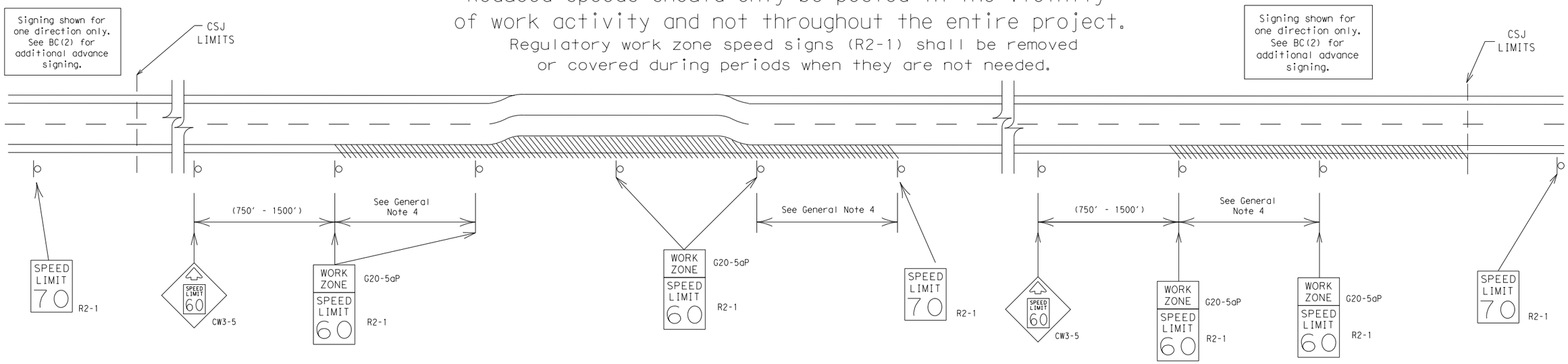
DATE:
FILE:

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

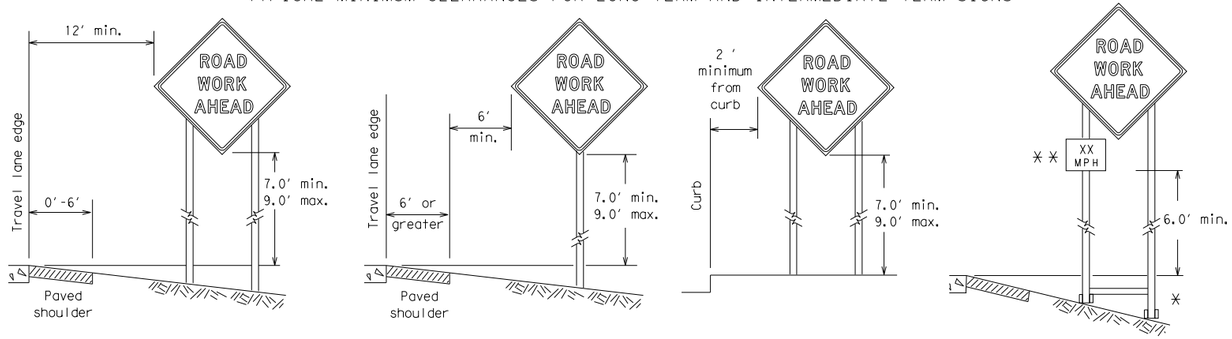
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		17

DATE:
FILE:

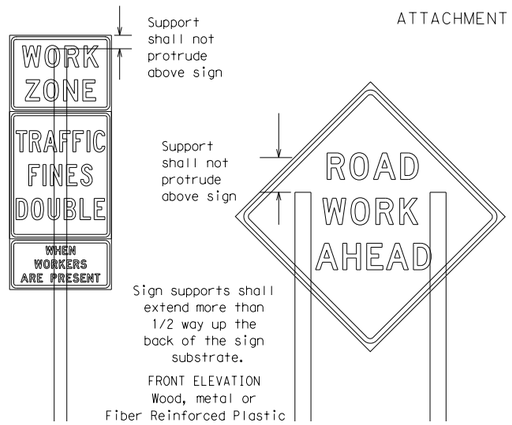
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

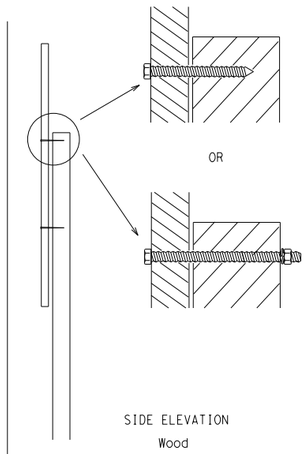


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





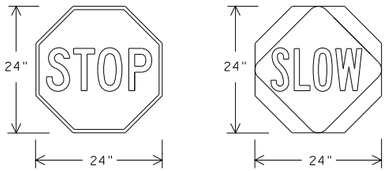
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

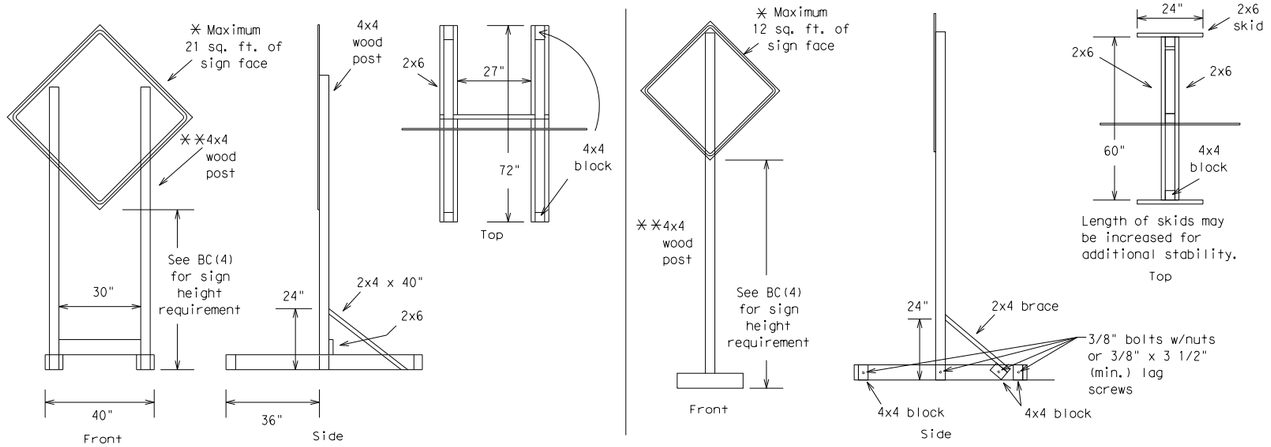
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

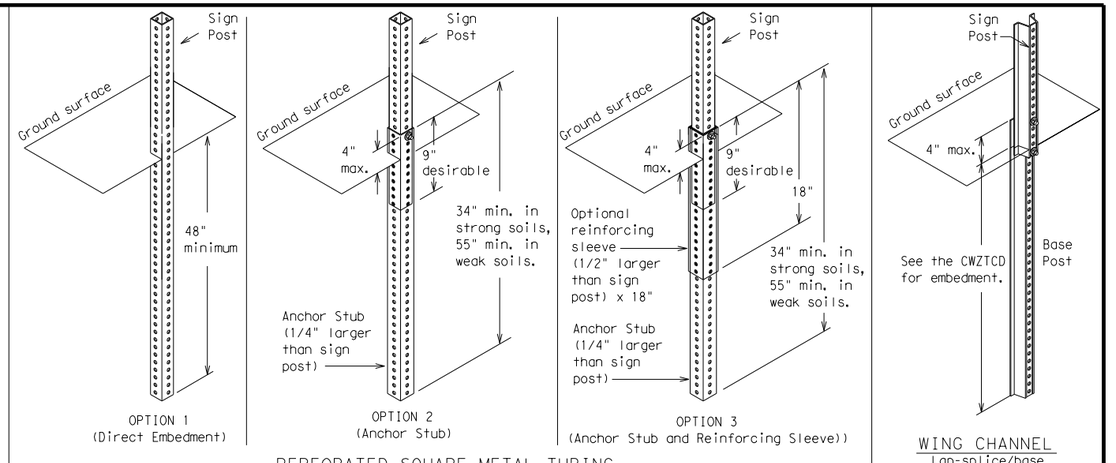
BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		18



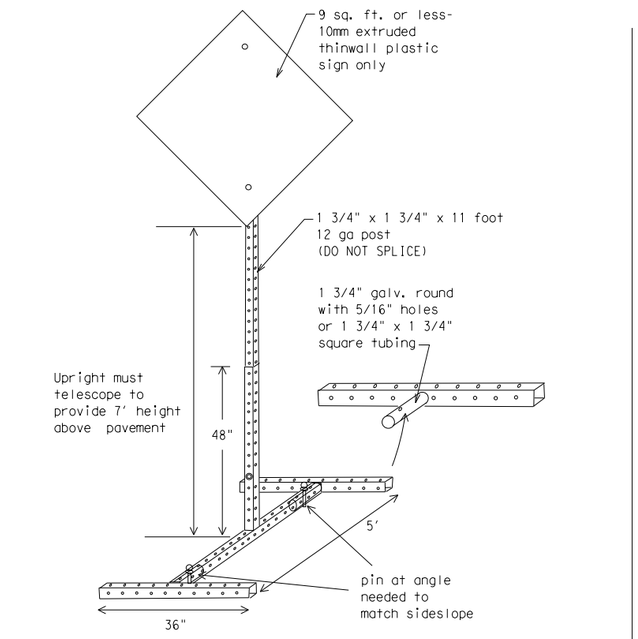
SKID MOUNTED WOOD SIGN SUPPORTS

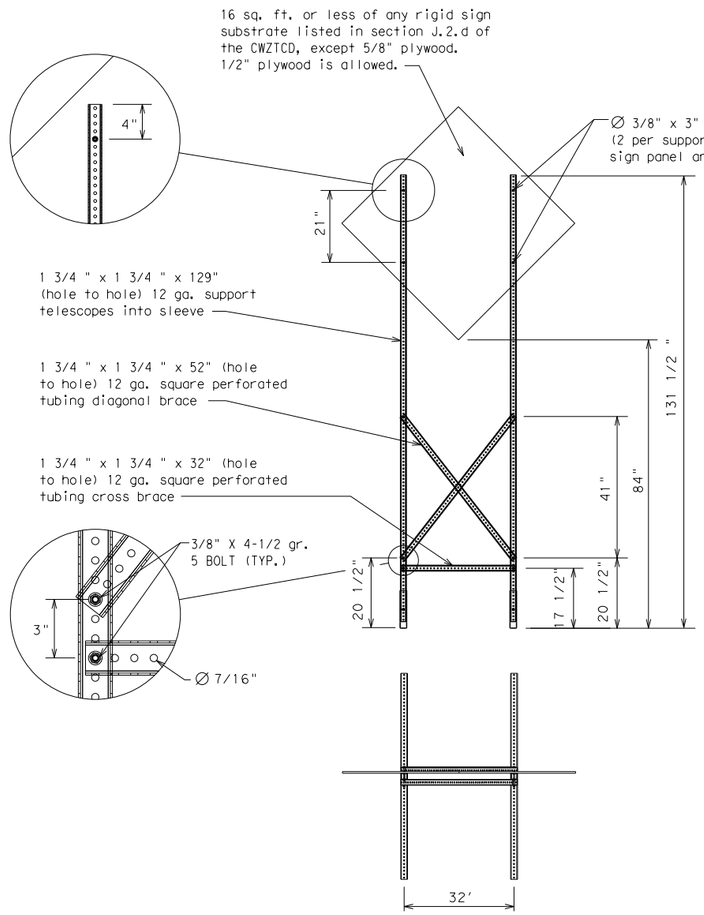
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

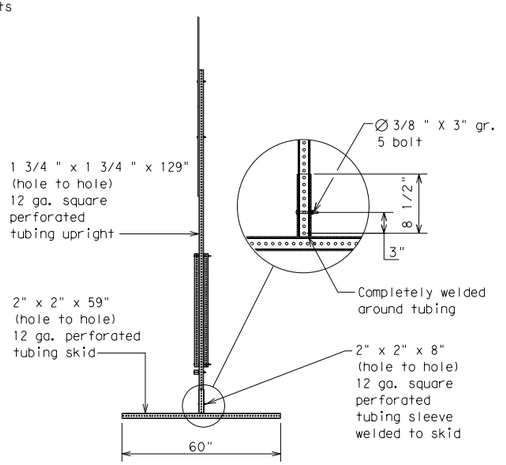


GROUND MOUNTED SIGN SUPPORTS

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
REVISIONS	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		19

DATE:
FILE:

DATE:
FILE:

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)

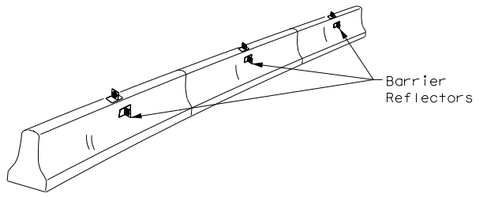
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	12	532	WALTERS ST
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		SAT	BEXAR		20

100

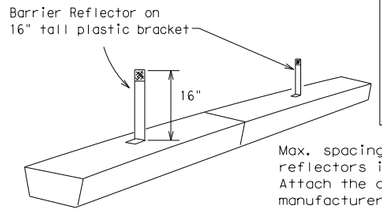
DATE:
FILE:

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.

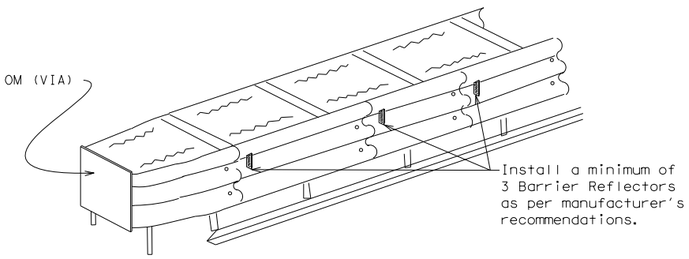


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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.

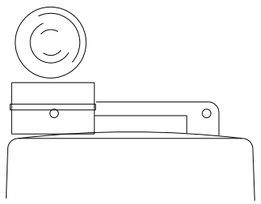


DELINEATION OF END TREATMENTS

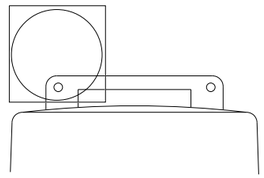
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

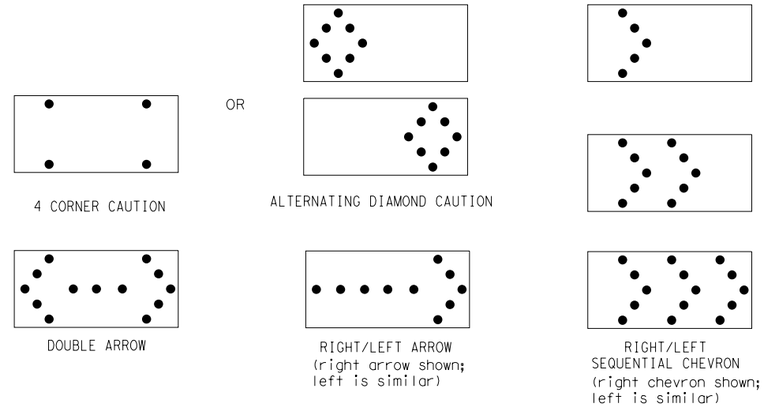
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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

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.

SHEET 7 OF 12

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	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		21

101

DATE:
FILE:

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:

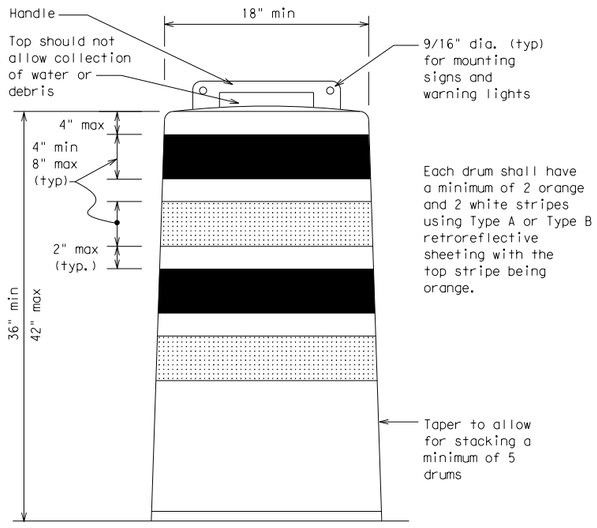
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

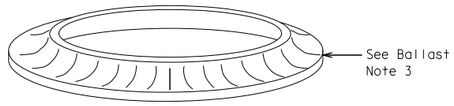
RETROREFLECTIVE SHEETING

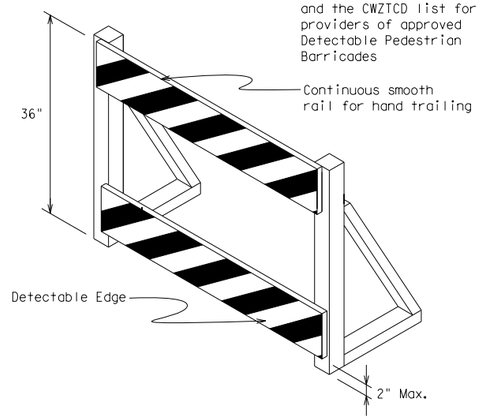
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

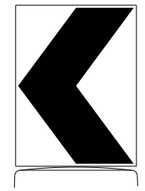




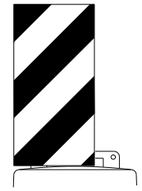


DETECTABLE PEDESTRIAN BARRICADES

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

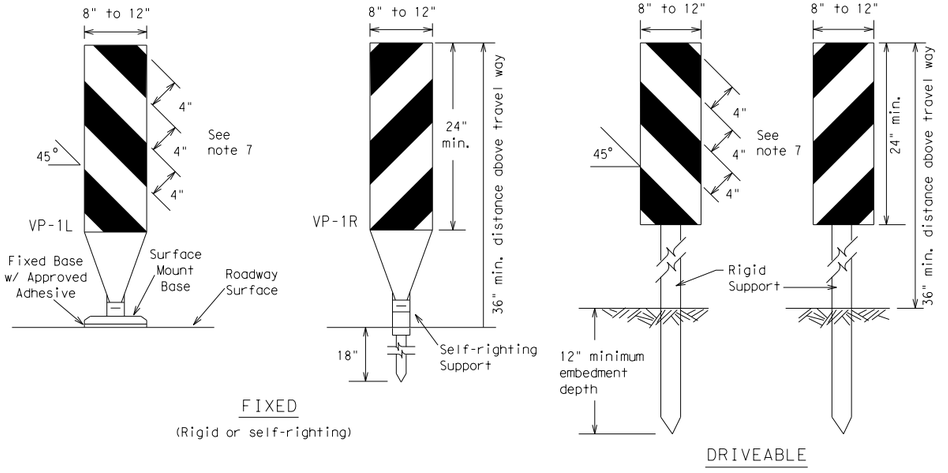
Traffic Safety Division Standard

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
REVISIONS	0915	12	532	WALTERS ST
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SAT	BEXAR		22
7-13				

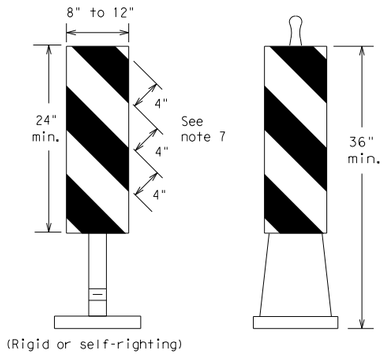
DATE:
FILE:



FIXED

(Rigid or self-righting)

DRIVEABLE

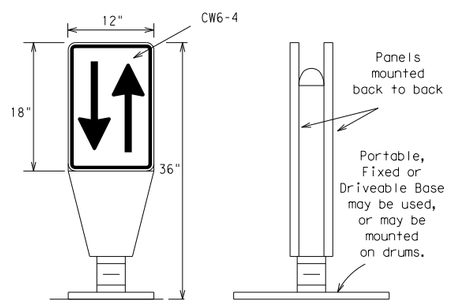


(Rigid or self-righting)

PORTABLE

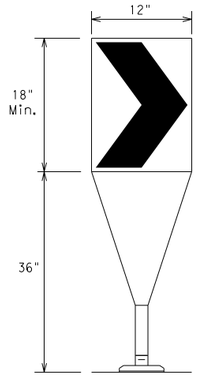
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



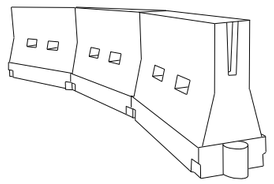
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

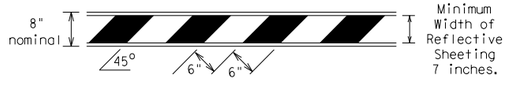
BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		23

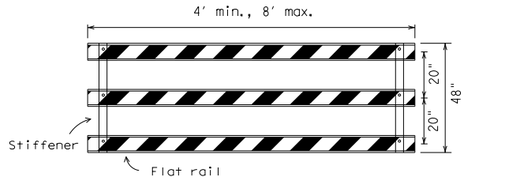
TYPE 3 BARRICADES

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.



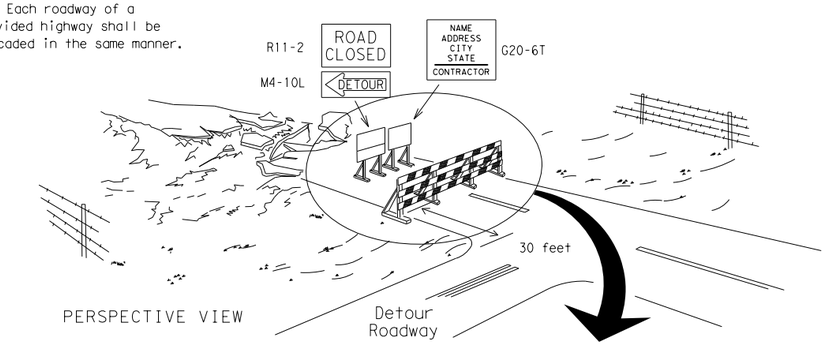
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

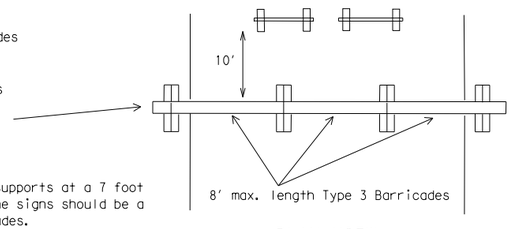
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

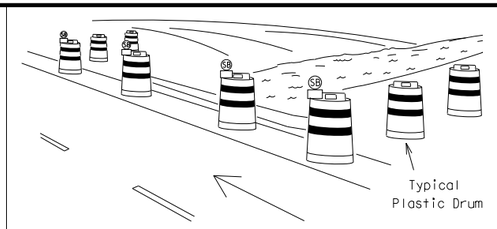
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

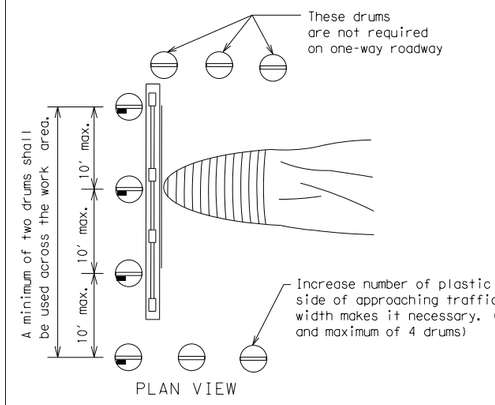
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

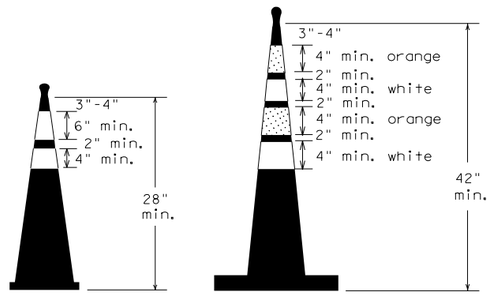
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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

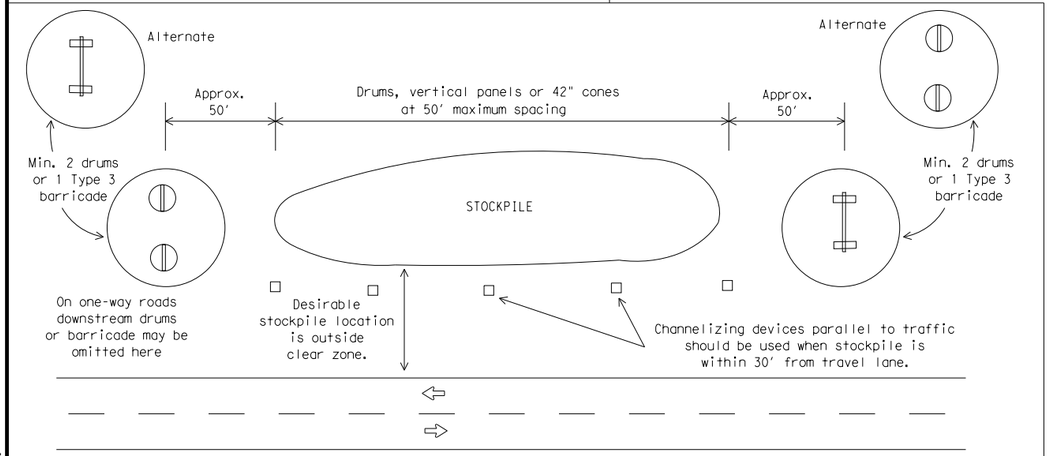
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

SHEET 10 OF 12

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
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		24

DATE:
FILE:

104

DATE:
FILE:

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.

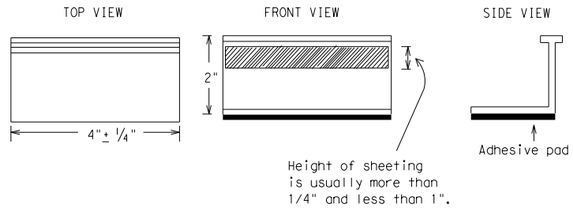
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

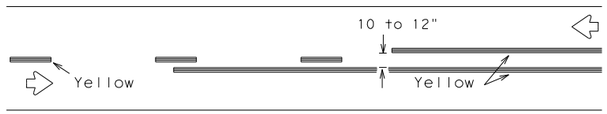
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

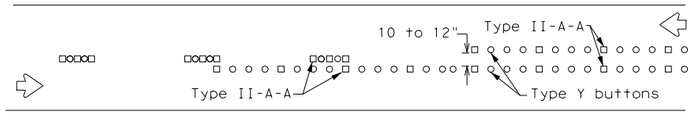
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		25

DATE:
FILE:

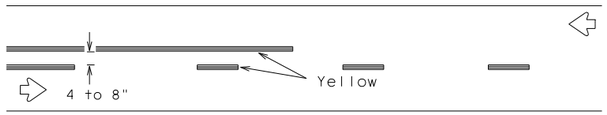
PAVEMENT MARKING PATTERNS



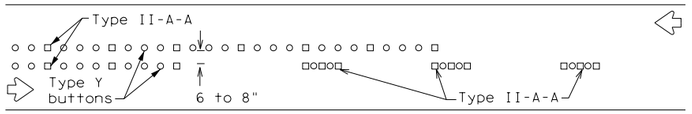
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



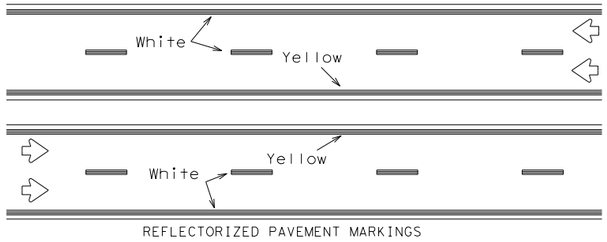
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



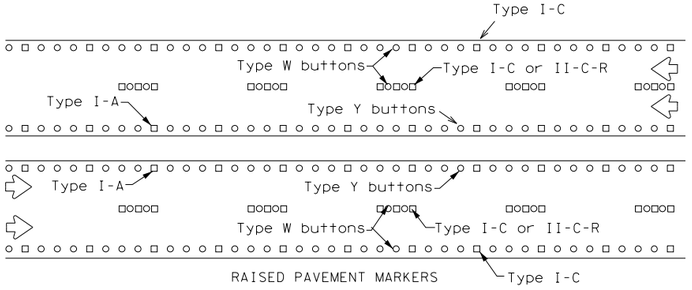
RAISED PAVEMENT MARKERS - PATTERN B

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



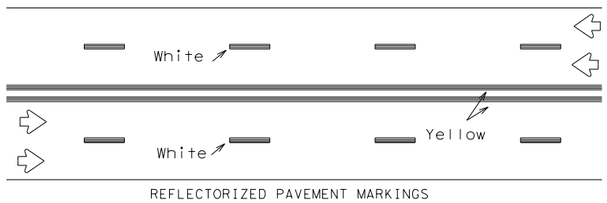
REFLECTORIZED PAVEMENT MARKINGS



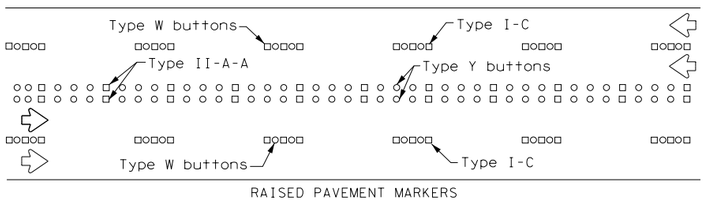
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



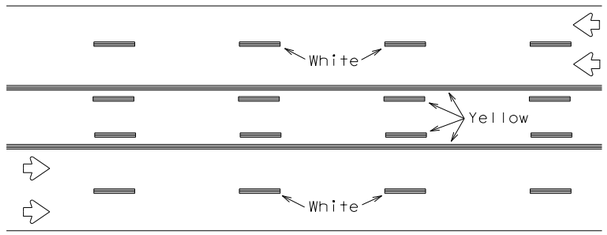
REFLECTORIZED PAVEMENT MARKINGS



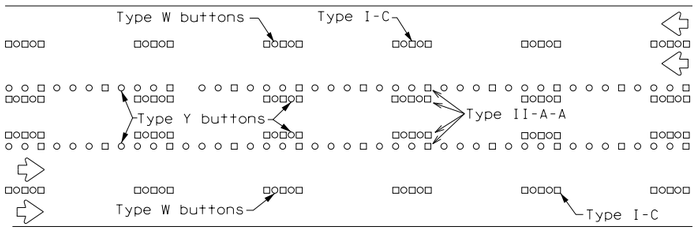
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

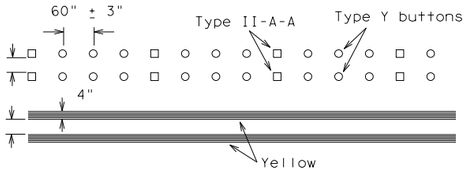
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

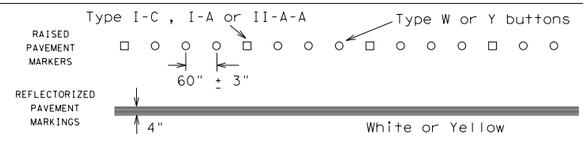
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

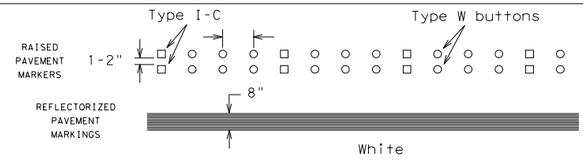


EDGE LINE OR SINGLE NO-PASSING LINE



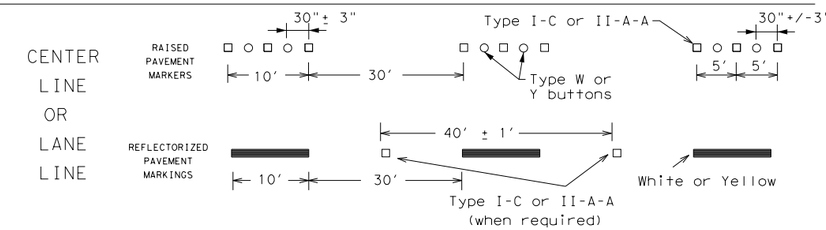
WIDE LINE

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

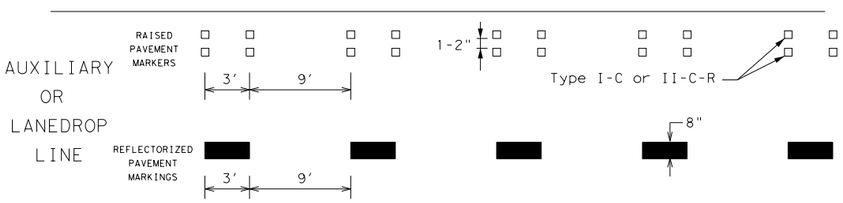


BROKEN LINES

CENTER LINE OR LANE LINE

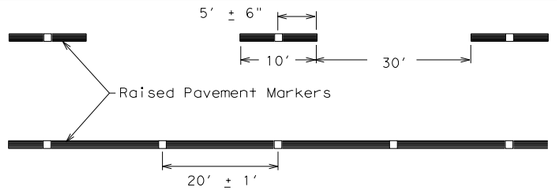


AUXILIARY OR LANEDROP LINE



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."

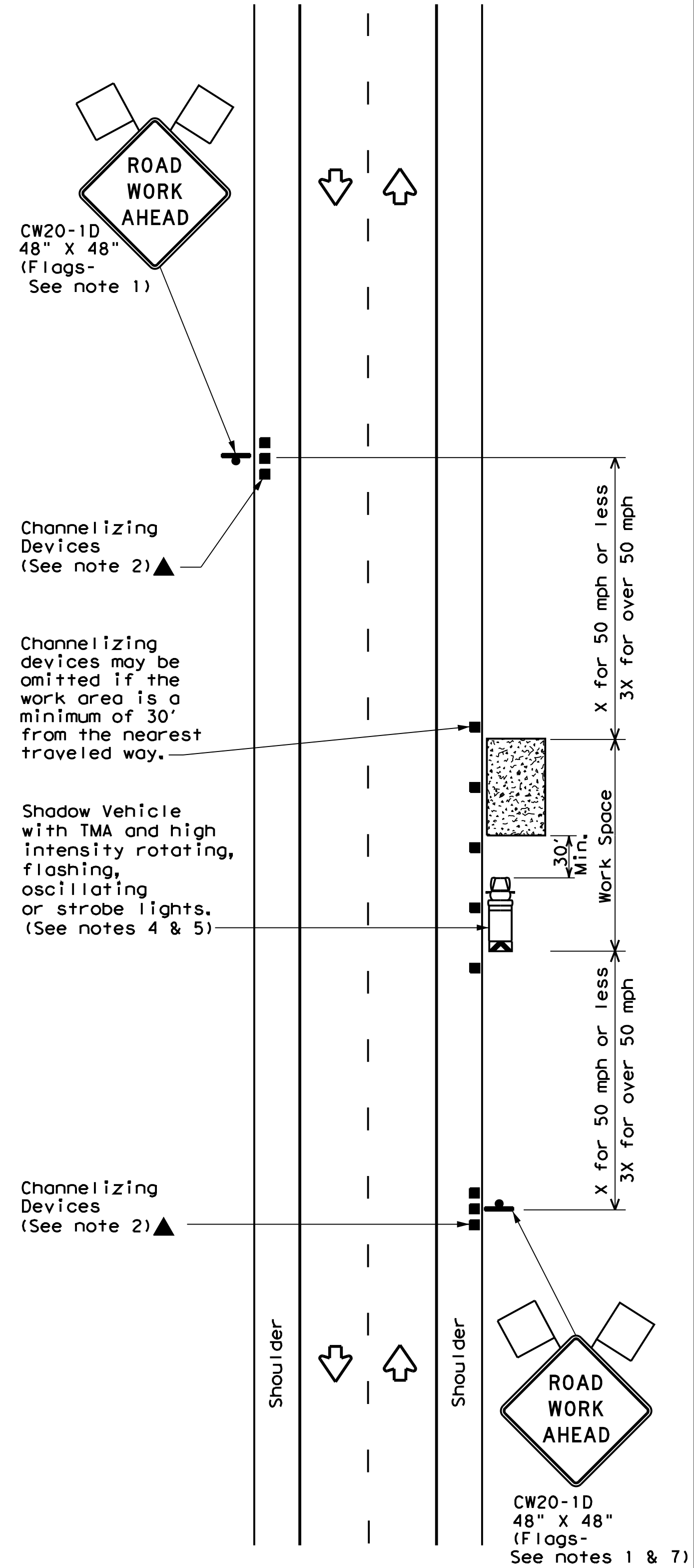
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

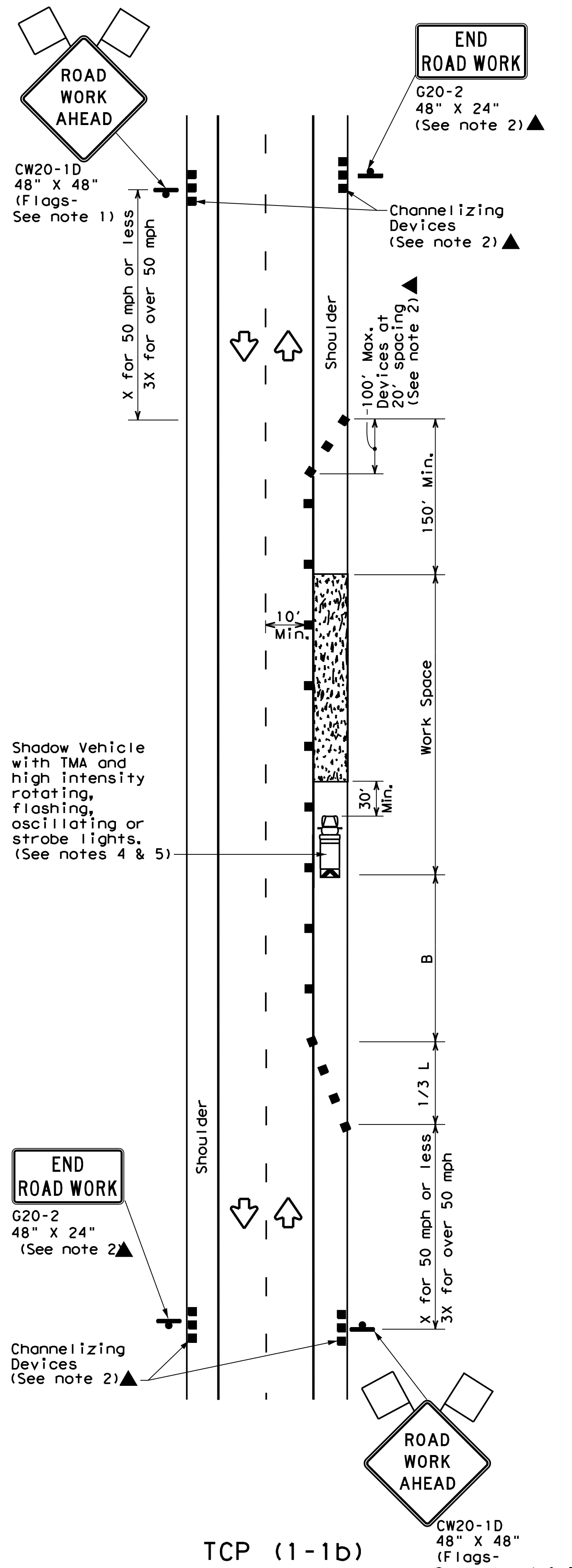
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		26



TCP (1-1a)

WORK SPACE NEAR SHOULDER

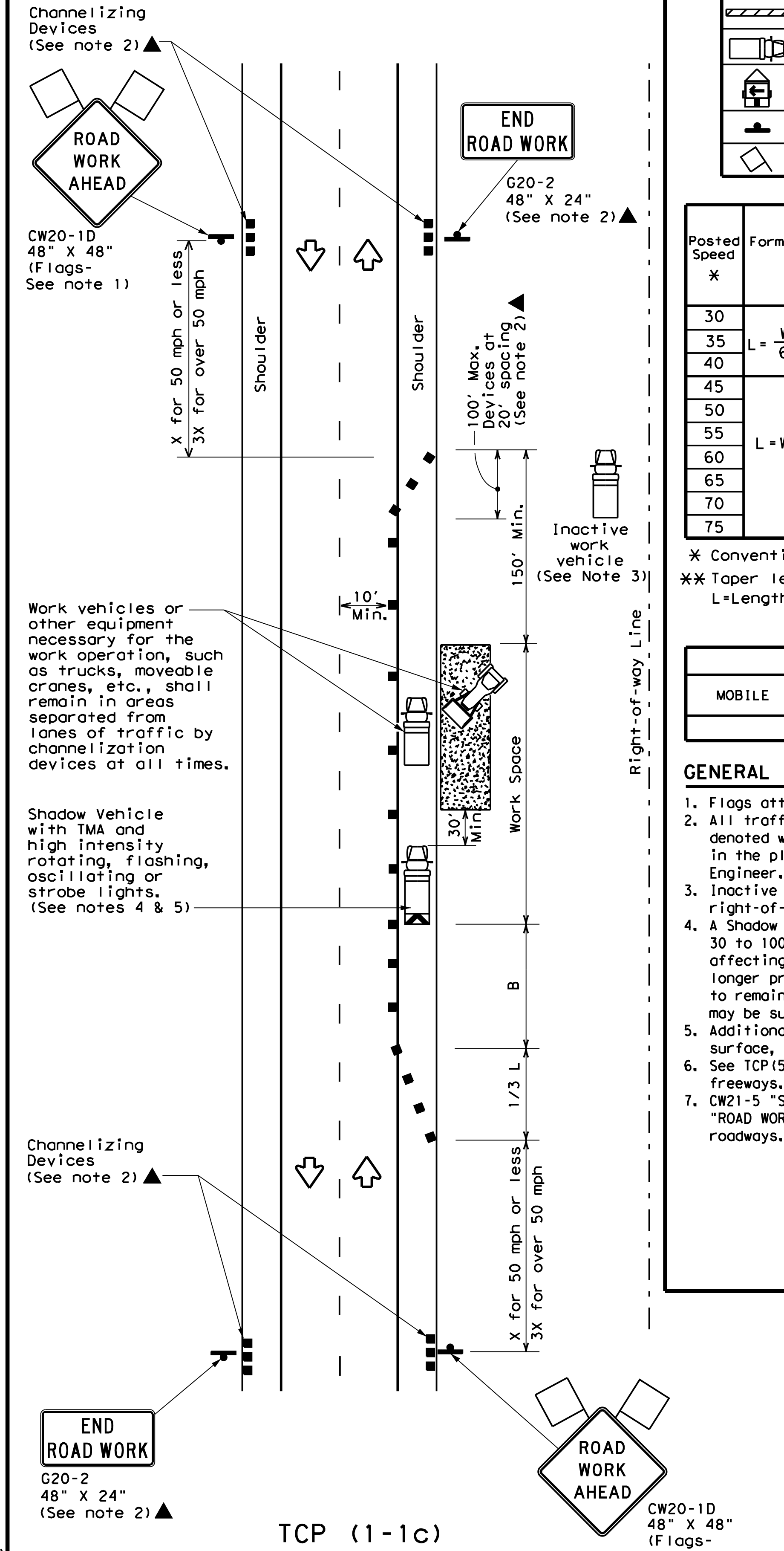
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. 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 wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. 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

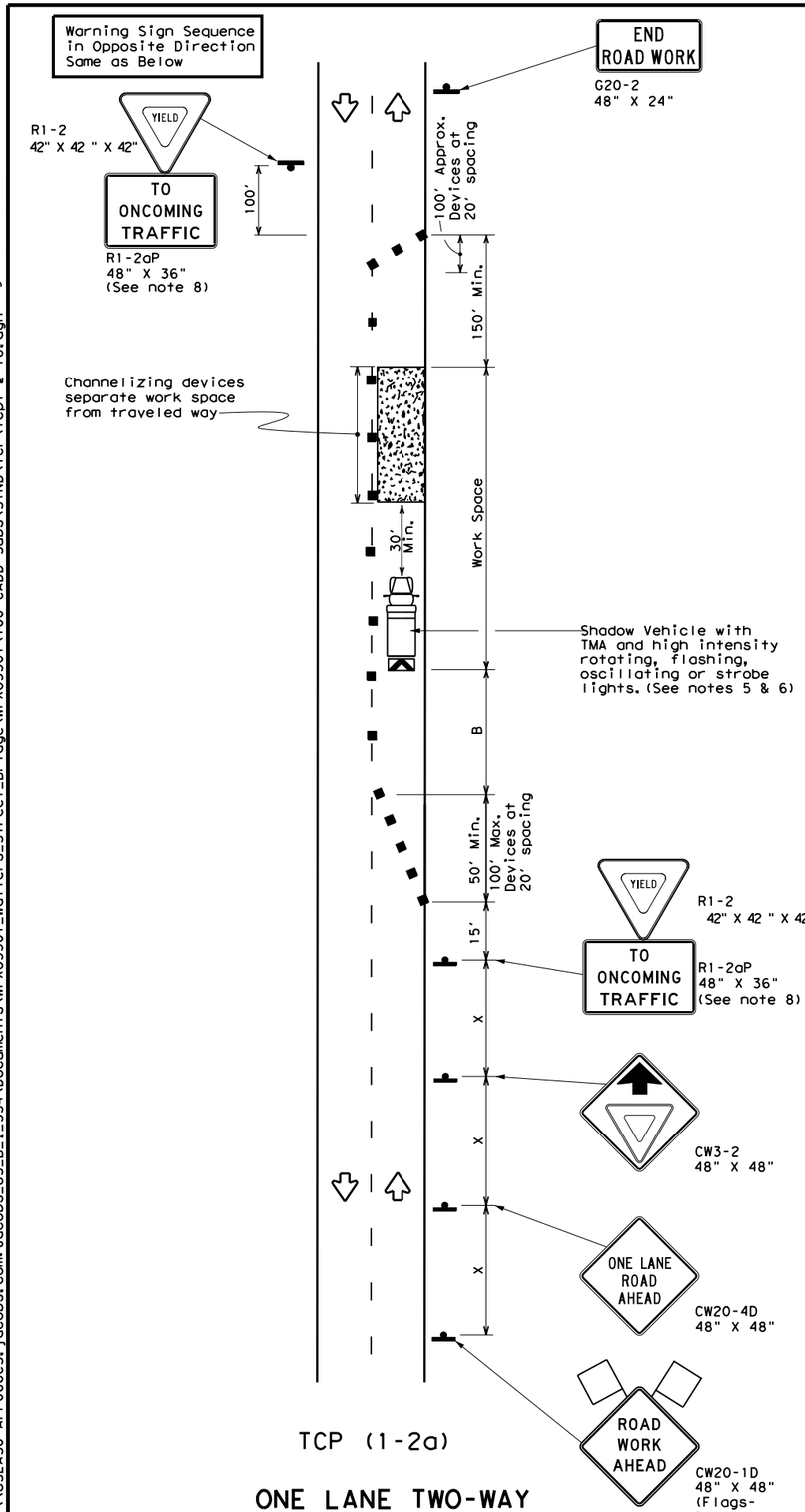
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.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		0915	12	532	WALTERS ST
		DIST		COUNTY	SHEET NO.
		SAT		BEXAR	27

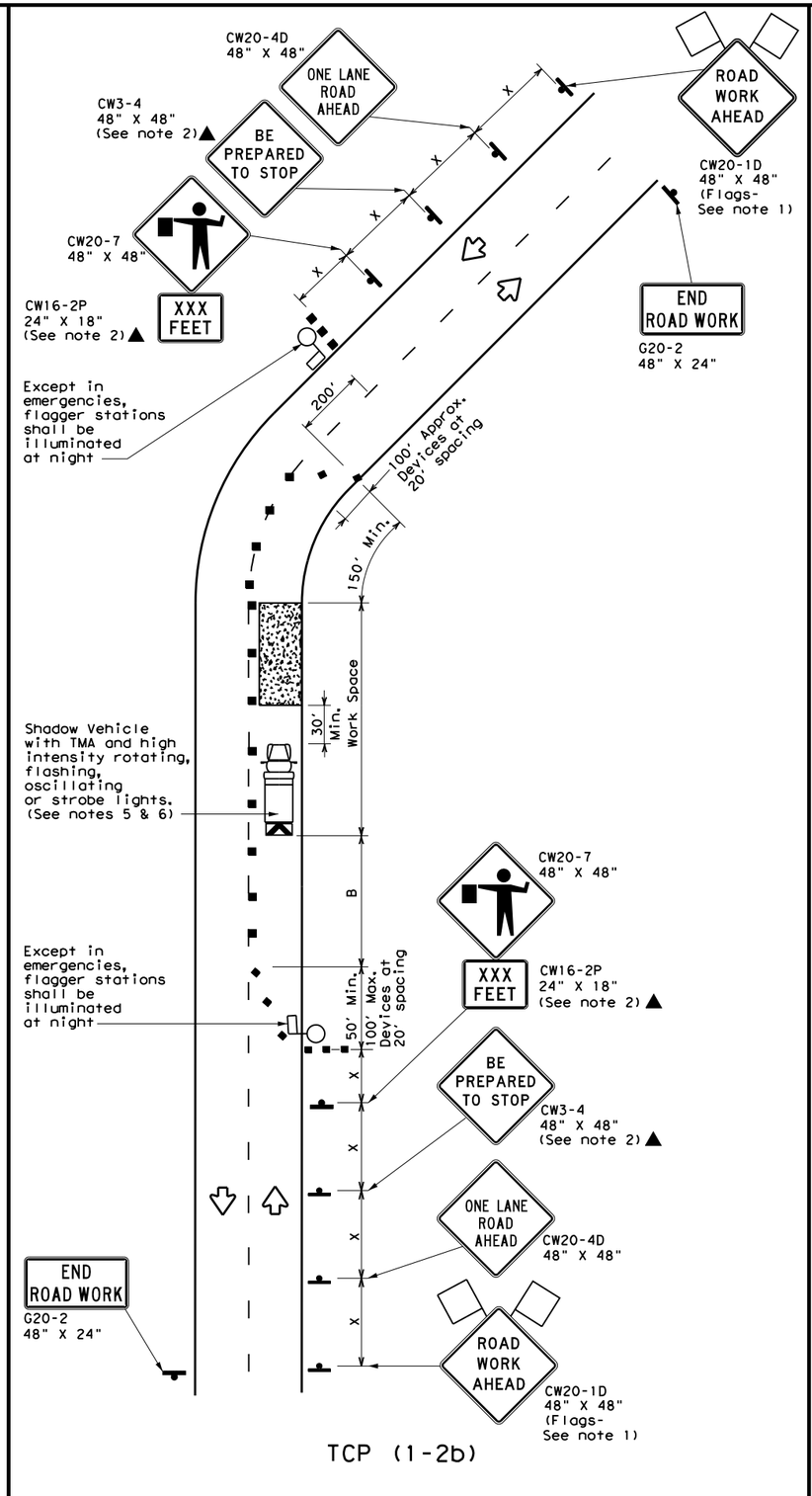
151

DATE: 11/12/2021 10:56:19 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_4\Other standards\tcp1-2-18.dgn



TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

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 CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

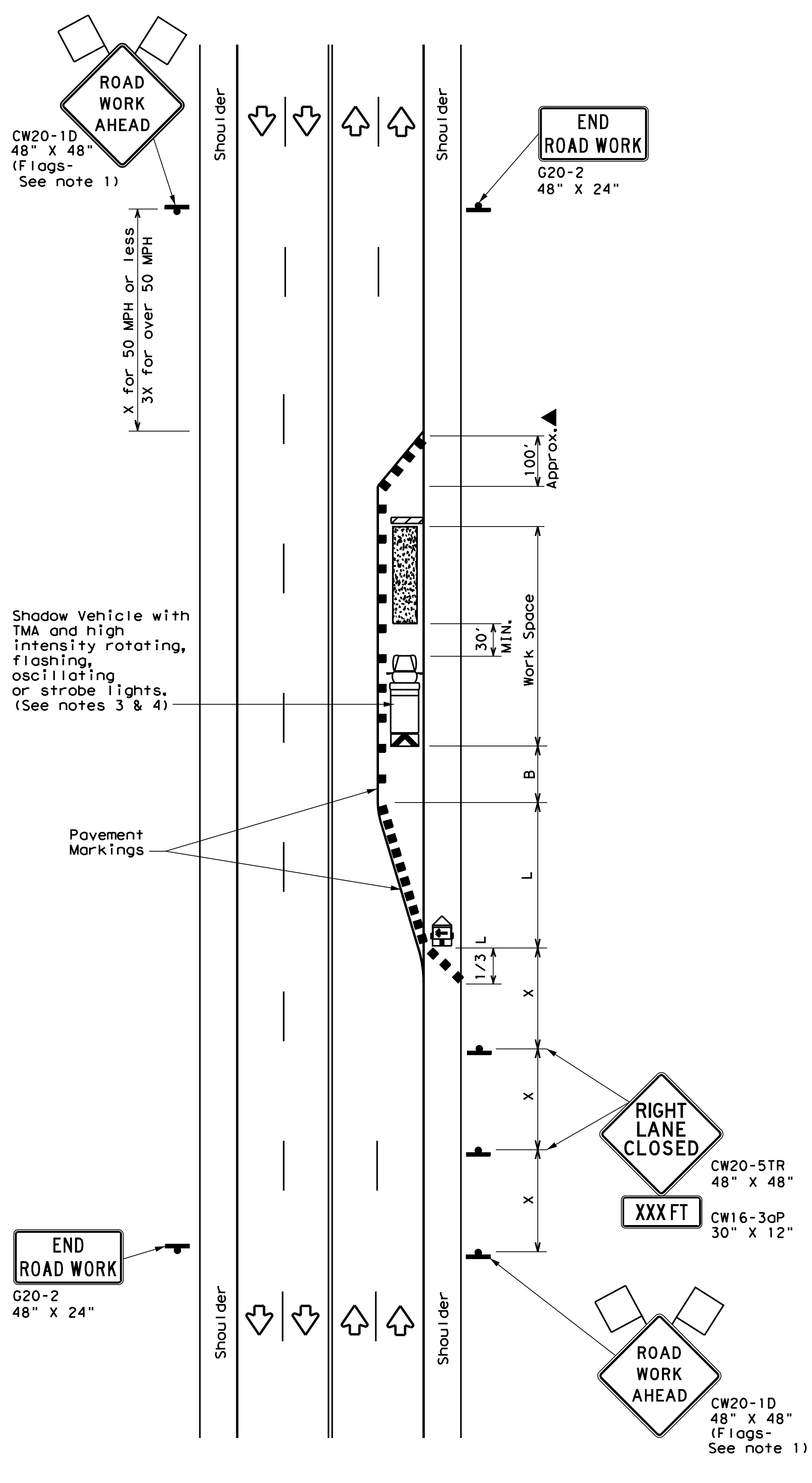
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

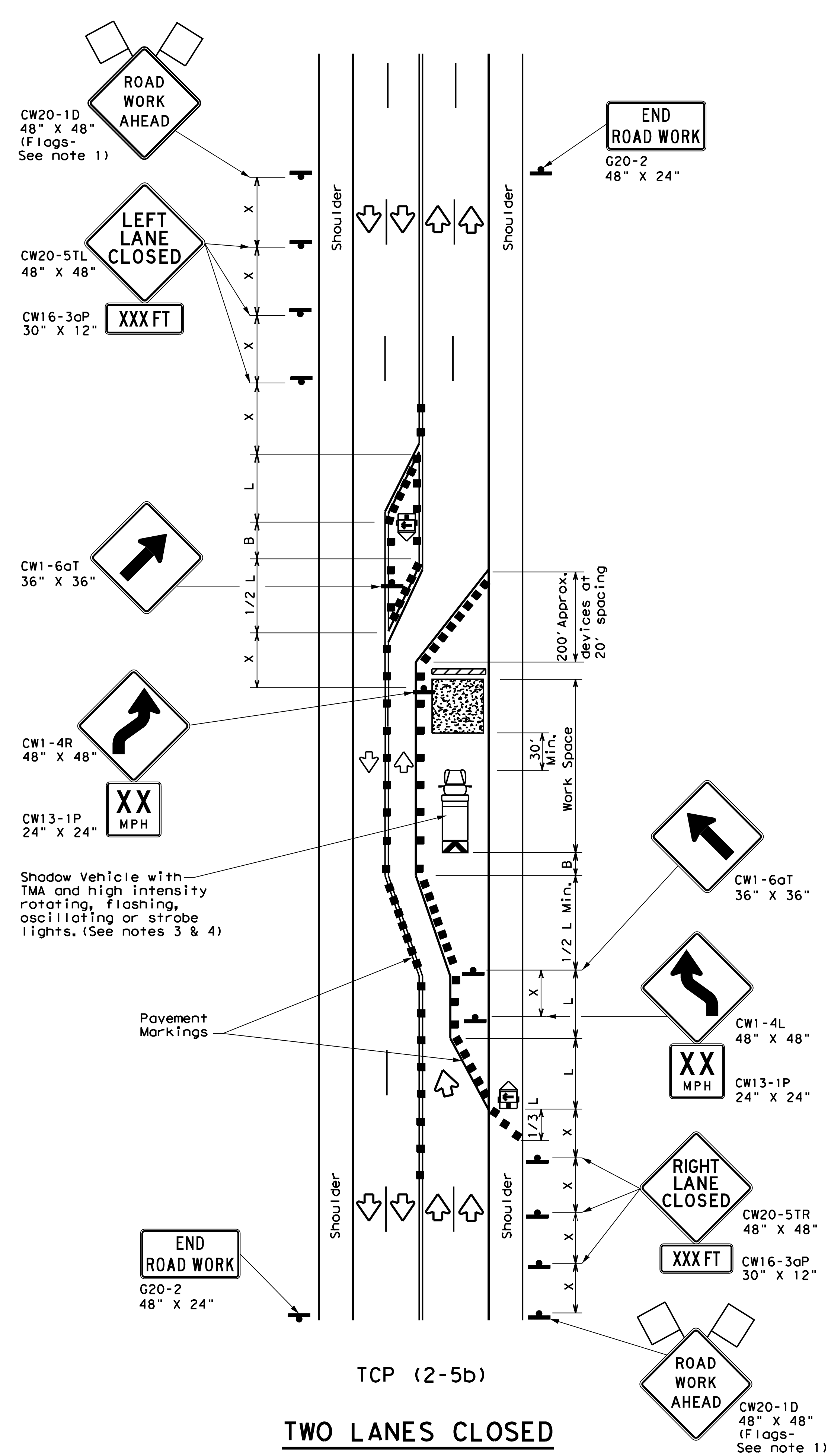
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		28

DATE: 11/12/2021 10:56:28 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301...



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

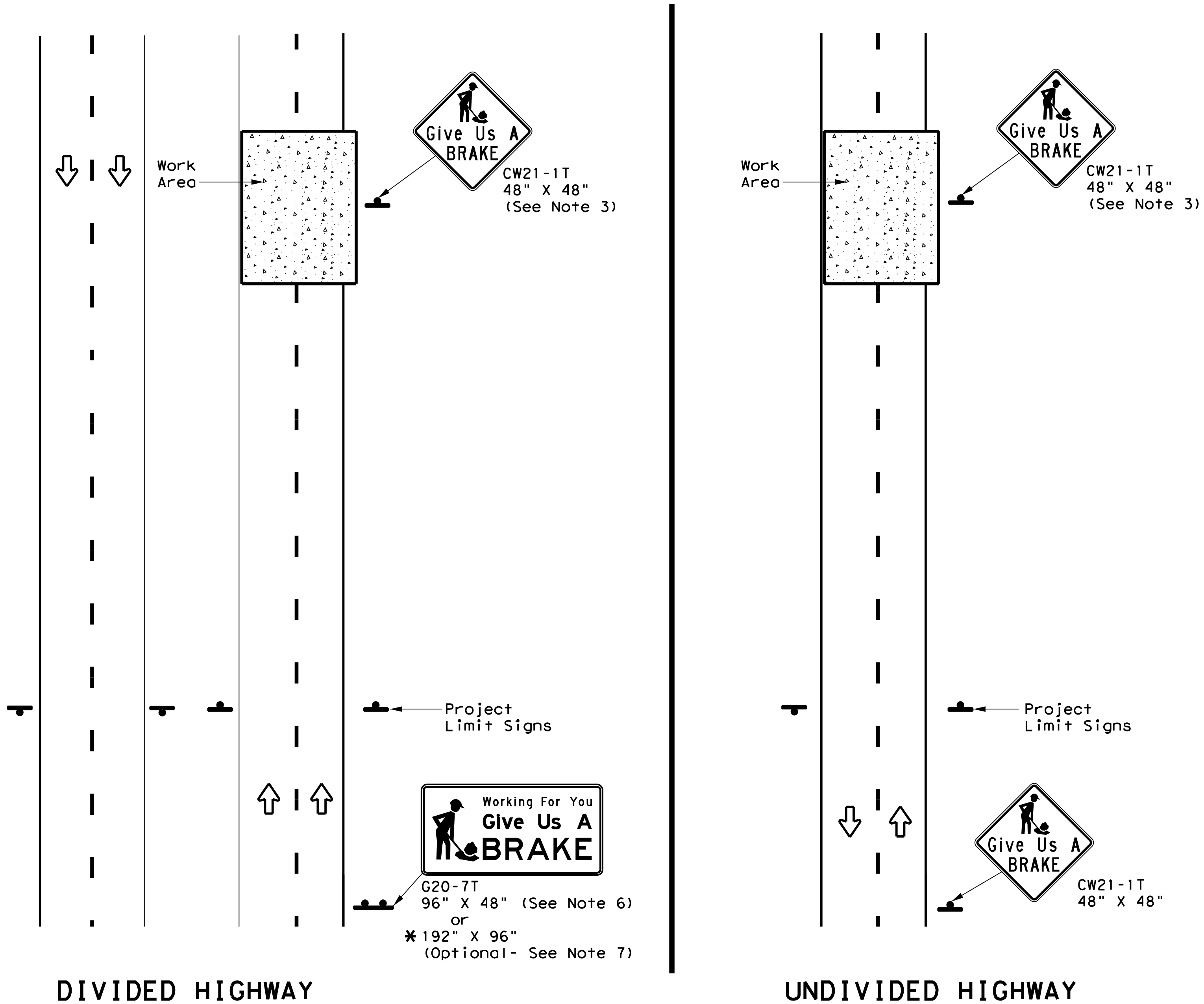
7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST
REVISIONS 8-95 2-12, 1-97 3-03, 4-98 2-18	DIST SAT		COUNTY BEXAR	SHEET NO. 29



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

✱ When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL Size	(LF) ①	(LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T		192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
▁▲▁	Sign
▁▲▲▁	Large Sign
⇦	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   - Item 636 - Aluminum Signs
   - Item 647 - Large Roadside Sign Supports and Assemblies.
   - Item 416 - Drilled Shaft Foundations
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.

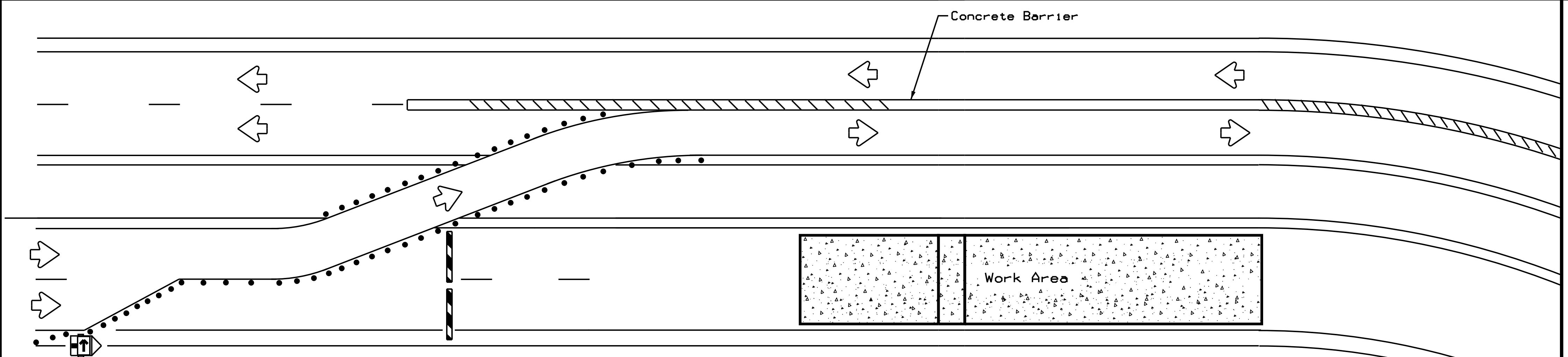
Texas Department of Transportation
Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST
REVISIONS 6-96 5-98 7-13 8-96 3-03	DIST SAT		COUNTY BEXAR	SHEET NO. 30

116



LEGEND	
(symbol)	Type 3 Barricade
• • •	Channelizing Devices
(symbol)	Trailer Mounted Flashing Arrow Board
(symbol)	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

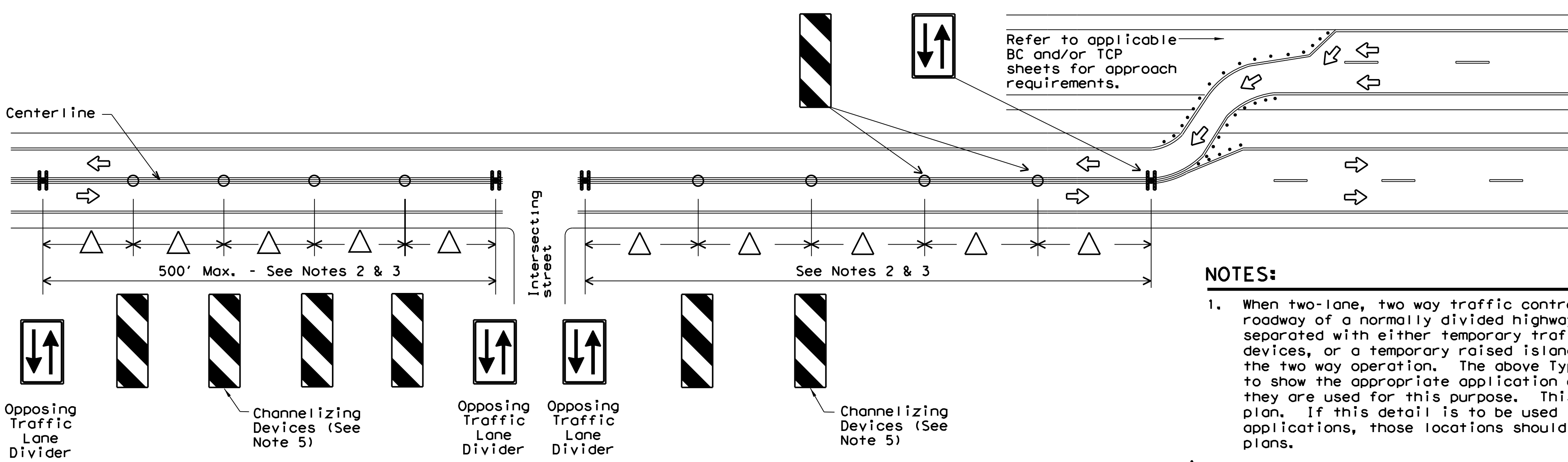
Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html

BARRIER DELINEATION WITH MODULAR GLARE SCREENS

NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation — Traffic Operations Division Standard

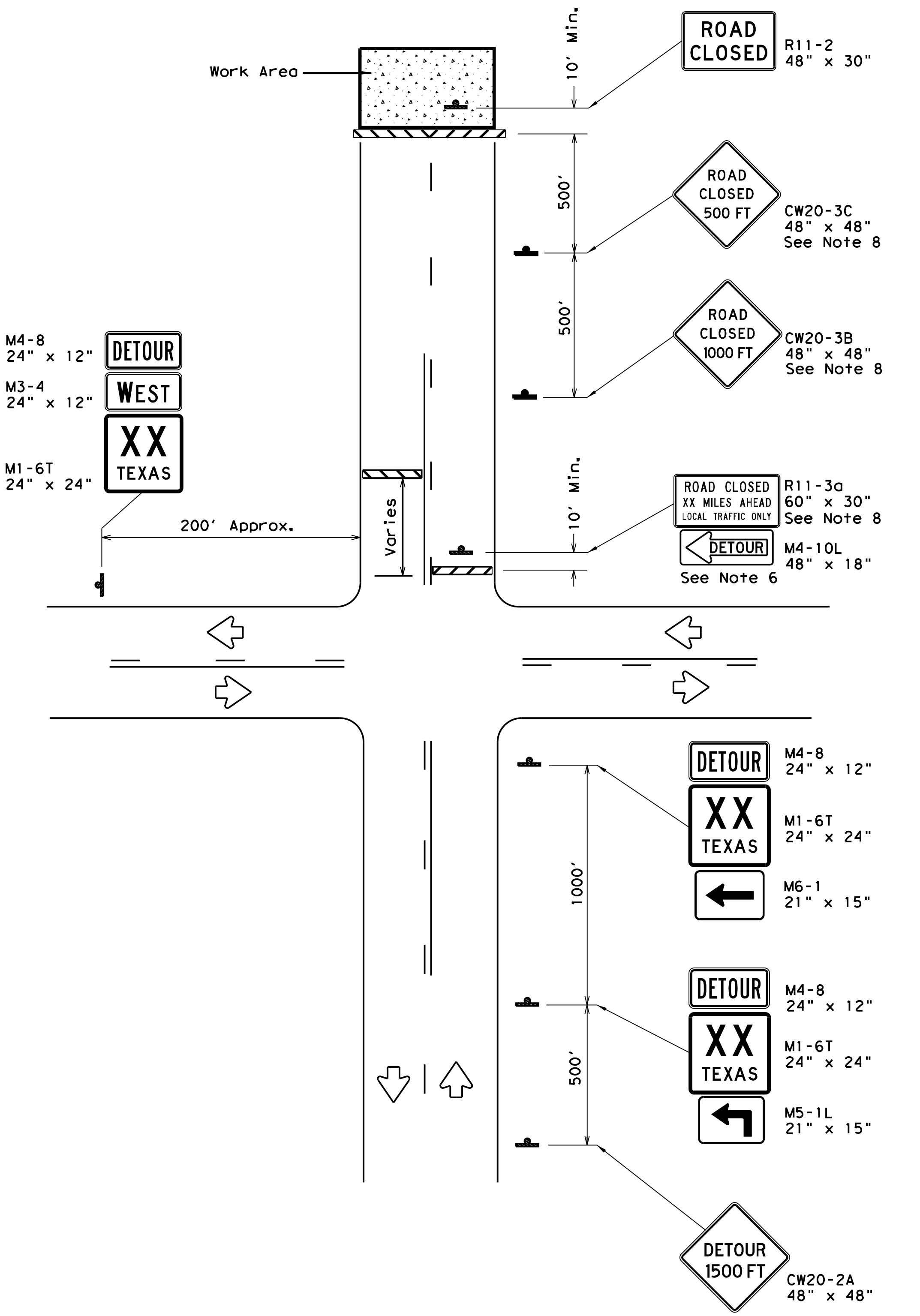
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0915	12	532	WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	31

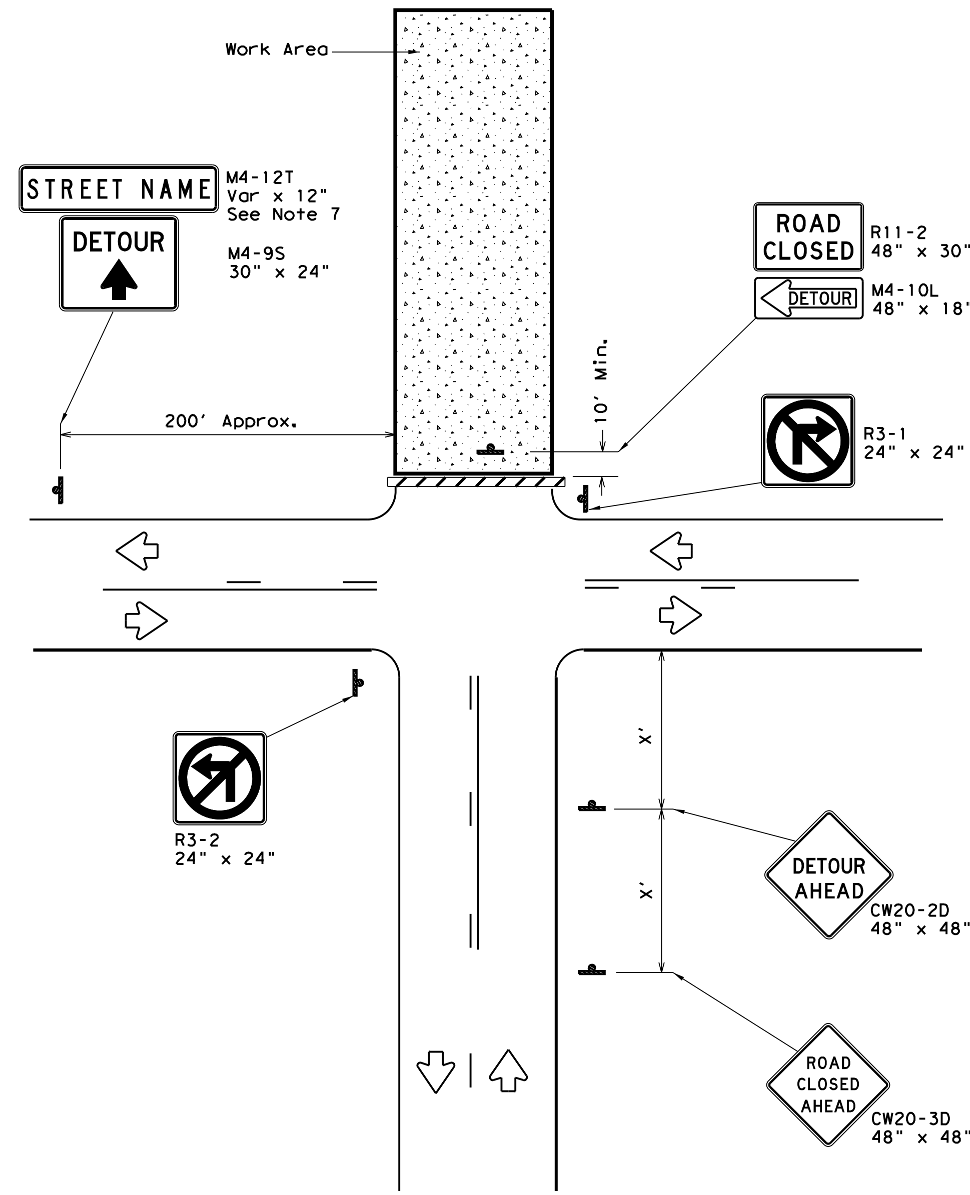
110

DATE: 11/12/2021 10:56:46 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301...



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
(hatched bar)	Type 3 Barricade
(sign symbol)	Sign

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

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation — Traffic Operations Division Standard

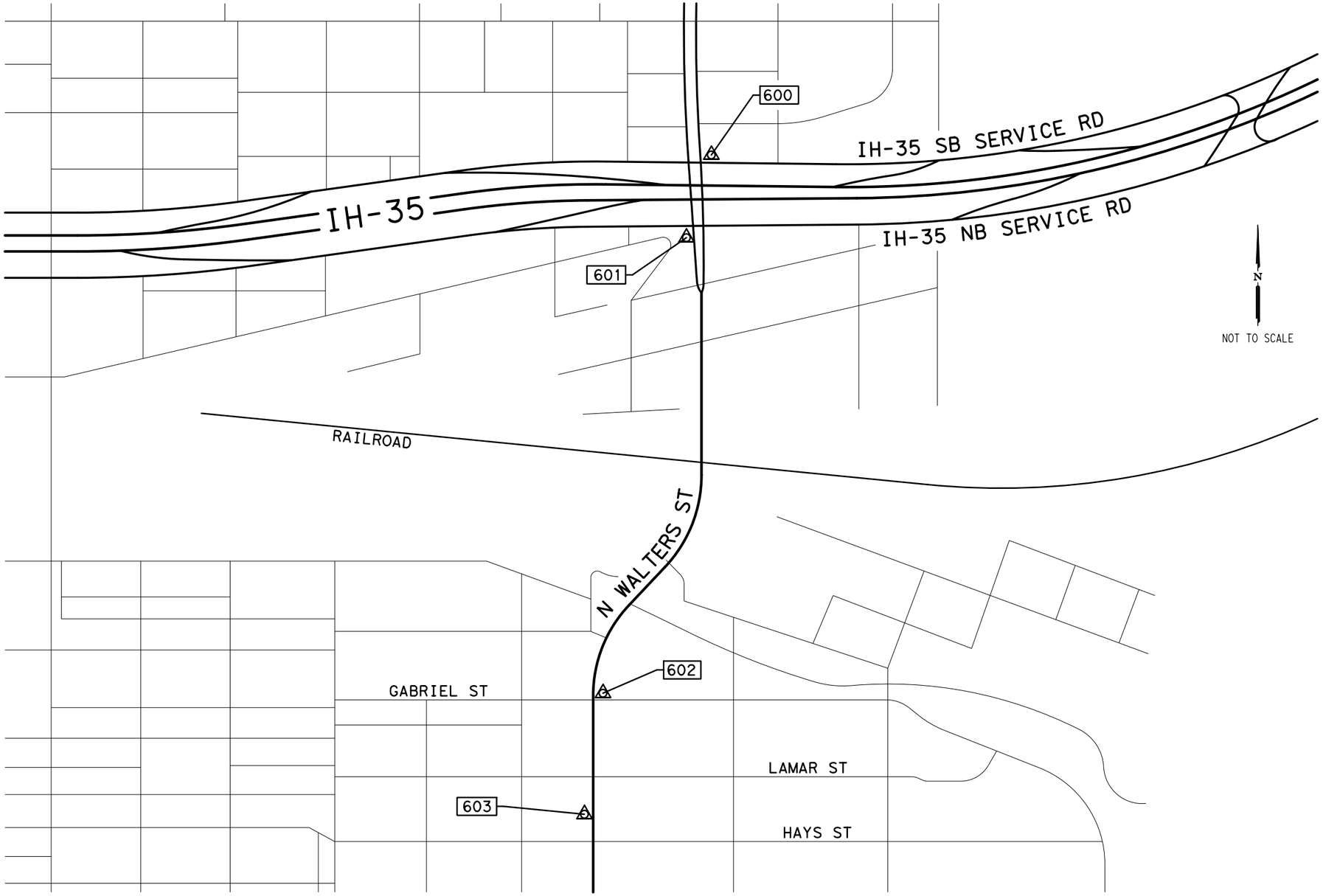
WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
1-97 4-98 7-13	DIST		COUNTY	SHEET NO.
2-98 3-03	SAT		BEXAR	32

113

CONTROL POINTS								
CONTROL POINT	GRID COORDINATES		SURFACE COORDINATES		LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING				
600	13,707,877.4195	2,143,435.3518	13,709,659.4435	2,143,713.9983	29°26′23.44662"	98°27′01.30397"	731.949	SET MAG NAIL W\LTRA WASHER IN CURB INLET
601	13,707,389.1506	2,143,339.8108	13,709,171.1112	2,143,618.4450	29°26′18.61688"	98°27′02.41056"	717.129	SET MAG NAIL W\LTRA WASHER IN CONCRETE SIDEWALK
602	13,705,051.8071	2,142,886.5776	13,706,833.4638	2,143,165.1528	29°25′55.49669"	98°27′07.66080"	679.060	SET MAG NAIL W\LTRA WASHER IN CONCRETE SIDEWALK
603	13,704,443.4161	2,142,830.8013	13,706,224.9937	2,143,109.3693	29°25′49.47580"	98°27′08.32385"	685.374	SET MAG NAIL W\LTRA WASHER IN CONCRETE SIDEWALK



N

NOT TO SCALE

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00013
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SAN ANTONIO), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SAN ANTONIO)
5. FIELD SURVEYS WERE PERFORMED DURING JANUARY 2018
6. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

STATE OF TEXAS
REGISTERED
CHRISTOPHER R. FREEMAN
5701
PROFESSIONAL
LAND SURVEYOR

11/12/2021

CHRISTOPHER R. FREEMAN - R.P.L.S. NO. 5701

LTRA
LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPELS REGISTRATION NO. 10140700

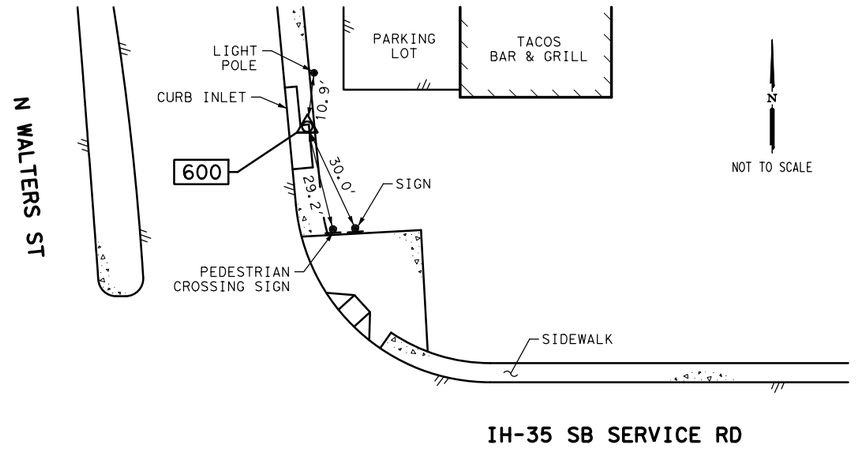
JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

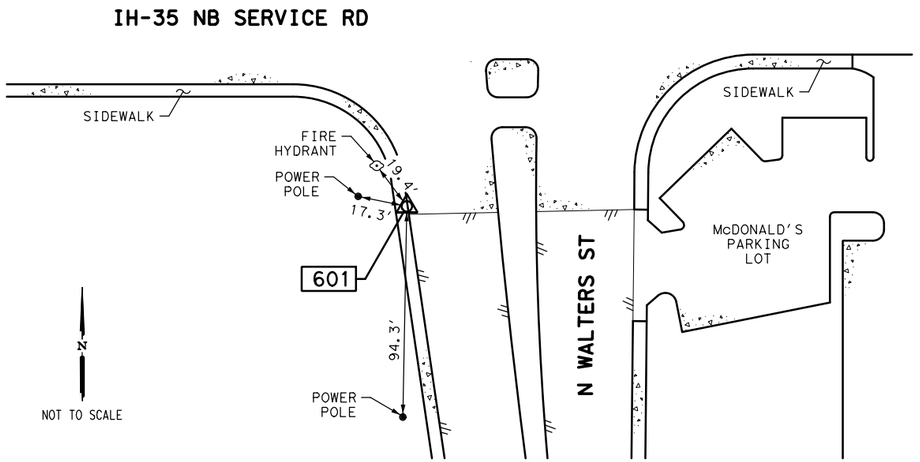
Texas Department of Transportation®

N WALTERS STREET BRIDGE

SURVEY CONTROL INDEX SHEET

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	33
15	BEXAR		N WALTERS ST	





CONTROL POINT: 600

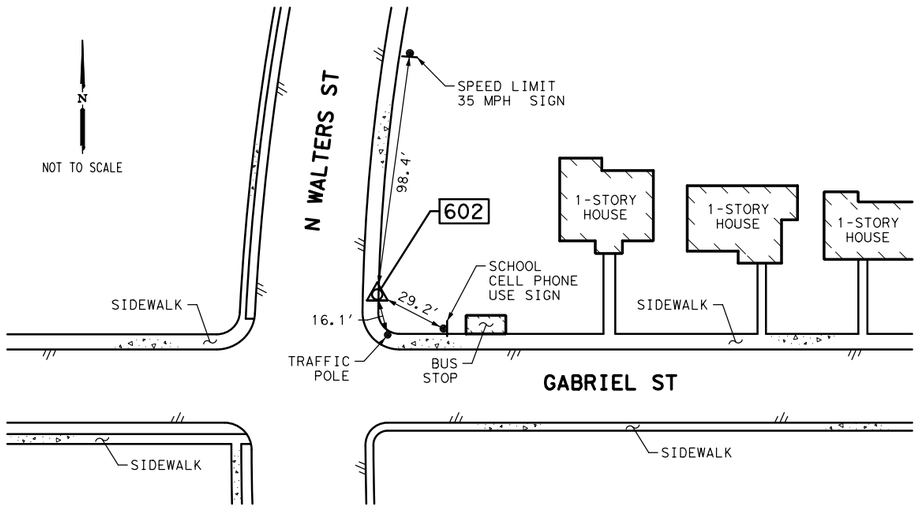
CONTROL POINT 600 IS A MAG NAIL W\LTRA WASHER SET IN A CURB INLET. LOCATED ON THE NORTHEAST CORNER OF THE INTERSECTION OF N WALTERS ST AND THE IH-35 SB SERVICE RD IN SAN ANTONIO, TEXAS

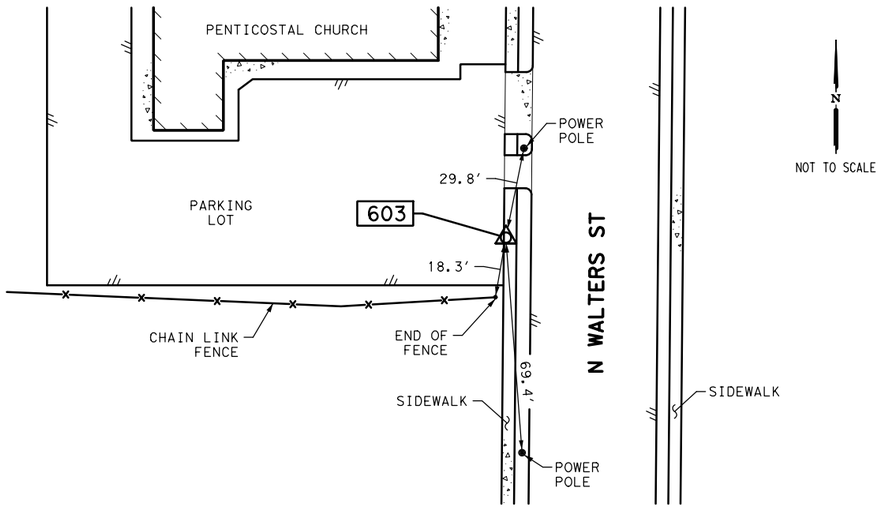
SURFACE COORDINATES:		GRID COORDINATES:			
NORTHING:	13,709,659.4435	NORTHING:	13,707,877.4195	LATITUDE:	29°26′23.44662"
EASTING:	2,143,713.9983	EASTING:	2,143,435.3518	LONGITUDE:	98°27′01.30397"
ELEVATION:	731.949	ELEVATION:	731.949		

CONTROL POINT: 601

CONTROL POINT 601 IS A MAG NAIL W\LTRA WASHER SET IN A CONCRETE SIDEWALK. LOCATED ON THE SOUTHWEST CORNER OF THE INTERSECTION OF N WALTERS ST AND THE IH-35 NB SERVICE RD IN SAN ANTONIO, TEXAS

SURFACE COORDINATES:		GRID COORDINATES:			
NORTHING:	13,709,171.1112	NORTHING:	13,707,389.1506	LATITUDE:	29°26′18.61688"
EASTING:	2,143,618.4450	EASTING:	2,143,339.8108	LONGITUDE:	98°27′02.41056"
ELEVATION:	717.129	ELEVATION:	717.129		





CONTROL POINT: 602

CONTROL POINT 602 IS A MAG NAIL W\LTRA WASHER SET IN A CONCRETE SIDEWALK. LOCATED ON THE NORTHEAST CORNER OF THE INTERSECTION OF N WALTERS ST AND GABRIEL ST IN SAN ANTONIO, TEXAS

SURFACE COORDINATES:		GRID COORDINATES:			
NORTHING:	13,706,833.4638	NORTHING:	13,705,051.8071	LATITUDE:	29°25′55.49669"
EASTING:	2,143,165.1528	EASTING:	2,142,886.5776	LONGITUDE:	98°27′07.66080"
ELEVATION:	679.060	ELEVATION:	679.060		

CONTROL POINT: 603

CONTROL POINT 603 IS A MAG NAIL W\LTRA WASHER SET IN A CONCRETE SIDEWALK. LOCATED ON THE WEST SIDE OF N WALTERS ST, +\- 210′ SOUTH OF THE INTERSECTION OF N WALTERS STREET AND LAMAR ST IN SAN ANTONIO, TEXAS

SURFACE COORDINATES:		GRID COORDINATES:			
NORTHING:	13,706,224.9937	NORTHING:	13,704,443.4161	LATITUDE:	29°25′49.47580"
EASTING:	2,143,109.3693	EASTING:	2,142,830.8013	LONGITUDE:	98°27′08.32385"
ELEVATION:	685.374	ELEVATION:	685.374		

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00013
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SAN ANTONIO), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SAN ANTONIO)
5. FIELD SURVEYS WERE PERFORMED DURING JANUARY 2018
6. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

STATE OF TEXAS REGISTERED CHRISTOPHER R. FREEMAN 5701 PROFESSIONAL LAND SURVEYOR

11/12/2021

CHRISTOPHER R. FREEMAN - R.P.L.S. NO. 5701

LINA T. RAMEY & ASSOCIATES, INC.
3320 Belt Line Road
Farmers Branch, Texas 75234 - 214-979-1144
FIRM REGISTRATION NO. F-782
TBPELS REGISTRATION NO. 10140700

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS STREET BRIDGE

HORIZONTAL AND VERTICAL CONTROL SHEET

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	34
DIST	COUNTY		HIGHWAY	
15	BEXAR		N WALTERS ST	

O:_(079-02) Jacobs_012 Jacobs\17-27 IH 35 Walters St. Project Bridge\Control\IH-35 Walter St Bridge CONTROL DATA SHEET 01.dgn

11/10/2021

℄ WALTERS

Beginning chain WALTERS description
Feature: Geom_Centerline

Point WALTERS1 N 13,708,757.5029 E 2,143,695.4400 Sta 14+33.39

Course from WALTERS1 to PC WALTERS_3 S 1° 29′ 08.12" E Dist 147.3092

		Curve Data		
Curve WALTERS_3				
P.I. Station	15+95.64	N 13,708,595.2998	E	2,143,699.6467
Delta =	2° 08′ 27.48" (LT)			
Degree =	7° 09′ 43.10"			
Tangent =	14.9485			
Length =	29.8935			
Radius =	800.0000			
External =	0.1396			
Long Chord =	29.8918			
Mid. Ord. =	0.1396			
P.C. Station	15+80.70	N 13,708,610.2433	E	2,143,699.2591
P.T. Station	16+10.59	N 13,708,580.3812	E	2,143,700.5922
C.C.		N 13,708,630.9837	E	2,144,498.9902
Back = S	1° 29′ 08.12" E			
Ahead = S	3° 37′ 35.60" E			
Chord Bear = S	2° 33′ 21.86" E			

		Curve Data		
Curve WALTERS_4				
P.I. Station	16+32.00	N 13,708,559.0102	E	2,143,701.9467
Delta =	3° 03′ 59.68" (RT)			
Degree =	7° 09′ 43.10"			
Tangent =	21.4139			
Length =	42.8175			
Radius =	800.0000			
External =	0.2865			
Long Chord =	42.8124			
Mid. Ord. =	0.2864			
P.C. Station	16+10.59	N 13,708,580.3812	E	2,143,700.5922
P.T. Station	16+53.41	N 13,708,537.5974	E	2,143,702.1560
C.C.		N 13,708,529.7788	E	2,142,902.1942
Back = S	3° 37′ 35.60" E			
Ahead = S	0° 33′ 35.92" E			
Chord Bear = S	2° 05′ 35.76" E			

Course from PT WALTERS_4 to PC WALTERS_7 S 0° 33′ 35.92" E Dist 557.4242

		Curve Data		
Curve WALTERS_7				
P.I. Station	25+04.85	N 13,707,686.1934	E	2,143,710.4774
Delta =	45° 34′ 03.56" (RT)			
Degree =	8° 11′ 06.40"			
Tangent =	294.0204			
Length =	556.7139			
Radius =	700.0000			
External =	59.2417			
Long Chord =	542.1575			
Mid. Ord. =	54.6193			
P.C. Station	22+10.83	N 13,707,980.1998	E	2,143,707.6038
P.T. Station	27+67.54	N 13,707,478.3174	E	2,143,502.5457
C.C.		N 13,707,973.3585	E	2,143,007.6373
Back = S	0° 33′ 35.92" E			
Ahead = S	45° 00′ 27.64" W			
Chord Bear = S	22° 13′ 25.86" W			

Course from PT WALTERS_7 to PC WALTERS_10 S 45° 00′ 27.65" W Dist 264.0071

		Curve Data		
Curve WALTERS_10				
P.I. Station	32+89.53	N 13,707,109.2650	E	2,143,133.3944
Delta =	45° 35′ 43.08" (LT)			
Degree =	9° 20′ 05.40"			
Tangent =	257.9817			
Length =	488.4426			
Radius =	613.7847			
External =	52.0127			
Long Chord =	475.6559			
Mid. Ord. =	47.9494			
P.C. Station	30+31.55	N 13,707,291.6612	E	2,143,315.8394
P.T. Station	35+19.99	N 13,706,851.2969	E	2,143,136.0401
C.C.		N 13,706,857.5917	E	2,143,749.7926
Back = S	45° 00′ 27.64" W			
Ahead = S	0° 35′ 15.44" E			
Chord Bear = S	22° 12′ 36.10" W			

Course from PT WALTERS_10 to WALTERS12 S 0° 35′ 15.44" E Dist 247.8935

Point WALTERS12 N 13,706,603.4165 E 2,143,138.5825 Sta 37+67.89

Ending chain WALTERS description

...\SHT\RDWY\534_HAL01.dgn
11/12/2021 10:57:24 AM

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

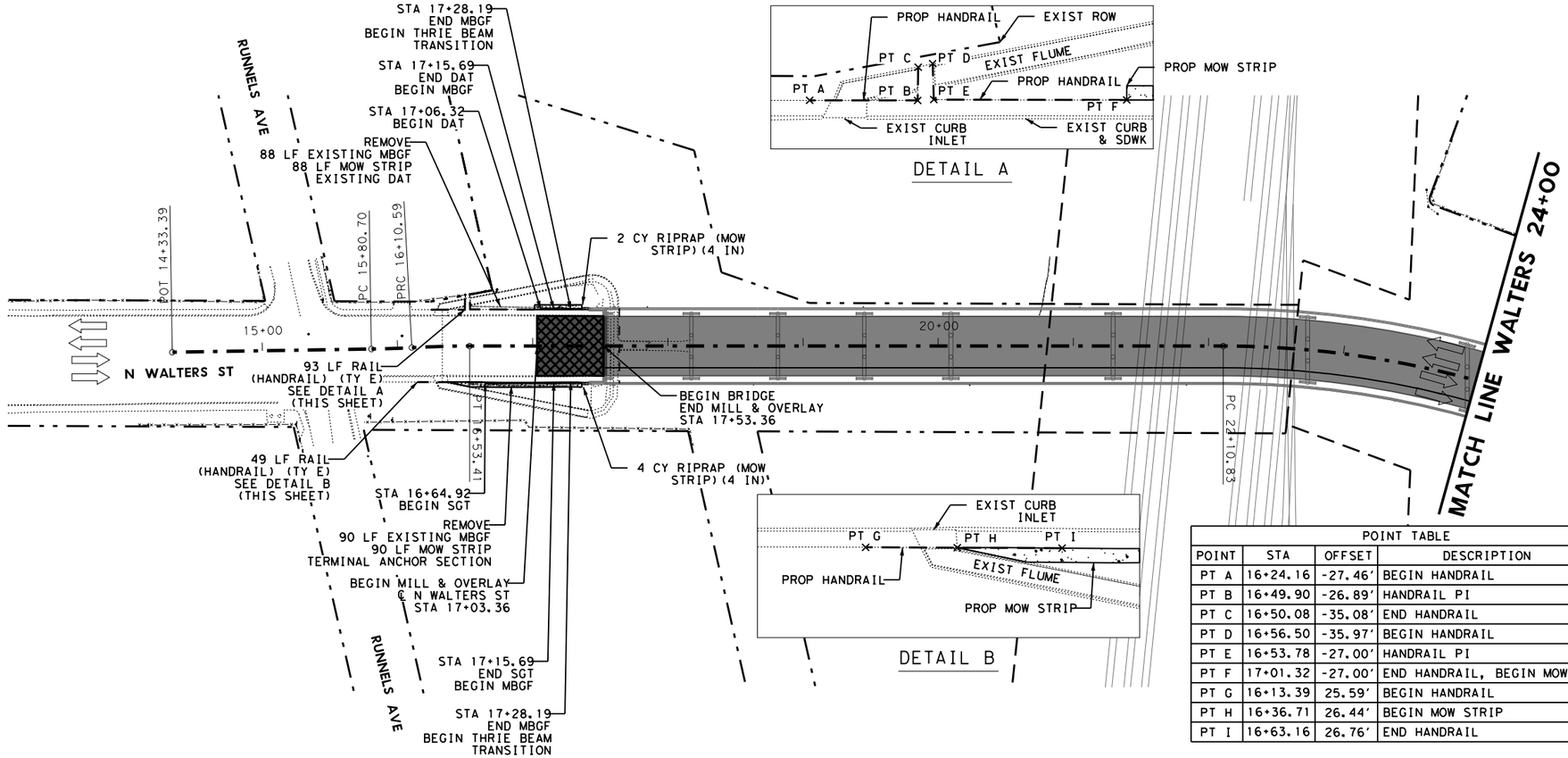
JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

HORIZONTAL DATA

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	35
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	



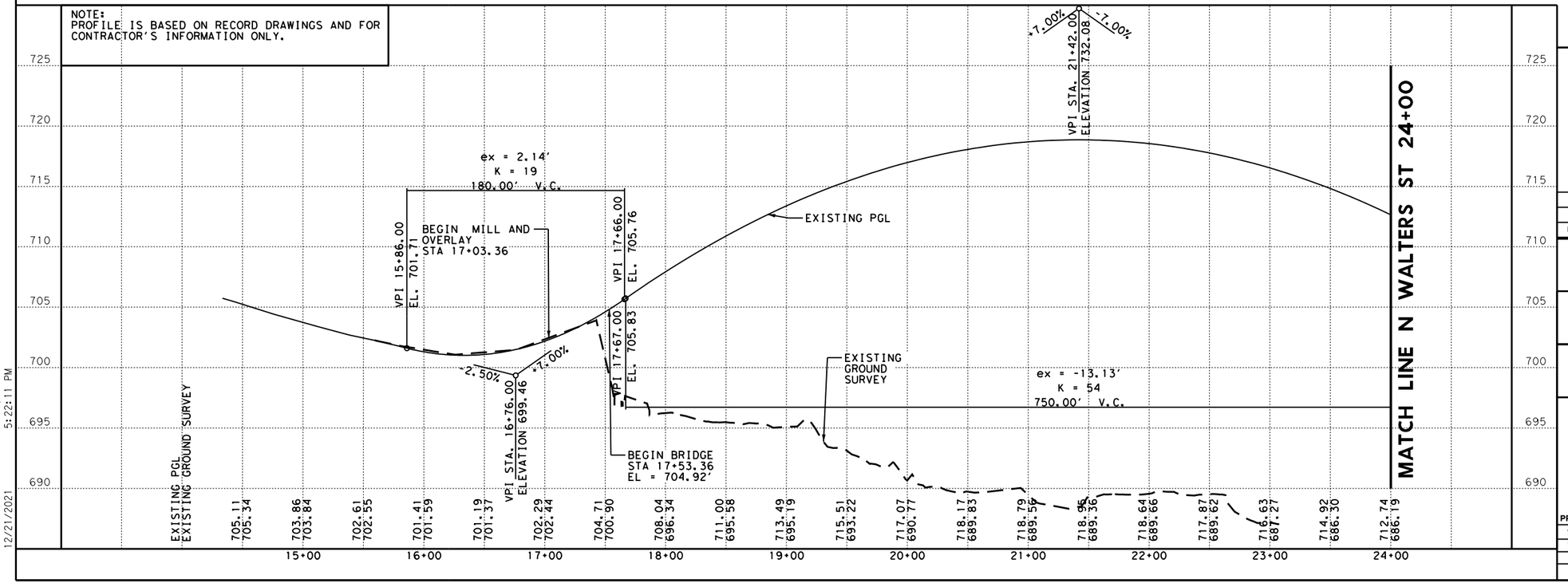
SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION
7		STA	PREPARING ROW
178		LF	*REMOVING CONCRETE(MOW STRIP)
8		CY	EXCAVATION (ROADWAY)
12		CY	EMBANKMENT (FINAL)(ORD COMP)(TY B)
49		GAL	TACK COAT
10		SY	**FLEX PVMT STRUCTURE REPAIR (12")
241		SY	PLANE ASPH CONC PAV(2")
27		TON	***D-GR HMA TY-C SAC-B PG70-22 (EXEMPT)
6		CY	RIPRAP (MOW STRIP)(4 IN)
142		LF	RAIL (HANDRAIL)(TY E)
26		LF	MTL W-BEAM GF FEN (TIM POST)
2		EA	MTL BEAM GD FEN TRANS (TL2)
1		EA	DOWNSTREAM ANCHOR TERMINAL SECTION
178		LF	REMOVE METAL BEAM GUARD FENCE
1		EA	REMOVE TERMINAL ANCHOR SECTION
1		EA	REMOVE DOWNSTREAM ANCHOR TERMINAL

POINT TABLE			
POINT	STA	OFFSET	DESCRIPTION
PT A	16+24.16	-27.46'	BEGIN HANDRAIL
PT B	16+49.90	-26.89'	HANDRAIL PI
PT C	16+50.08	-35.08'	END HANDRAIL
PT D	16+56.50	-35.97'	BEGIN HANDRAIL
PT E	16+53.78	-27.00'	HANDRAIL PI
PT F	17+01.32	-27.00'	END HANDRAIL, BEGIN MOW STRIP
PT G	16+13.39	25.59'	BEGIN HANDRAIL
PT H	16+36.71	26.44'	BEGIN MOW STRIP
PT I	16+63.16	26.76'	END HANDRAIL

0 50 100 H
0 5 10 V

LEGEND
- REPAIR WORK
- ROW LINE
- RAILROAD ROW
- FENCE LINE
- TRAFFIC DIRECTION

1. SEE HORIZONTAL ALIGNMENT DATA, DRAINAGE, AND BRIDGE SHEETS FOR ADDITIONAL INFORMATION.
2. **FLEXIBLE PAVEMENT STRUCTURE REPAIR ITEM TO BE USED AT THE DIRECTION OF THE ENGINEER.
3. ***CONTRACTOR MAY SUBSTITUTE THE ASPHALT MIX TYPE WITH THE APPROVAL OF THE ENGINEER.
4. REMOVAL OF EXISTING ACP ON THE BRDIGE IS SUBSIDIARY TO PAYMENT FOR HYDRO-DEMOLITION, EXISTING ACP MAY BE REMOVED DURING HYDRO-DEMOLITION OPERATIONS OR MILLED BEFOREHAND. DAMAGE TO THE EXISTING ARMOR JOINTS CAUSED BY CONSTRUCTION OPERATIONS WILL BE REPAIRD AT THE CONTRACTOR'S EXPENSE.



STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
12/21/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P - 512.338.1704 F - 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

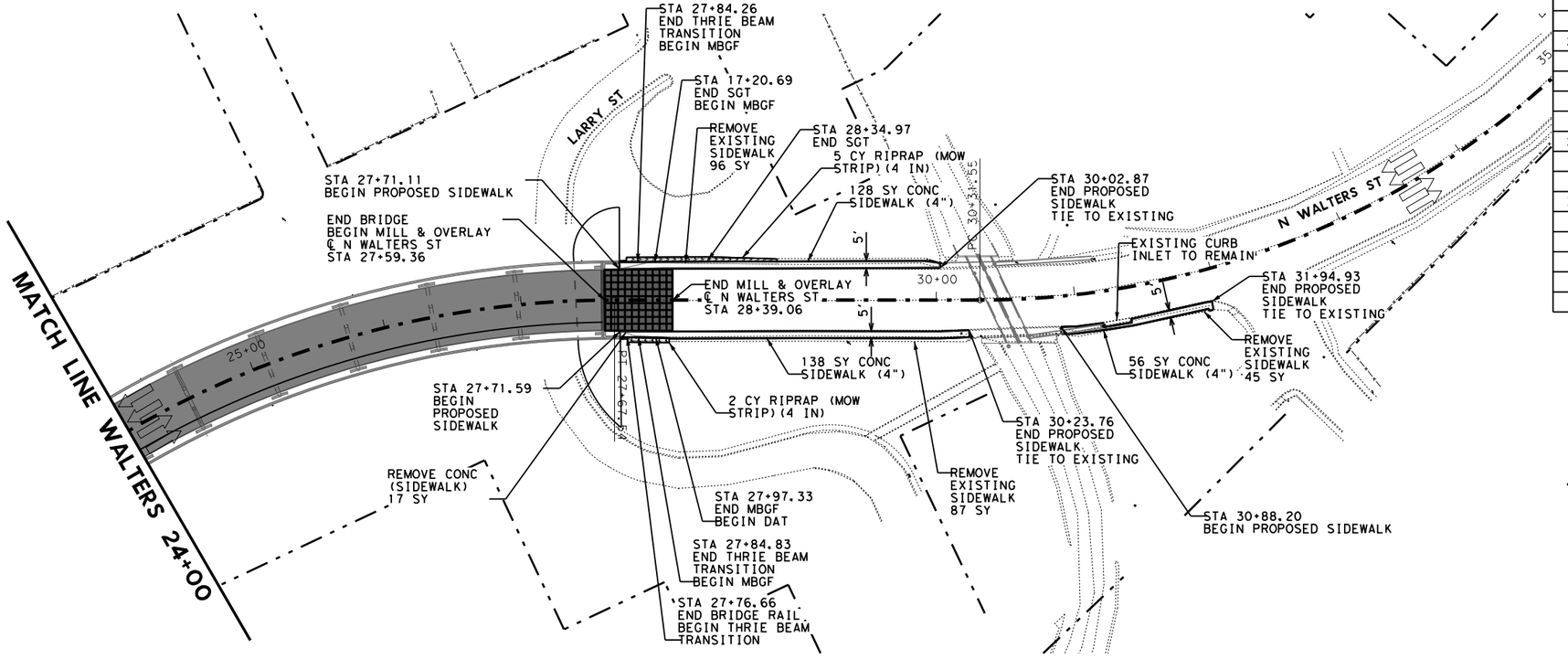
N WALTERS ST

ROADWAY P&P
N WALTERS ST
BEGIN PROJECT TO STA 24+00

PRINT DATE: 12/21/2021 SHEET 1 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	36
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\RDWY\0534_PP01.dgn
12/21/2021 5:22:11 PM

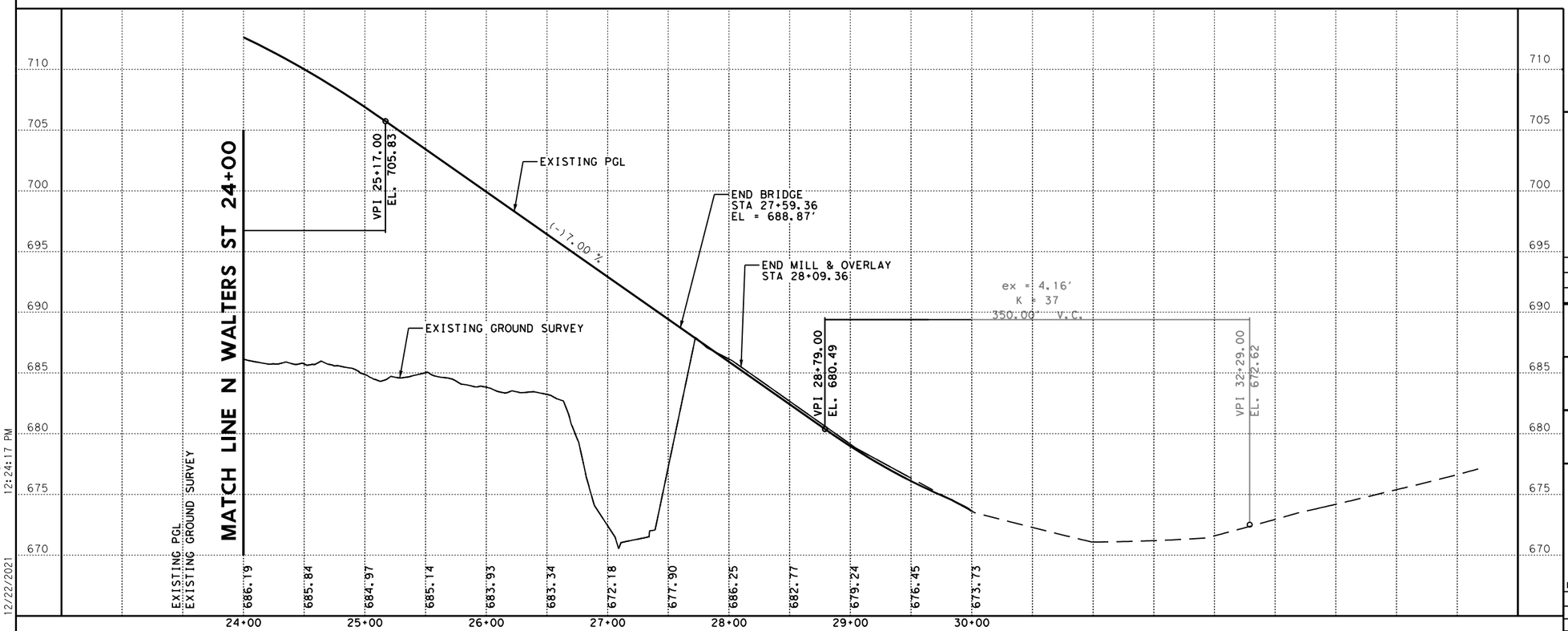


SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION
8		STA	PREPARING ROW
228		SY	REMOVING CONC (SIDEWALK OR RAMP)
159		CY	EXCAVATION (ROADWAY)
4		CY	EMBANKMENT (FINAL)(ORD COMP)(TY B)
48		GAL	PRIME COAT (MC-30 OR AE-P)
10		SY	**FLEX PVMT STRUCTURE REPAIR (12")
240		SY	PLANE ASPH CONC PAV(2")
27		TON	***D-GR HMA TY-C SAC-B PG70-22 (EXEMPT)
7		CY	RIPRAP (MOW STRIP)(4 IN)
322		SY	CONC SIDEWALKS (4")
13		LF	MTL W-BEAM GF FEN (TIM POST)
1		EA	TERMINAL ANCHOR SECTION
2		EA	MTL BEAM GD FEN TRANS (TL2)
1		EA	DOWNSTREAM ANCHOR TERMINAL SECTION
1		EA	GUARDRAIL END TREATMENT (INSTALL)

0 50 100 H
0 5 10 V

LEGEND
- REPAIR WORK
- ROW LINE
- RAILROAD ROW
- FENCE LINE
- TRAFFIC DIRECTION

1. SEE HORIZONTAL ALIGNMENT DATA, DRAINAGE, AND BRIDGE SHEETS FOR ADDITIONAL INFORMATION.
2. **FLEXIBLE PAVEMENT STRUCTURE REPAIR ITEM TO BE USED AT THE DIRECTION OF THE ENGINEER.
3. ***CONTRACTOR MAY SUBSTITUTE THE ASPHALT MIX TYPE WITH THE APPROVAL OF THE ENGINEER.
4. REMOVAL OF EXISTING ACP ON THE BRDIGE IS SUBSIDIARY TO PAYMENT FOR HYDRO-DEMOLITION, EXISTING ACP MAY BE REMOVED DURING HYDRO-DEMOLITION OPERATIONS OR MILLED BEFOREHAND. DAMAGE TO THE EXISTING ARMOR JOINTS CAUSED BY CONSTRUCTION OPERATIONS WILL BE REPAIRD AT THE CONTRACTOR'S EXPENSE.



DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
12/22/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

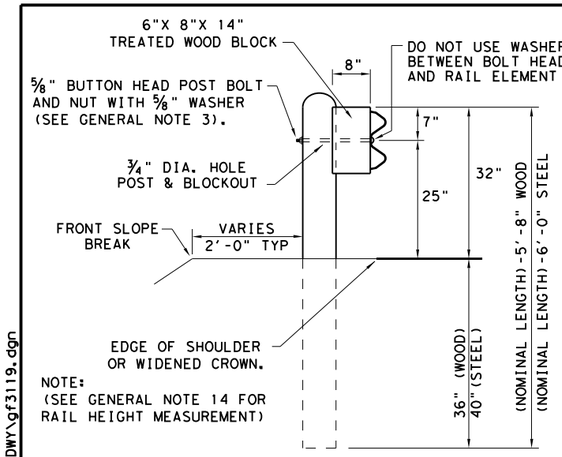
ROADWAY P&P
WALTERS ST
STA 24+00 TO END PROJECT

PRINT DATE: 12/22/2021 SHEET 2 OF 2

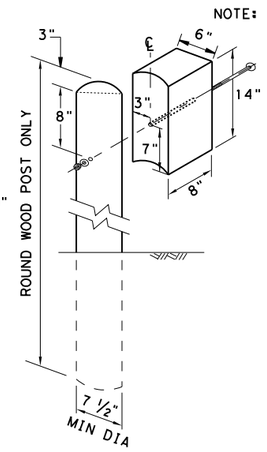
STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	37
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\RDWY\0534_PP02.dgn
12/22/2021 12:24:17 PM

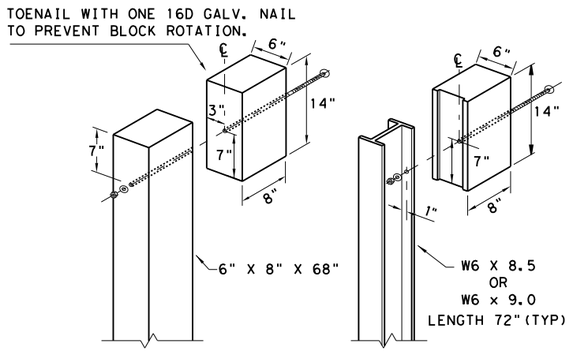
DATE: 11/12/2021
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\RDWY\gf3119.dgn



TYPICAL POST PLACEMENT



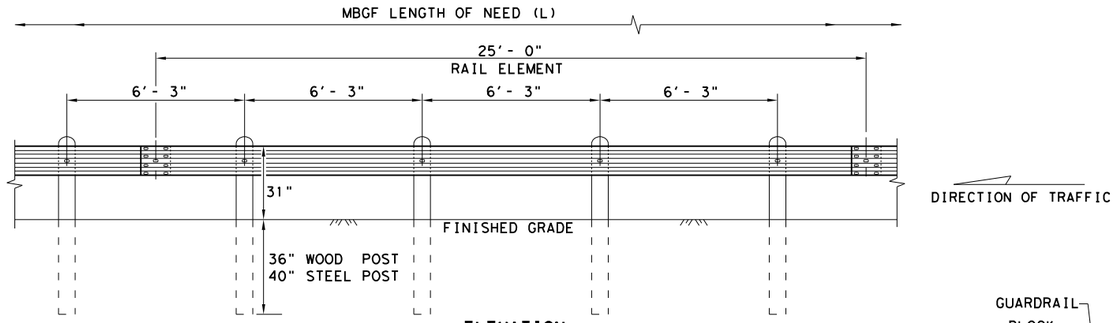
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

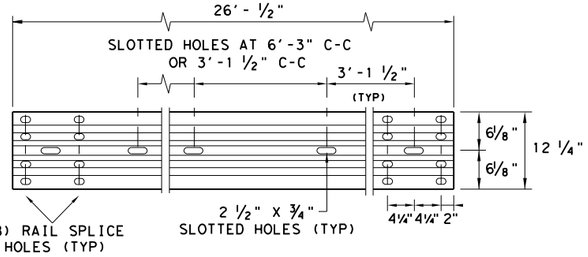
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



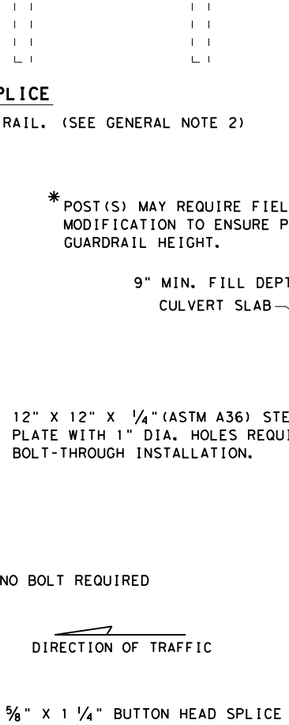
ELEVATION
MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)

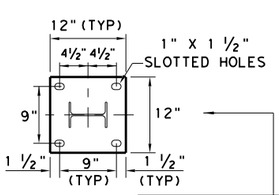


ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



LOW FILL CULVERT POST



STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

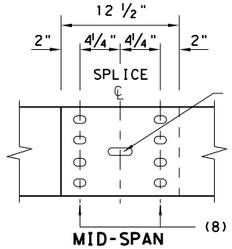
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES
FBB01 = 1 ¼"
FBB02 = 2"
⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

GENERAL NOTES

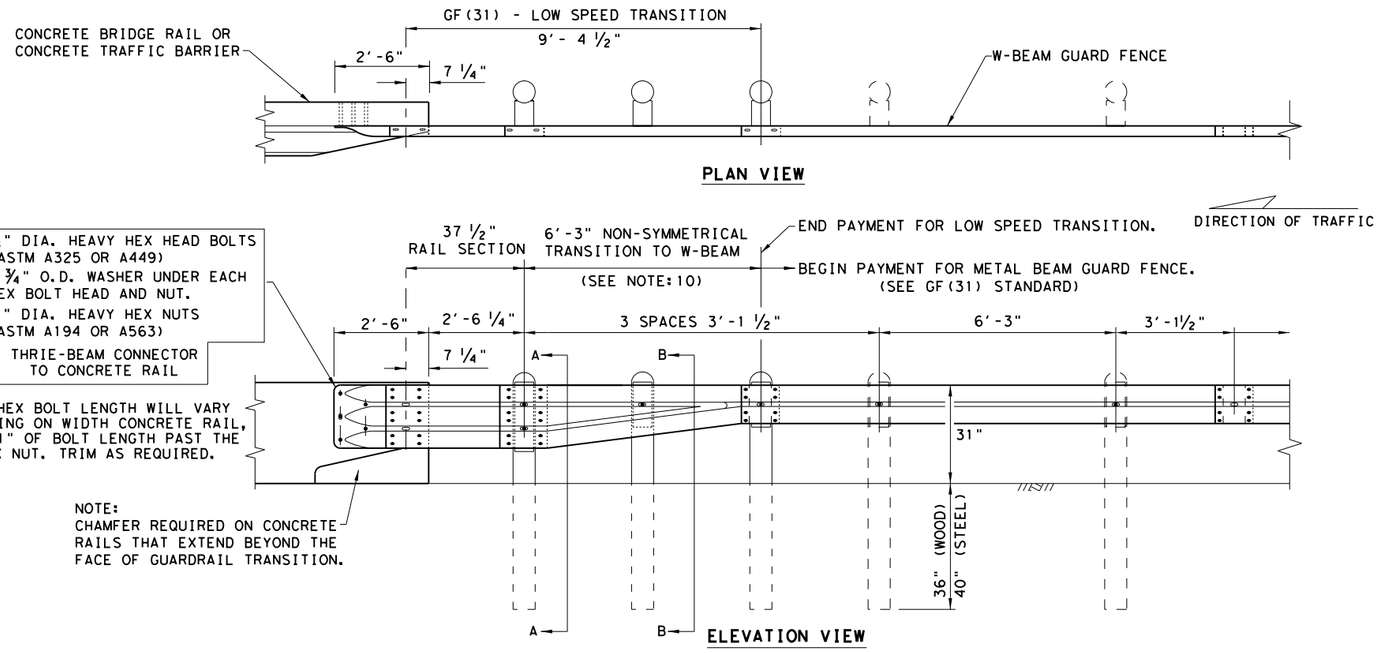
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

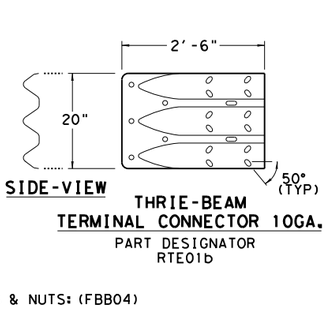
FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		38

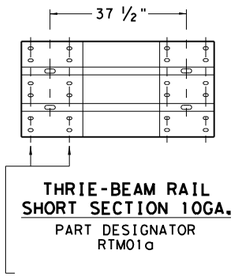
DATE: 11/12/2021 10:58:27 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\RDWY\gf31tr1219.dgn

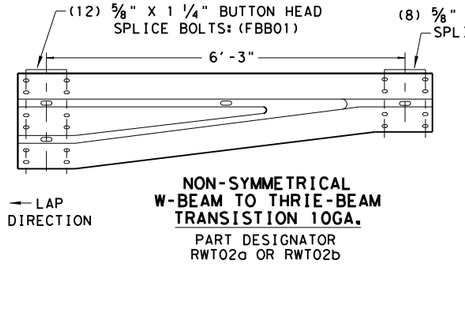


GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.







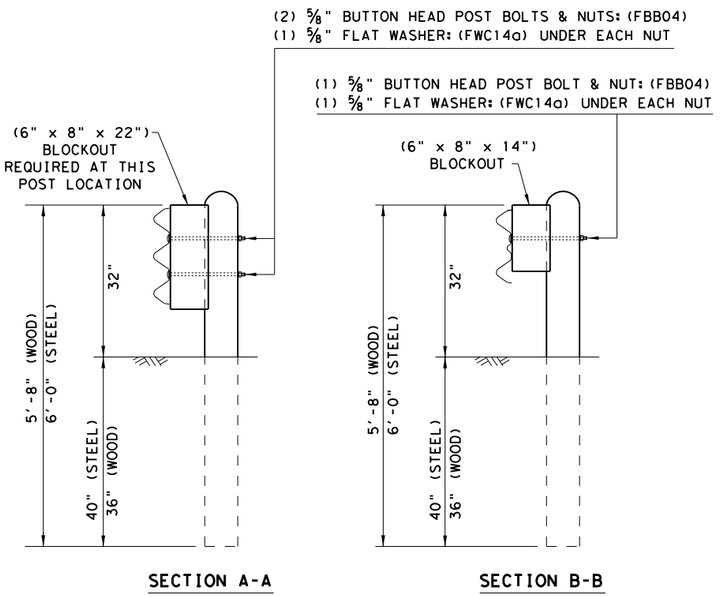
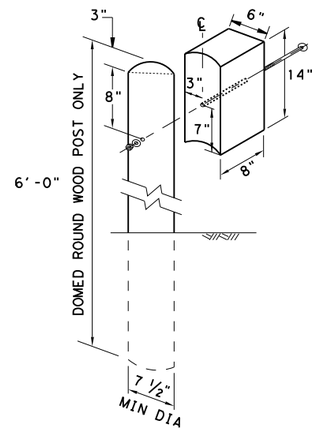
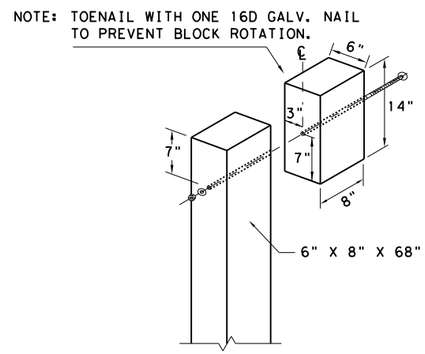
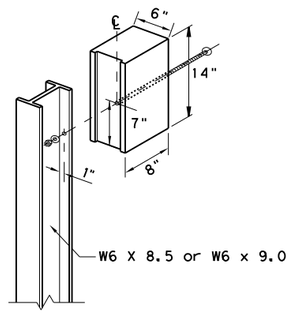


PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.







NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

LOW-SPEED TRANSITION

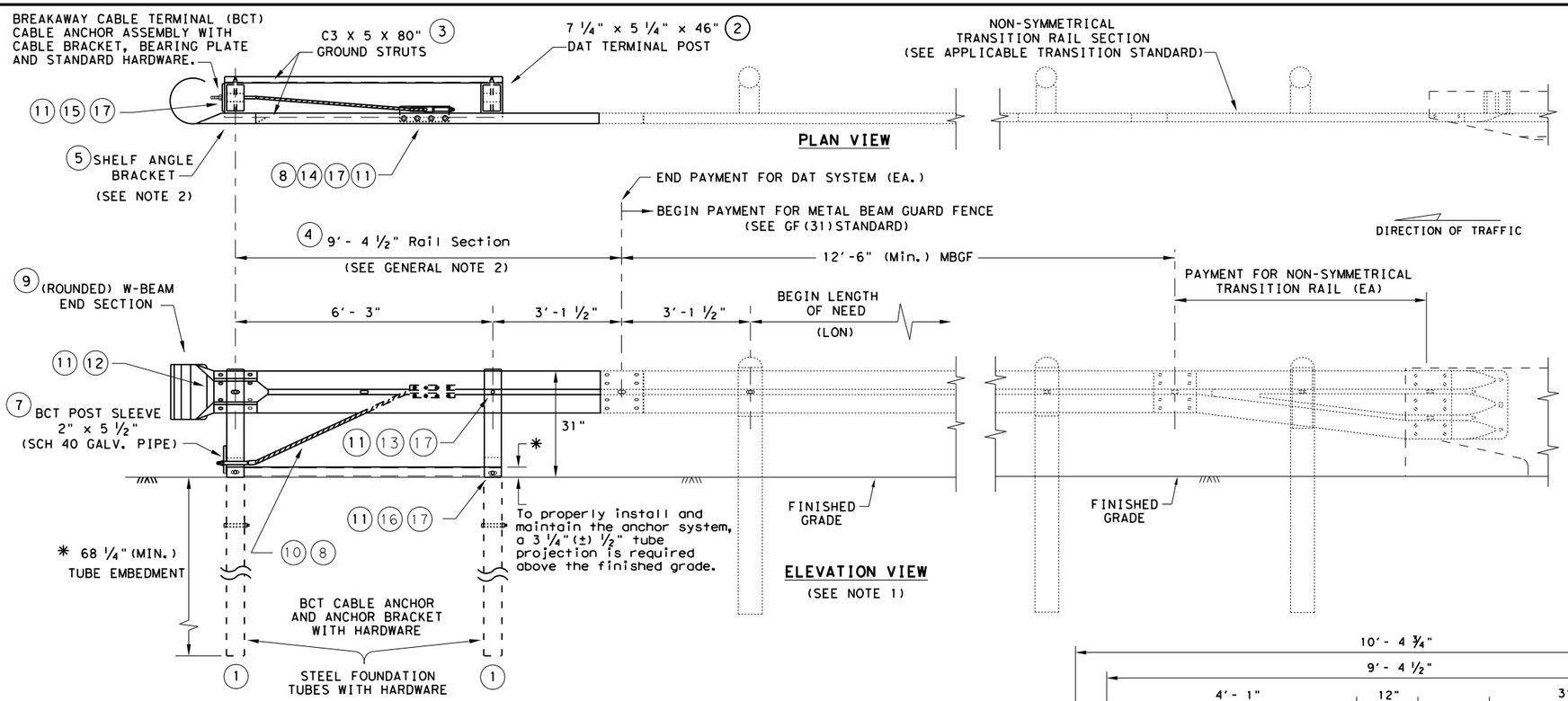
Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

FILE: gf31tr1219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		39

DATE: 11/12/2021
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\RDWY\gf31dat19.dgn



DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

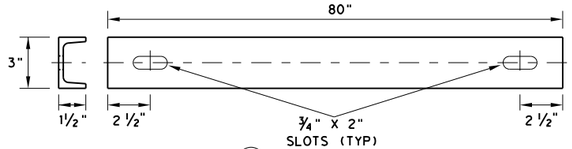
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

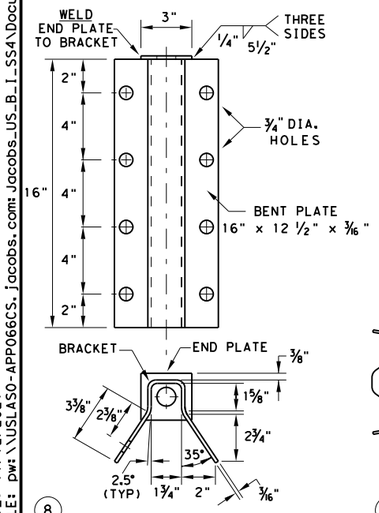
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

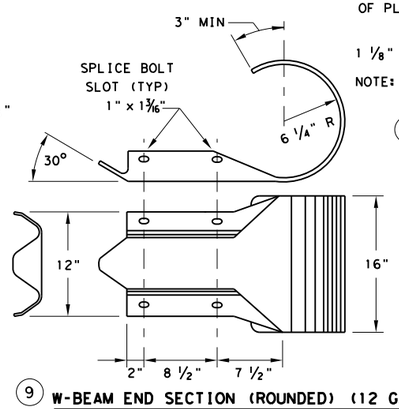
(4) TERMINAL RAIL ELEMENT FOR DAT



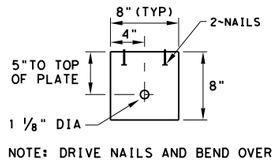
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

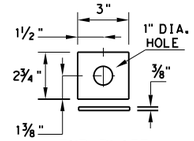


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

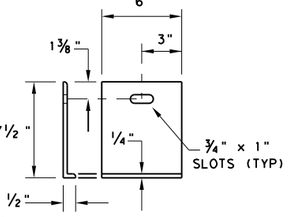


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

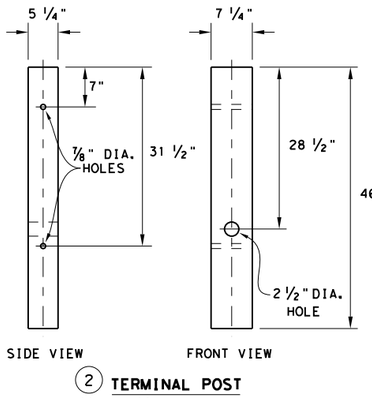
(6) BEARING PLATE
8"x 8"x 5/8" R



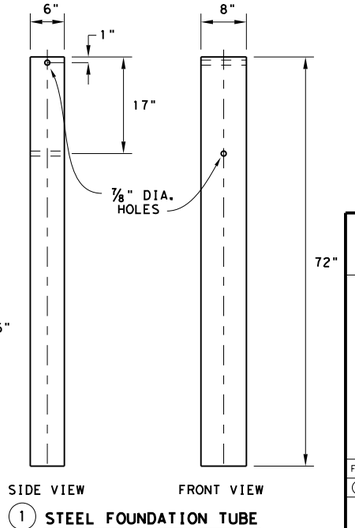
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

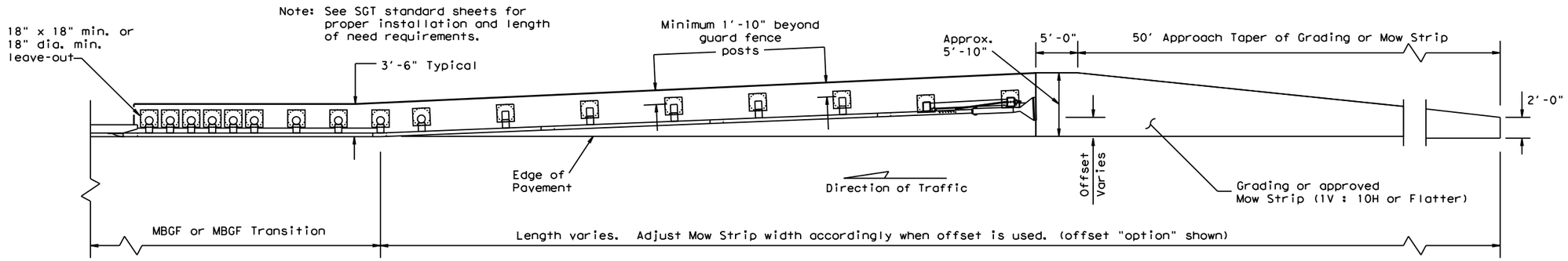
Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

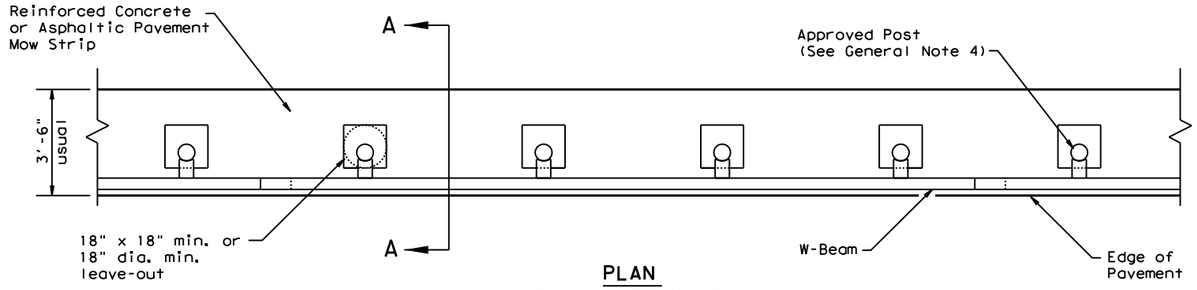
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		40

DATE: 11/12/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFXO5301_Walters_Street_Bridge\WFXO5301\700 CADD-Subs\STND\RDWY\gf31ms19.dgn

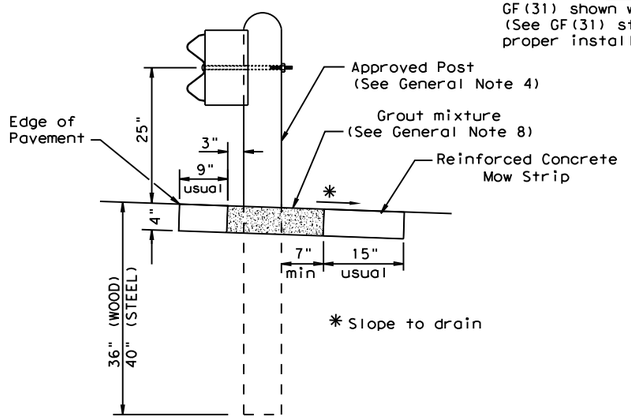


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



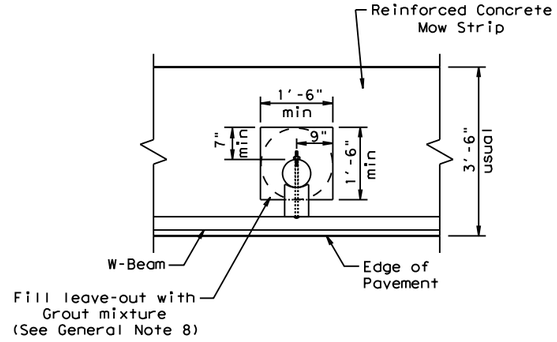
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



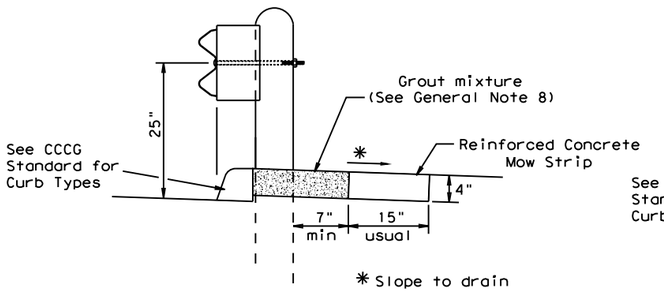
SECTION A-A

Typical



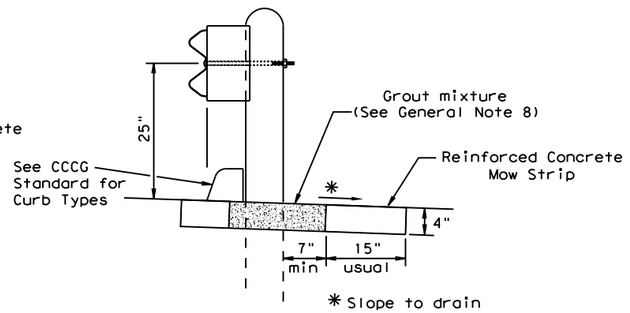
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



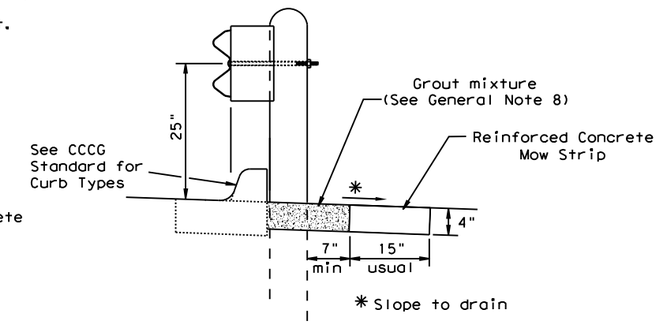
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

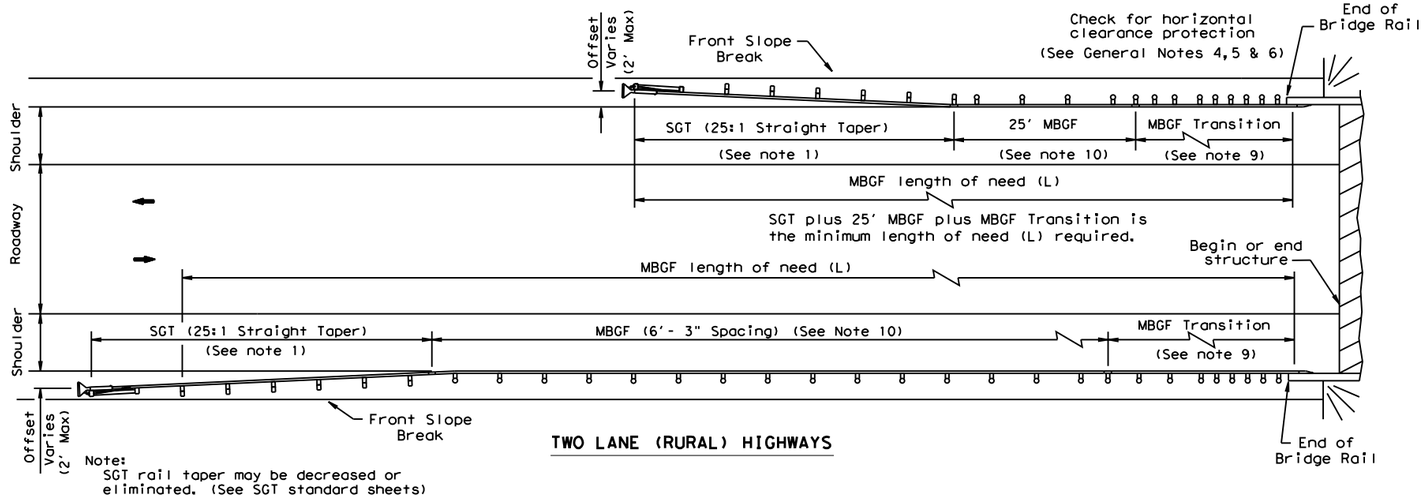
Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

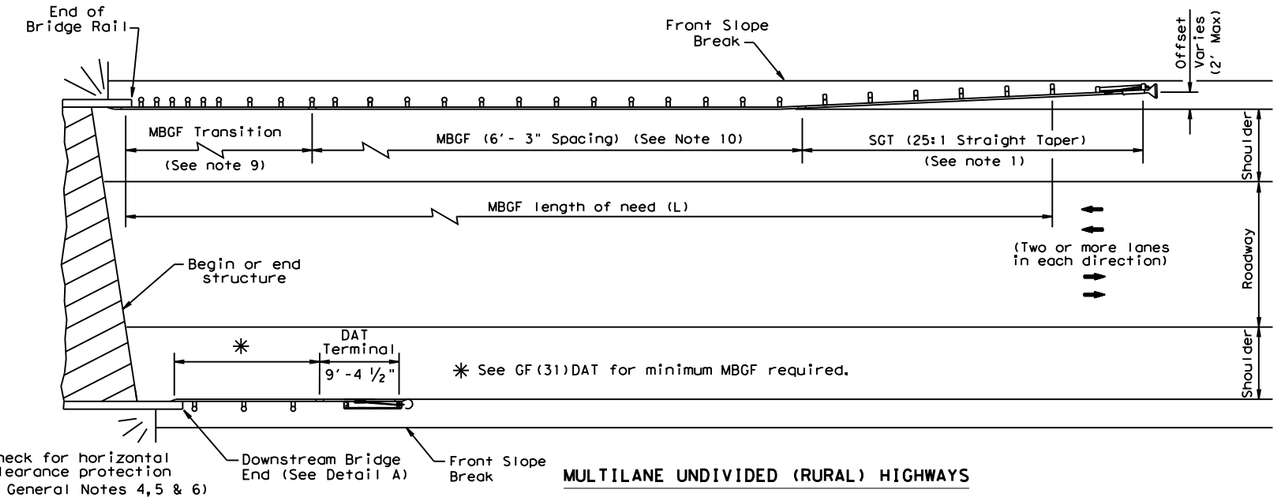
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		41

DATE: 11/12/2021 10:58:53 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFXO5301_Walters_Street_Bridge\WFXO5301\700 CADD-Subs\STND\RDWY\bed14.dgn

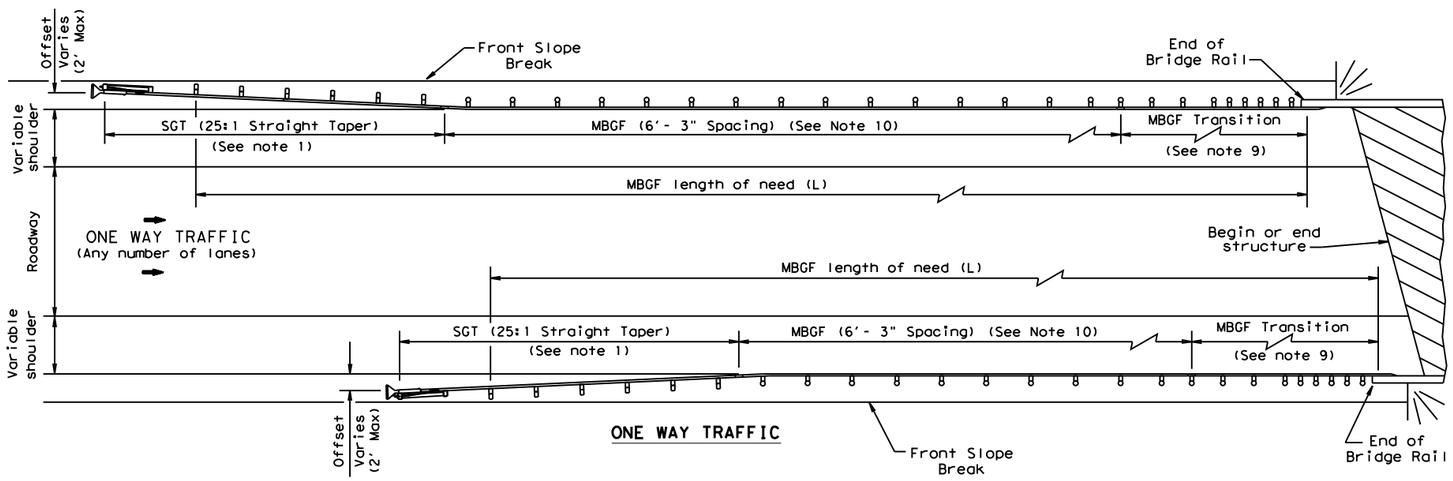


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



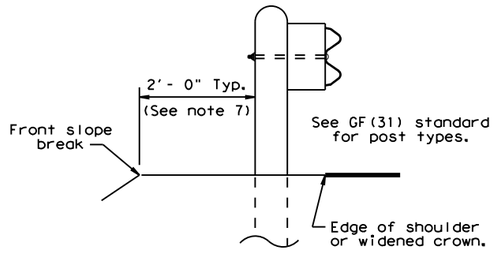
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft."maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF

Note:
All rail elements shall be lapped in the direction of adjacent traffic.

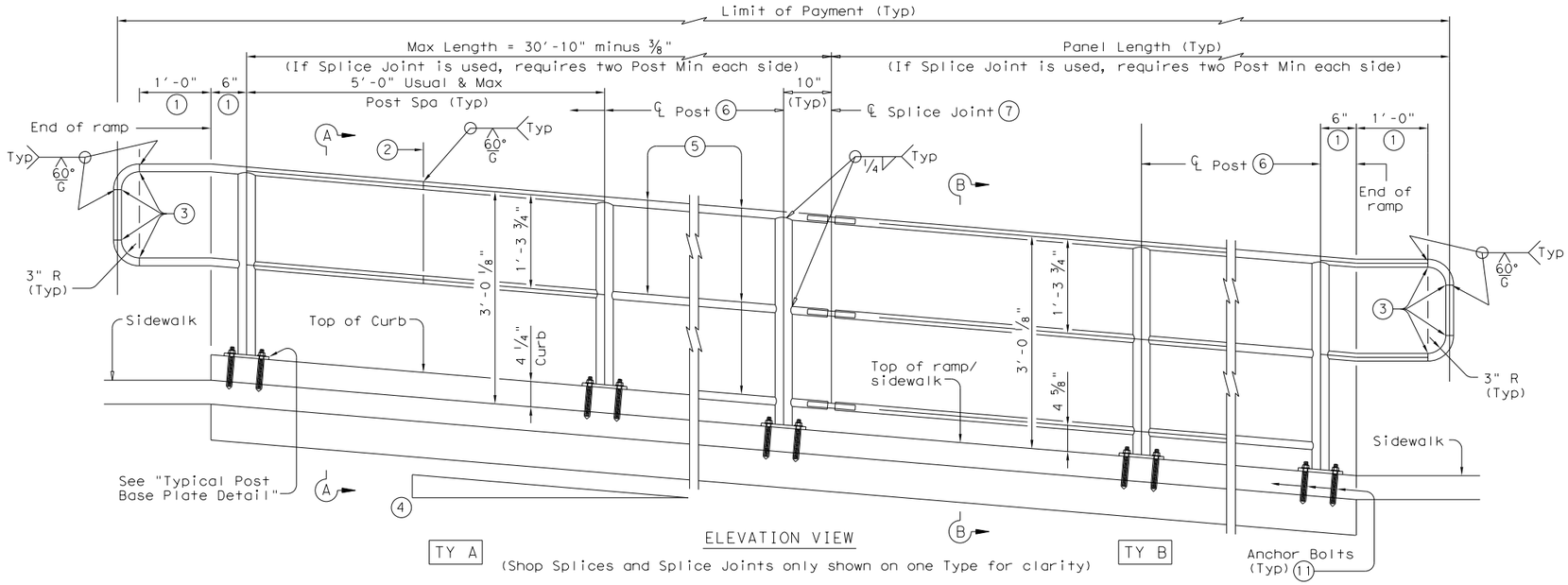
DETAIL A
Showing Downstream Rail Attachment

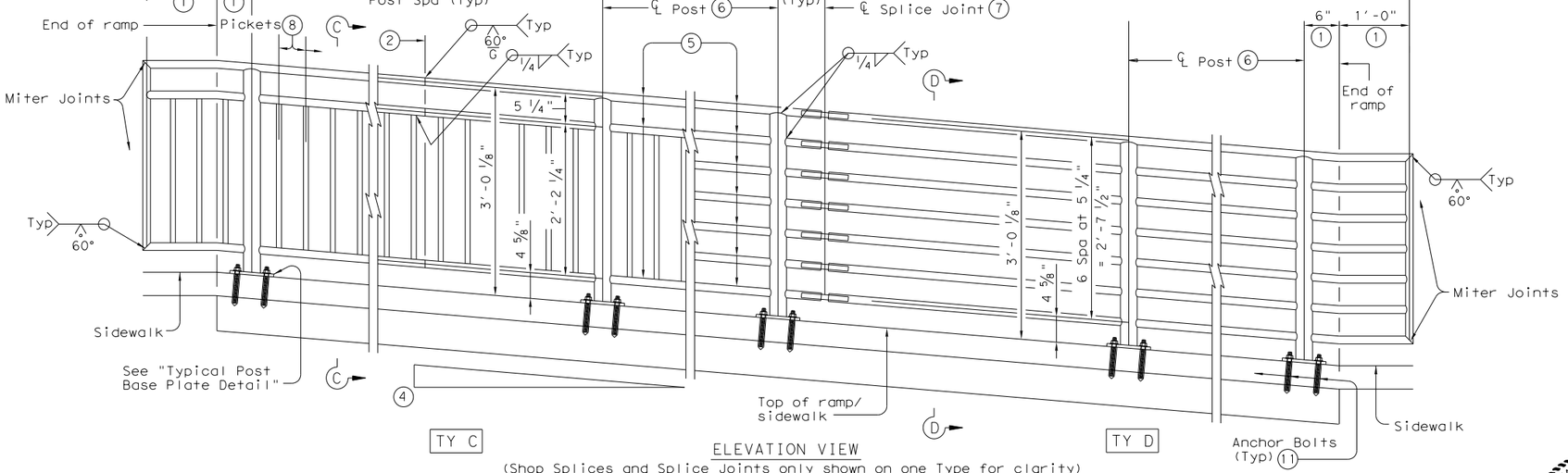
Texas Department of Transportation | Design Division Standard

BRIDGE END DETAILS
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)
BED-14

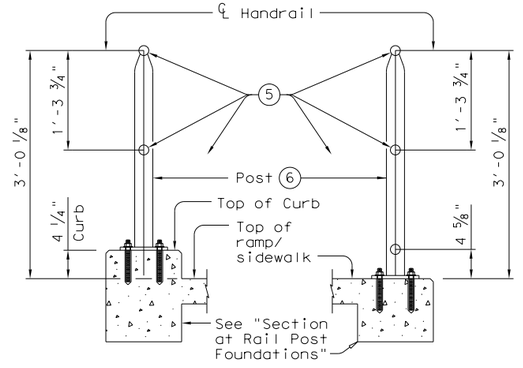
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		42

DATE: 11/16/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD\STND\RDWY\prd13(MOD).dgn



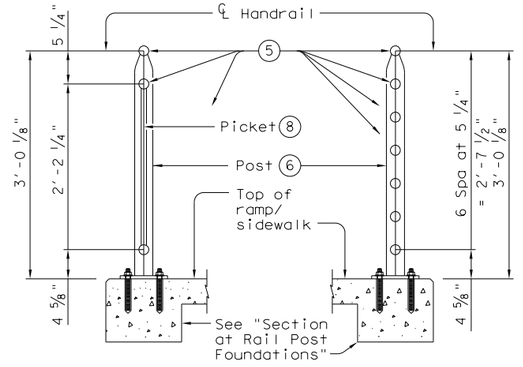


RECOMMENDED USAGE ⑨⑩	
Dropoff Height/ Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A
(Showing Handrail TY A)

SECTION B-B
(Showing Handrail TY B)



SECTION C-C
(Showing Handrail TY C)

SECTION D-D
(Showing Handrail TY D)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E.

Modified base plate so post is flush with edge of sidewalk and mount detail for sidewalk bridge.

SHEET 1 OF 3

Texas Department of Transportation

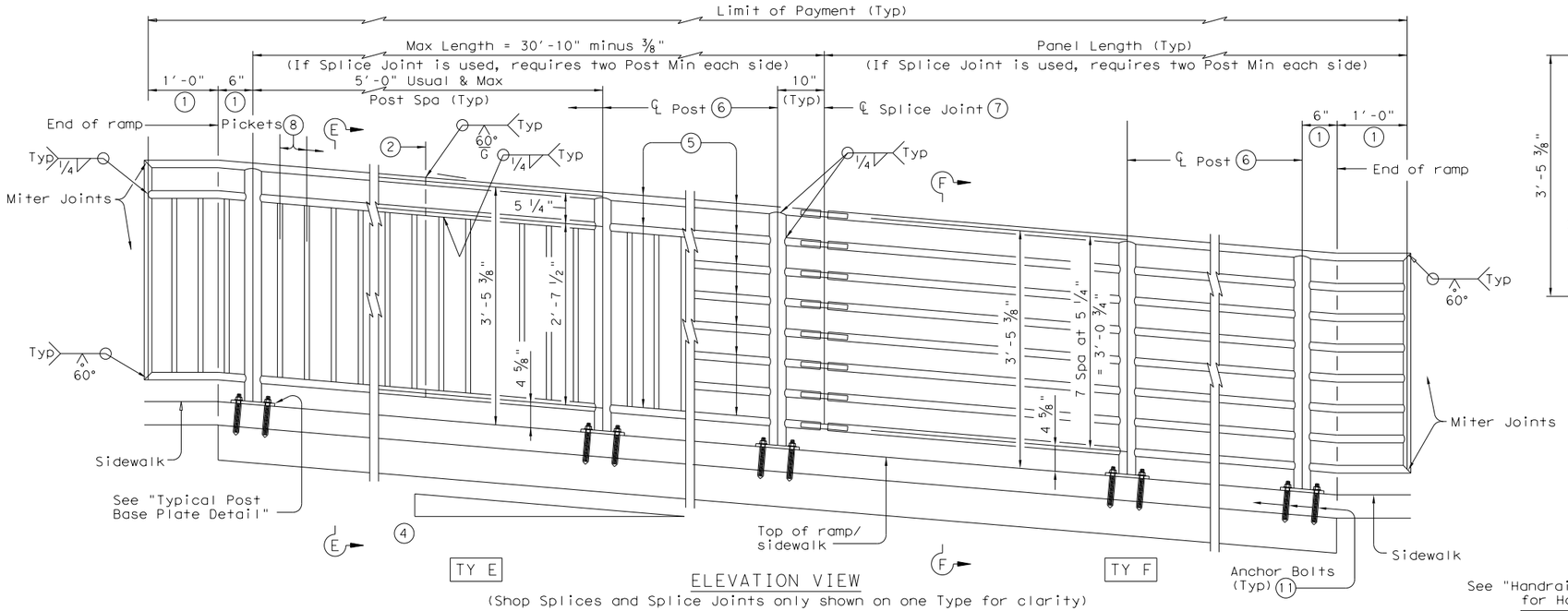
Design Division Standard

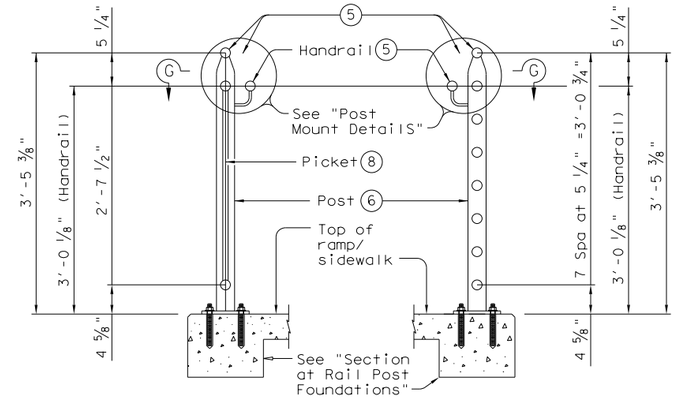
PEDESTRIAN HANDRAIL DETAILS

PRD-13 (MOD)

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT Decmeber 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		43

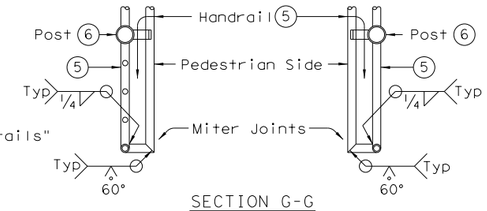
DATE: 11/16/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD\STND\ROWY\prd13(MOD).dgn





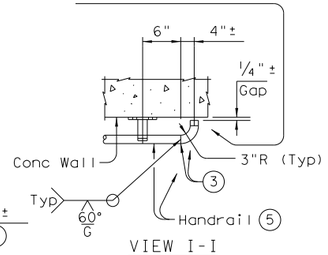
SECTION E-E
(Showing Handrail TY E)

SECTION F-F
(Showing Handrail TY F)

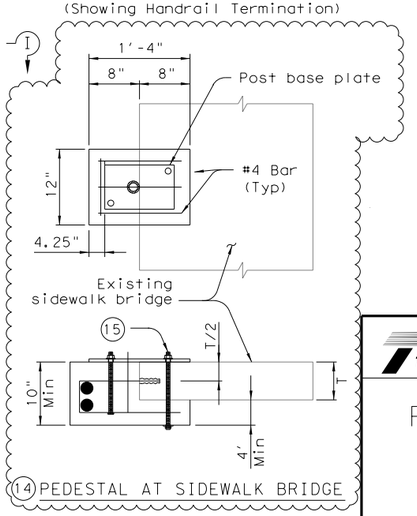


SECTION G-G
(Showing Handrail Termination)

See "Handrail Fabrication Details" for Handrail End Caps.

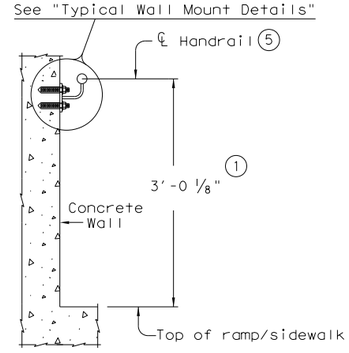


VIEW I-I
(Showing Handrail Termination)

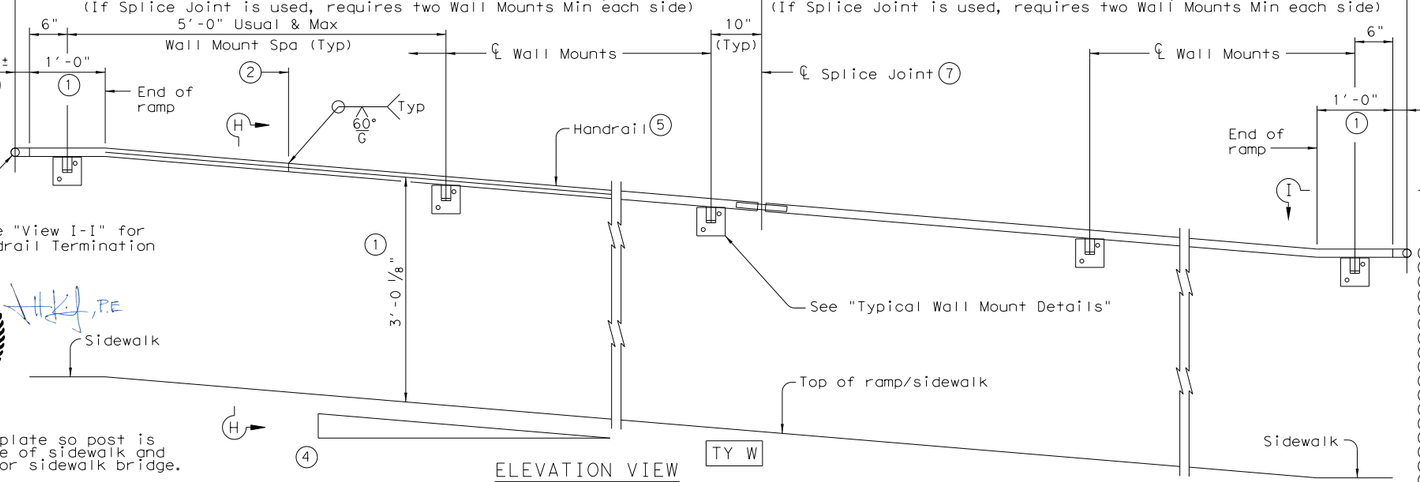


(14) PEDESTAL AT SIDEWALK BRIDGE

See "Typical Wall Mount Details"



SECTION H-H
(Showing Handrail TY W)



STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

Modified base plate so post is flush with edge of sidewalk and mount detail for sidewalk bridge.

(1) Parallel to ground.

(2) One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(3) Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(4) See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

(7) See "Handrail Fabrication Details" for Splice Joints.

(8) ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

(11) See "General Notes" for anchor bolt information.

(14) Use low viscosity, Type A material as per DMS 4655 " Concrete Repair Materials", provide adequate vibration. All reinforcing stell shown will be #4 with 2" of clear cover, adjust bar dimensions to accomodate the sidewalk slab thickness, to be measured in the field. Dowel reinforcing steel into the side of the sidewalk bridge 4", see General notes for epoxy.

(15) The threaded bolt length will be adjusted to accomodate the sidewalk bridge thickness, to the detail shown, add a washer on the bottom, this hardware will be galvanized. Cut projection flush with top of nut.

Texas Department of Transportation

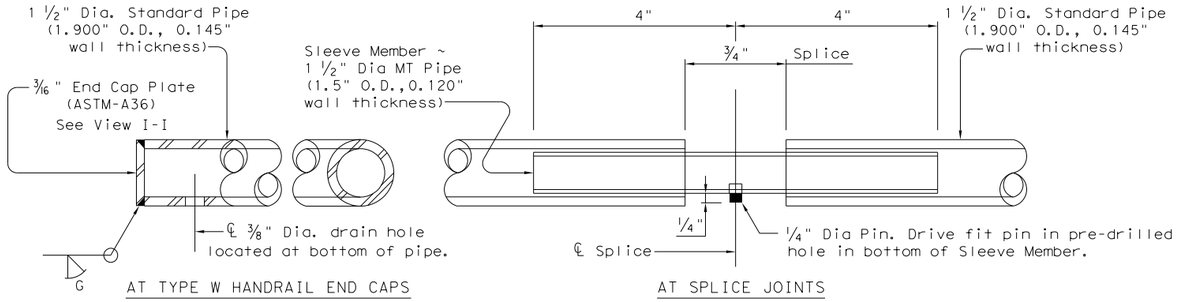
Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13 (MOD)

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		44

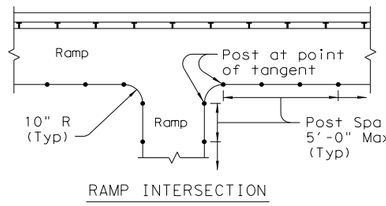
DATE: 11/16/2021
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_St



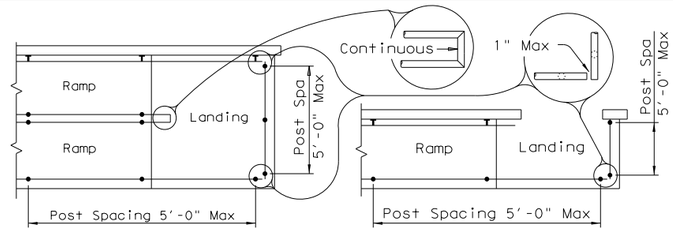
AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

HANDRAIL FABRICATION DETAILS



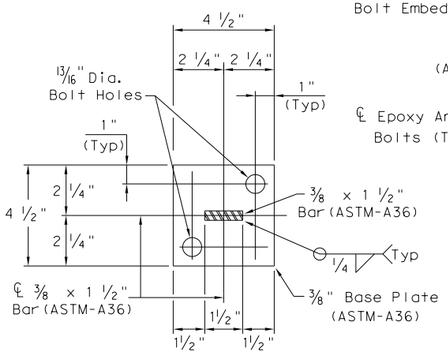
RAMP INTERSECTION



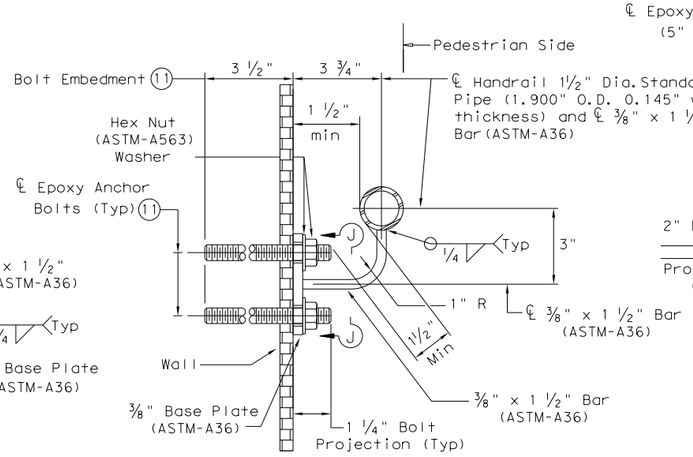
MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

PLAN SHOWING RAIL AT RAMP CONDITIONS

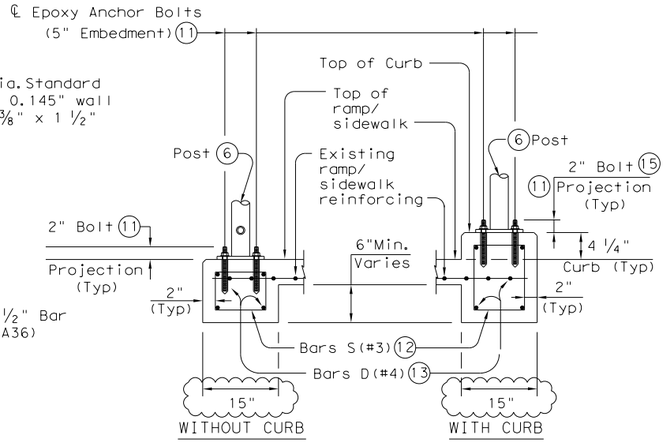


SECTION J-J
(Anchor Bolts not shown for clarity)



SECTION AT WALL MOUNT

TYPICAL WALL MOUNT DETAILS



(16) SECTION AT RAIL POST FOUNDATIONS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

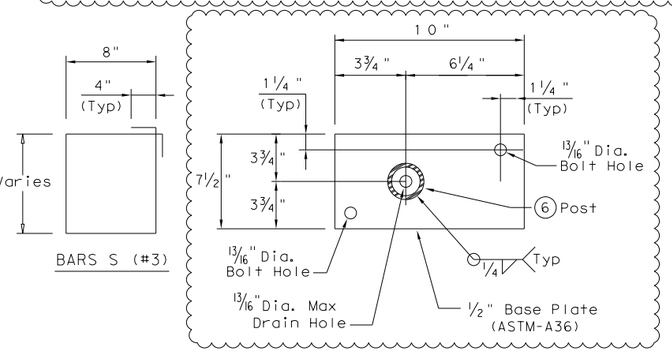
(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

(11) See "General Notes" for anchor bolt information.

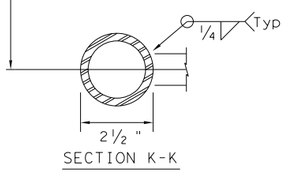
(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.

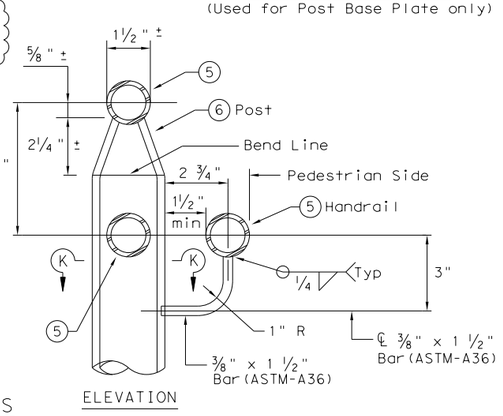
(16) Where foundation conflicts with existing sidewalk, saw cut and remove overlapping portion of sidewalk. Do not remove exisitng reinfircement, it may be cut and bent to permit excavation for the foundation and then bent back in place and tied into the foundation.



TYPICAL POST BASE PLATE DETAIL



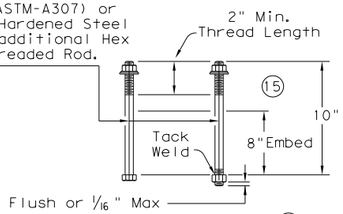
SECTION K-K



ELEVATION

POST MOUNT DETAILS

℄ ⅝" Dia. Hex Head Anchor Bolt (ASTM-A307) or Threaded Rod (ASTM-A36) with one Hardened Steel Washer placed under Hex Nut. One additional Hex Nut will be furnished for each Threaded Rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)

Modified base plate so post is flush with edge of sidewalk and mount detail for sidewalk bridge.

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13 (MOD)

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		45

DATE: 11/12/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\RDWY\sgt10s3116.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

BEGIN LENGTH OF NEED

PLAN VIEW

TRAFFIC FLOW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼"

3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT
(1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT
(2)1½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE: B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

SEE NOTE: C

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

31"

RAIL HEIGHT

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"x 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"x 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR. DH PN: 3245G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3

AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR. DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR. DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR. DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

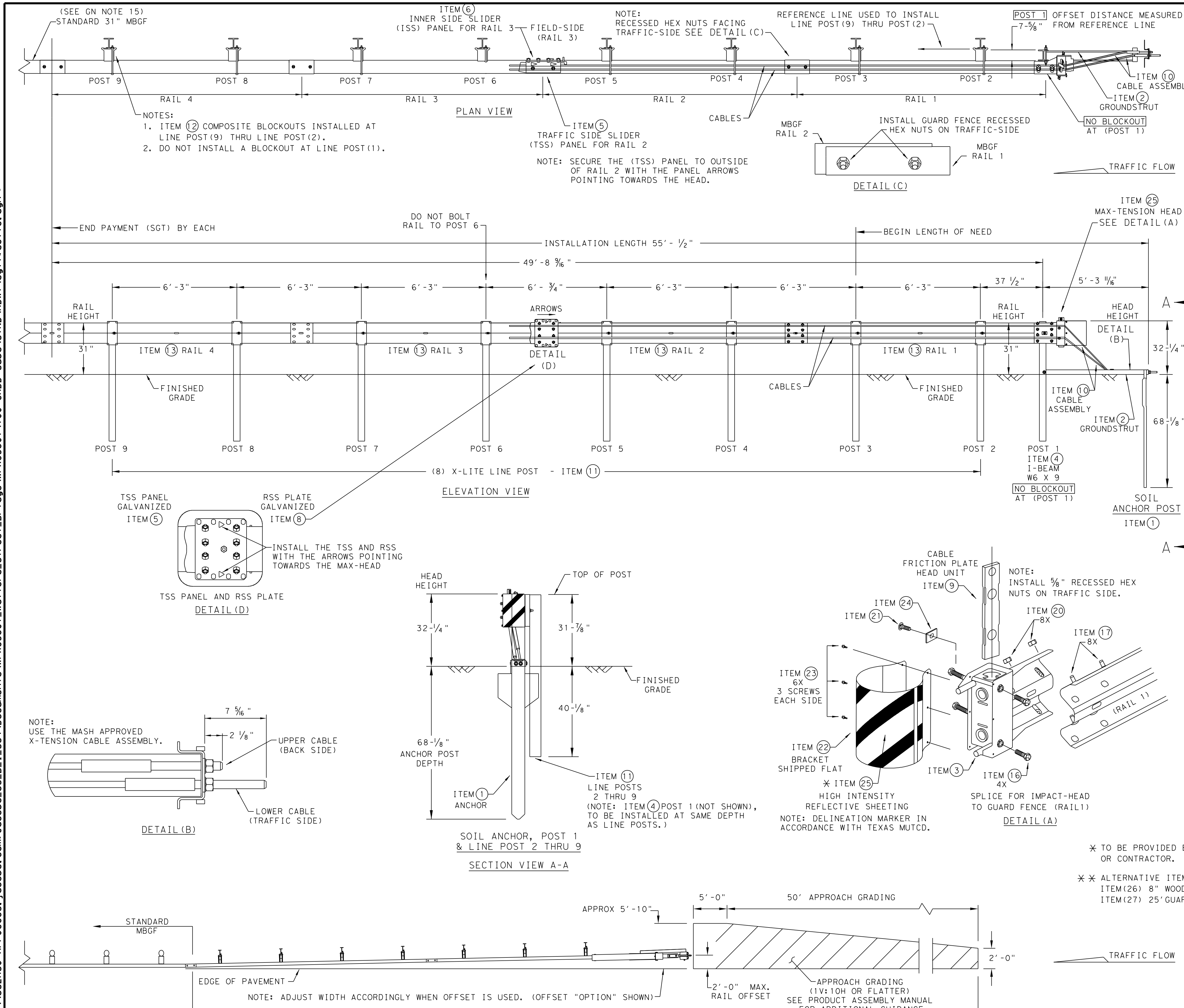
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0915	12	532	WALTERS ST	
	DIST	COUNTY		SHEET NO.	
	SAT	BEXAR		46	



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

	ITEM#	PART NUMBER	DESCRIPTION	QTY
	1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
	2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
	3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
	4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
	5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
	6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
	7	BSI-1610066-00	TOOTH - GEOMET	1
	8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
	9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
	10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
	11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
	12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
	13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
	14	BSI-1102027-00	X-LITE SQUARE WASHER	1
	15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
	16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
	17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
	18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
	19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
	20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
	21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
	22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
	23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
	24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
✱	25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
✱✱	26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
✱✱	27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
	28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

✱ TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

✱✱ ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25' GUARD FENCE PANELS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

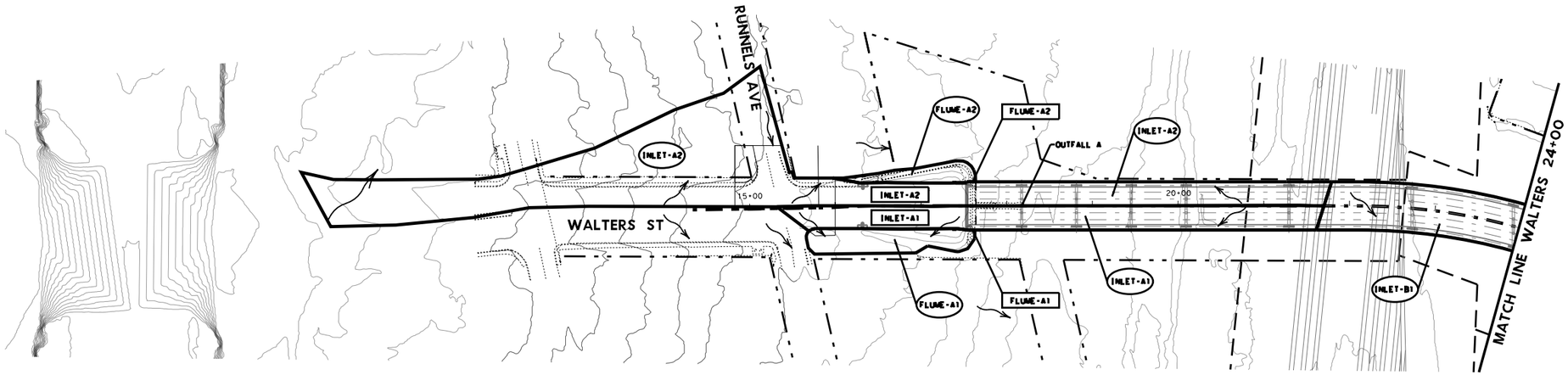
Texas Department of Transportation — Design Division Standard

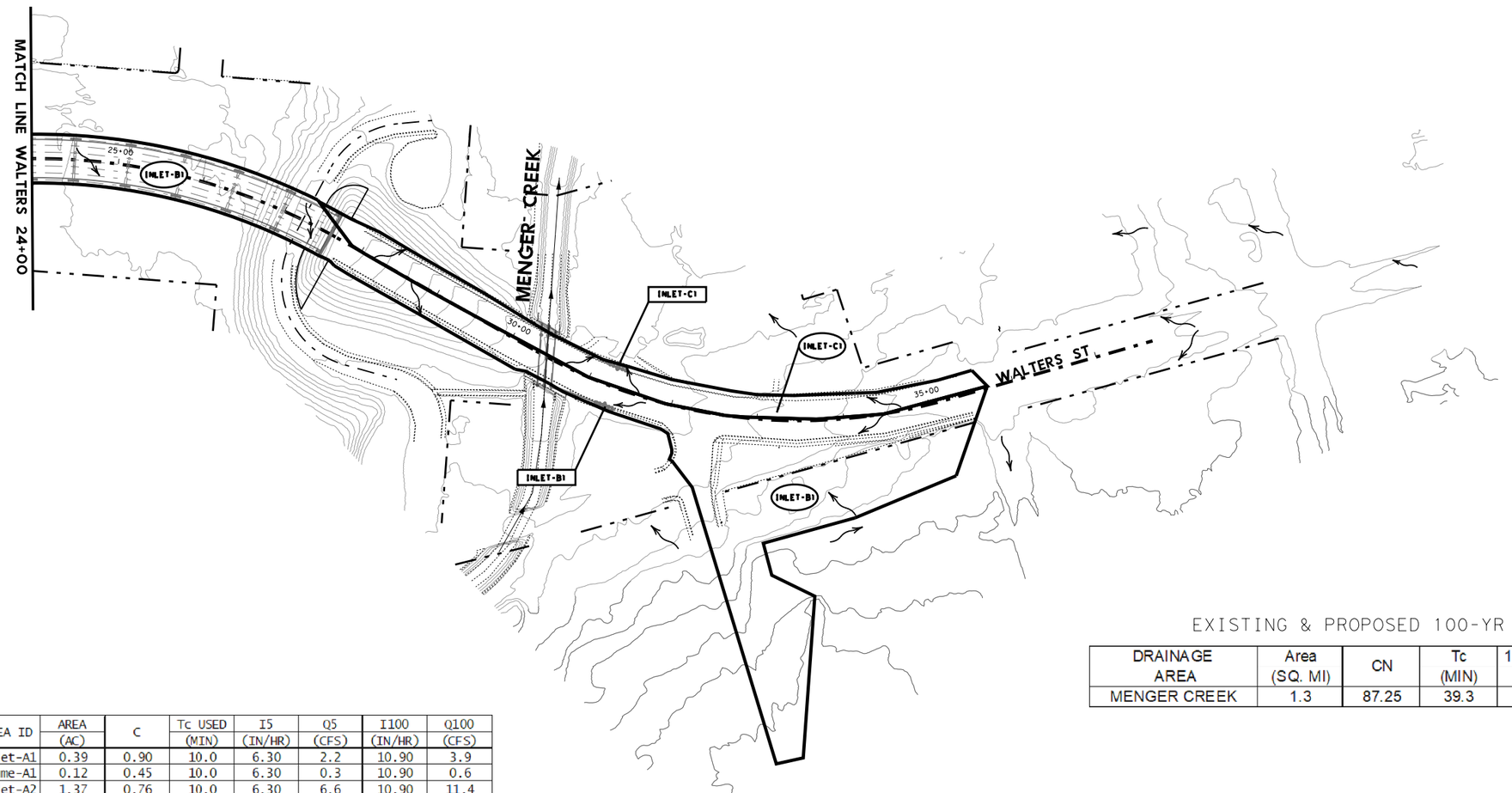
MAX-TENSION END TERMINAL MASH - TL-3

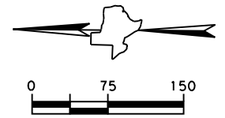
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	46A

DATE: 12/21/2021







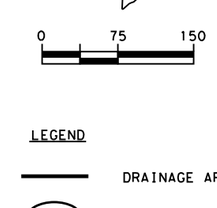
LEGEND

- DRAINAGE AREA BOUNDARY
- INLET-XX — DRAINAGE AREA ID
- INLET-XX — DRAINAGE NODE ID

AREA ID	AREA (AC)	C	Tc USED (MIN)	I5 (IN/HR)	Q5 (CFS)	I100 (IN/HR)	Q100 (CFS)
Inlet-A1	0.39	0.90	10.0	6.30	2.2	10.90	3.9
Flume-A1	0.12	0.45	10.0	6.30	0.3	10.90	0.6
Inlet-A2	1.37	0.76	10.0	6.30	6.6	10.90	11.4
Flume-A2	0.06	0.45	10.0	6.30	0.2	10.90	0.3
Inlet-B1	2.39	0.60	10.0	6.30	9.0	10.90	15.6
Inlet-C1	0.49	0.90	10.0	6.30	2.8	10.90	4.8

EXISTING & PROPOSED 100-YR

DRAINAGE AREA	Area (SQ. MI)	CN	Tc (MIN)	100YR-Q (CFS)
MENGER CREEK	1.3	87.25	39.3	3462



NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

DRAINAGE AREA MAP
BEGIN PROJECT TO END PROJECT

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	47
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\DRNG\0534_DA01.dgn
11/12/2021 10:59:33 AM

CURB INLETS - 5-YR

INLET ID	STATION	ALIGNMENT	TYPE	INLET DESCRIPTION	PROFILE TYPE	CURB LENGTH	PROFILE SLOPE (%)	CROSS SLOPE (%)	SPREAD MANNING'S N	DEPRESSION (FT)	5-YEAR DISCHARGE (CFS)	BY PASS (CFS)	BY PASS TO	ALLOWABLE PONDED WIDTH (FT)	ALLOWABLE PONDED DEPTH (FT)	PONDED DEPTH (FT)	NOTES
Inlet-A1	16+31.08	WALTERS	Curb	10' BACKLESS CURB INLET	Sag	11	N/A	2.4%	0.013	0.25	2.2	N/A	N/A	22.0	7.7	0.2	EXISTING TO REMAIN
Inlet-A2	16+32.60	WALTERS	Curb	10' BACKLESS CURB INLET	Sag	11	N/A	3.0%	0.013	0.25	6.6	N/A	N/A	22.0	12.2	0.4	EXISTING TO REMAIN
Inlet-B1	31+27.36	WALTERS	Curb	EXISTING CI	Sag	20	N/A	3.2%	0.013	0.25	10.7	N/A	N/A	22.0	10.8	0.4	EXISTING TO REMAIN
Inlet-C1	31+26.95	WALTERS	Curb	EXISTING CI	Sag	20	N/A	2.0%	0.013	0.25	2.8	N/A	N/A	22.0	7.4	0.1	EXISTING TO REMAIN

LINK CALCULATIONS - 5-YR

LINK ID	US NODE ID	DS NODE ID	US FL ELEV (FT)	US HGL (FT)	JUNCTION LOSS (FT)	DS FL ELEV (FT)	DS HGL (ft)	ACTUAL VELOCITY (FPS)	SIZE	NUMBER OF BARRELS	ACTUAL LENGTH (FT)	LINK SLOPE (%)	FRICTION SLOPE (%)	MANNING'S N	Tc CALCULATED (MIN)	Tc USED (MIN)	5-YEAR DISCHARGE (CFS)	CAPACITY (CFS)	NOTES
*Inlet-B1	Inlet-B1	Culvert-US	665.90	668.01	0.10	663.17	663.75	12.5	30" RCP	1	55	5.00	5.00	0.012	10.0	10.7	106.9	Pipe	EXISTING TO REMAIN
*Inlet-C1	Inlet-C1	Culvert-DS.1	665.88	667.71	0.01	661.00	661.27	9.9	30" RCP	1	71	6.91	6.90	0.012	10.0	2.8	125.6	Pipe	EXISTING TO REMAIN

* LINK SLOPES ARE ASSUMED FOR THE CALCULATIONS.

...\SHT\DRNG\0534_HYD01.dgn
11/12/2021 10:59:43 AM

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED
PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

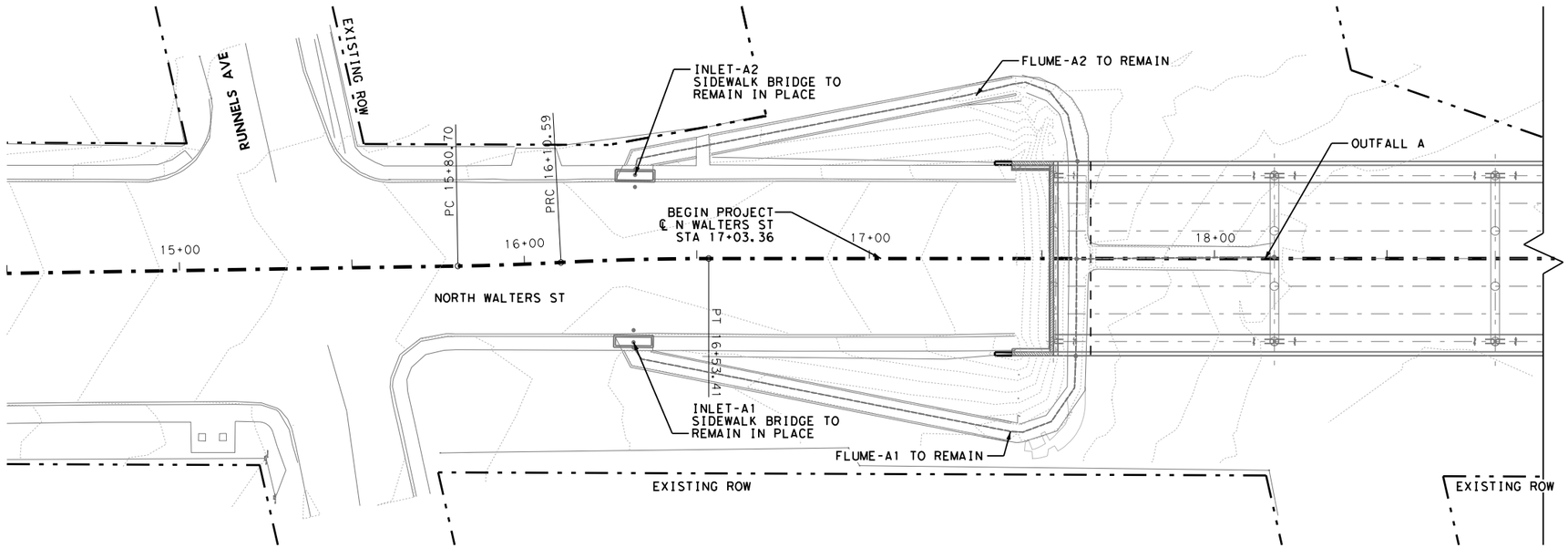
N WALTERS ST

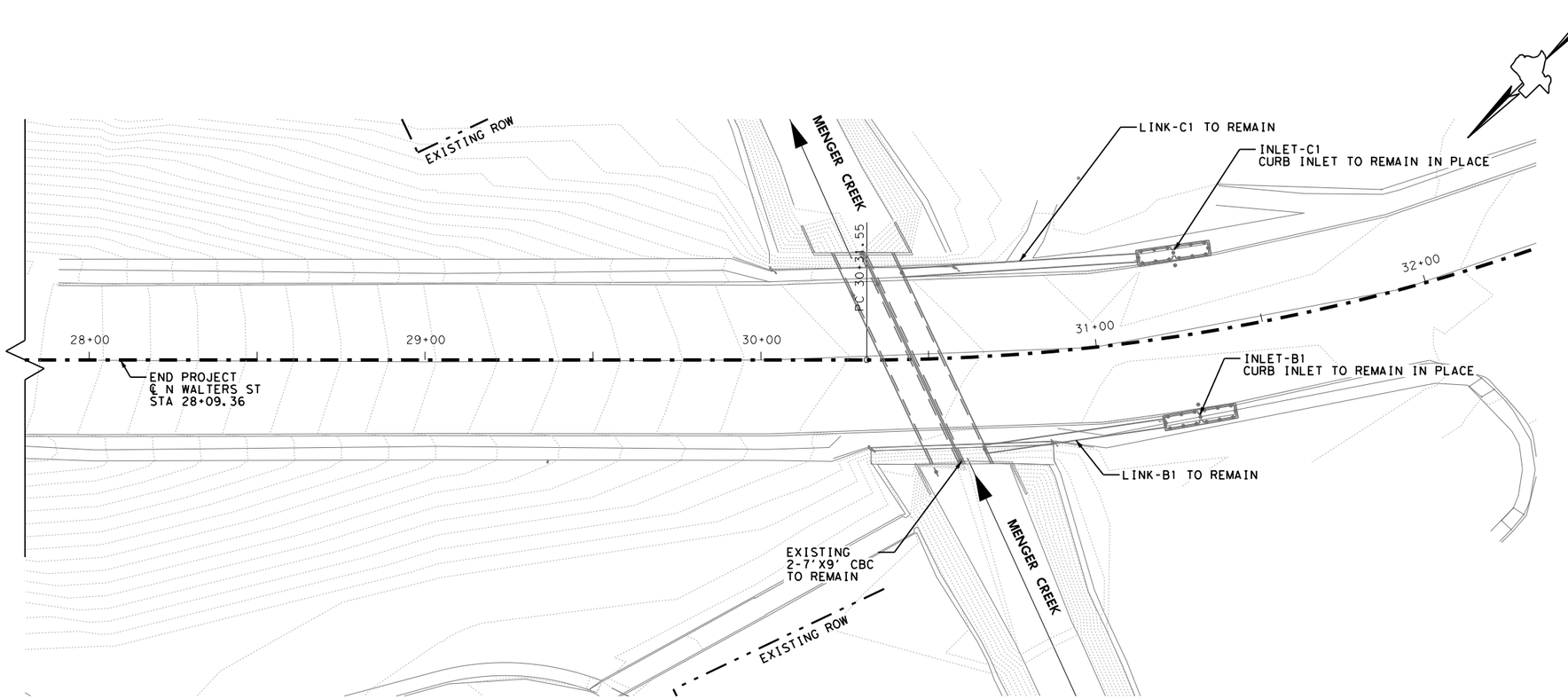
HYDRAULIC DATA SHEET

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	48
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION





0 10 20 40

1. THE CONTRACTOR SHALL PROTECT EXISTING INLETS TO REMAIN FROM BEING DAMAGED DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED INLET(S) AT ITS OWN COST.

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

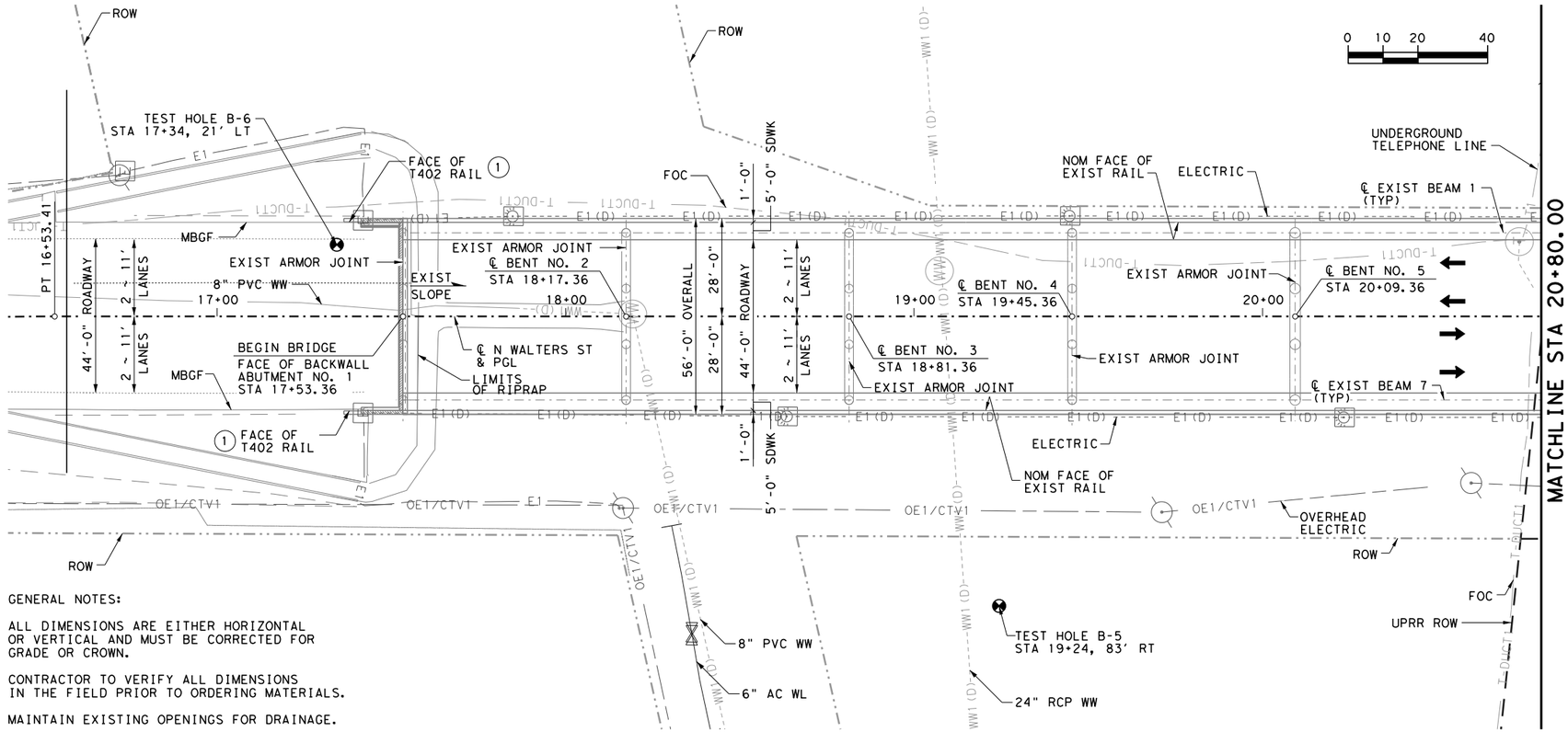
DRAINAGE LAYOUT

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	49
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\DRNG\0534_DRN01.dgn
11/12/2021 10:59:55 AM

(1) T402 RAIL TERMINAL CONNECTION PLACED ON TRF.



PLAN

GENERAL NOTES:

ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE OR CROWN.

CONTRACTOR TO VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.

MAINTAIN EXISTING OPENINGS FOR DRAINAGE.

HISTORICAL MARKER LOCATED AT ABUTMENT 1 WILL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION ACTIVITIES.

UPRR NOTES:
ALL PERMANENT CLEARANCES SHALL BE VERIFIED BEFORE PROJECT CLOSING.

THE CONTRACTOR MUST SUBMIT A PROPOSED METHOD OF EROSION AND SEDIMENT CONTROL AND HAVE THE METHOD APPROVED BY THE RAILROAD. (N/A)

REGARDLESS OF UNDERLYING LAND OWNERSHIP, ALL SHORING SYSTEMS WITHIN RAILROAD RIGHT-OF-WAY OR THAT MAY IMPACT THE RAILROAD'S OPERATIONS AND/OR SUPPORTS THE RAILROAD'S EMBANKMENT SHALL BE DESIGNED AND CONSTRUCTED PER CURRENT RAILROAD GUIDELINES FOR TEMPORARY SHORING. (N/A)

THE CONTRACTOR WILL SUBMIT AND PROVIDE SUFFICIENT SAFETY MEASURES TO PROTECT UNATTENDED EXCAVATIONS TO THE RAILROAD FOR APPROVAL. (N/A)

ALL DEMOLITIONS/REMOVALS WITHIN THE RAILROAD'S RIGHT-OF-WAY AND/OR THAT MAY IMPACT THE RAILROAD'S TRACKS OR OPERATIONS SHALL BE IN COMPLIANCE WITH THE CURRENT RAILROAD'S DEMOLITION GUIDELINES.

RAILROAD REQUIREMENTS DO NOT ALLOW WORK WITHIN 50 FEET OF TRACK CENTERLINE WHEN A TRAIN PASSES THE WORK SITE AND ALL PERSONNEL MUST CLEAR THE AREA WITHIN 25 FEET OF THE TRACK CENTERLINE AND SECURE ALL EQUIPMENT.

CALL BEFORE YOU DIG. PRIOIR TO EXCAVATING, DISRUPTING, OR WORKING ON THE RAILROAD PROPERTY THE CONTRACTOR SHALL LOCATE AND PROTECT UPRR "CALL BEFORE YOU DIG" (CYBD) PHONE NUMBER: 1-800-336-9193.

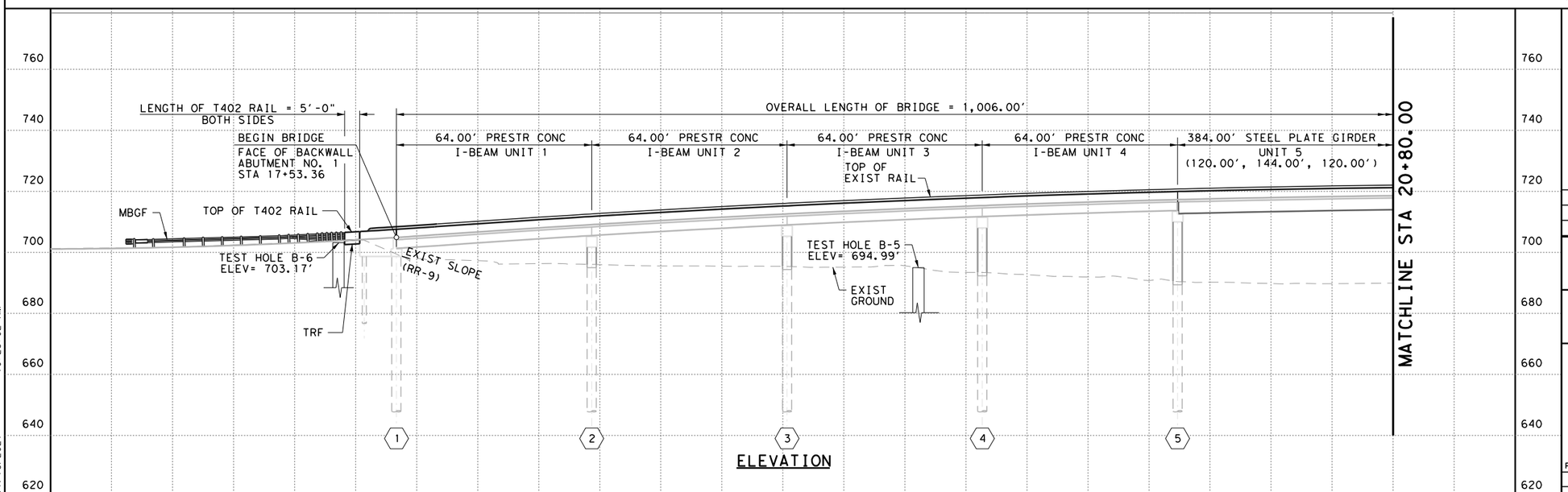
CONSTRUCTION ACTIVITIES, INCLUDING FALSEWORK/FORMWORK, ARE NOT ALLOWED WITHIN THE "MINIMUM CONSTRUCTION CLEARANCE ENVELOPE" AS THEY WOULD OTHERWISE DISRUPT RAILROAD OPERATIONS. (N/A)

NOTES PROVIDED ABOVE ARE STANDARD, THE SCOPE OF WORK FOR THIS PROJECT DO NOT INCLUDE ALL ACTIVITIES MENTIONED AND ARE DESIGNATED AS (N/A).

SEE "TYPICAL BRIDGE SECTION" FOR TYPICAL TRANSVERSE SECTION.

DESIGN SPEED: 30 MPH
FUNCTIONAL CLASS: URBAN MINOR ARTERIAL STREET
ADT: 13,293 (2019), 19,993 (2049)
NBI: 15-015-B360-85-001

HS20 LOADING (EXISTING DESIGN LOADING)



ELEVATION

STATE OF TEXAS
JON KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER
11/16/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

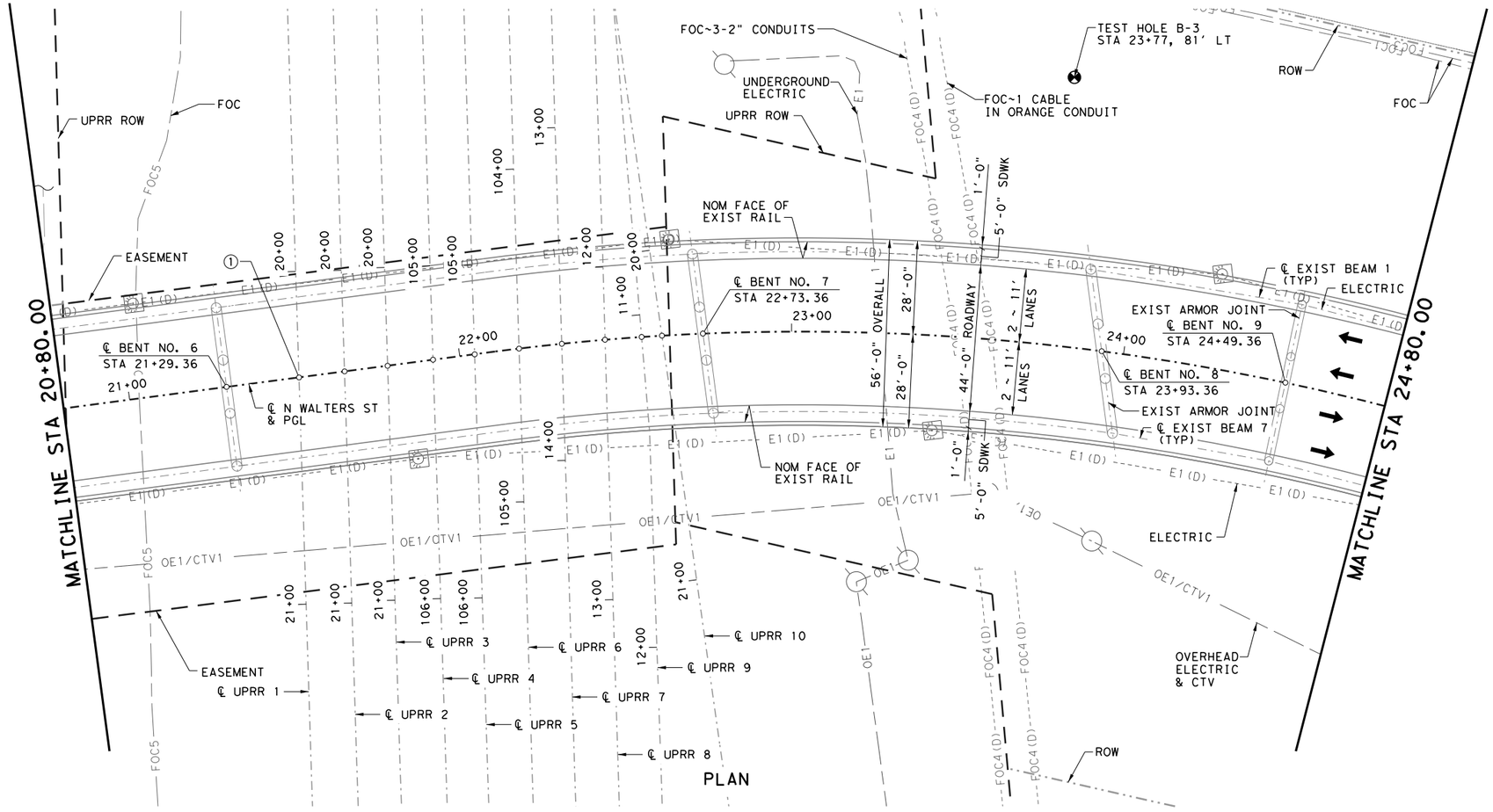
N WALTERS ST

BRIDGE LAYOUT
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 1 OF 3

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	50
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRLY01.dgn
11/16/2021 10:23:02 AM



PLAN

0 10 20 40

① N WALTERS ST ALIGNMENT INTERSECTIONS WITH UPRR TRACK ALIGNMENTS:

℄ N WALTERS STA 21+51.29
℄ UPRR 1 STA 20+31.83

℄ N WALTERS STA 21+65.08
℄ UPRR 2 STA 20+30.40

℄ N WALTERS STA 21+78.11
℄ UPRR 3 STA 20+29.53

℄ N WALTERS STA 21+91.89
℄ UPRR 4 STA 105+28.21

℄ N WALTERS STA 22+04.49
℄ UPRR 5 STA 105+26.78

℄ N WALTERS STA 22+17.94
℄ UPRR 6 STA 104+53.93

℄ N WALTERS STA 22+30.85
℄ UPRR 7 STA 13+64.96

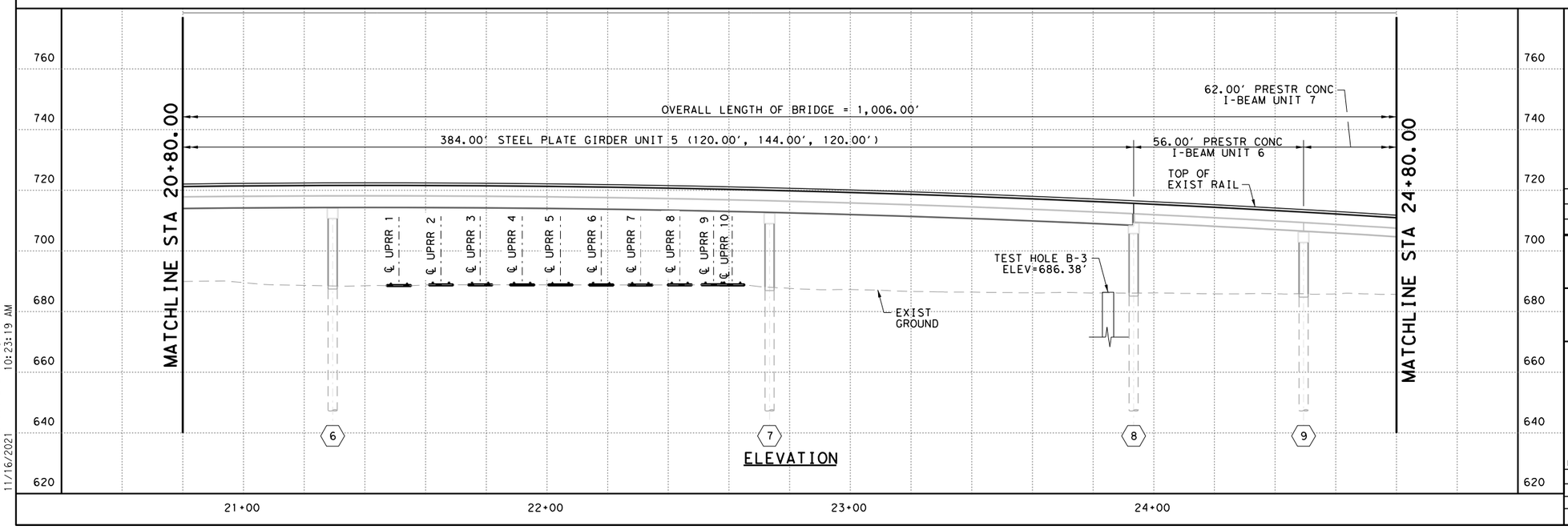
℄ N WALTERS STA 22+43.90
℄ UPRR 8 STA 12+21.88

℄ N WALTERS STA 22+54.91
℄ UPRR 9 STA 11+06.65

℄ N WALTERS STA 22+61.04
℄ UPRR 10 STA 20+25.92

SEE "TYPICAL BRIDGE SECTION" FOR TYPICAL TRANSVERSE SECTION.

HS20 LOADING (EXISTING DESIGN LOADING)



ELEVATION

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®
© 2022

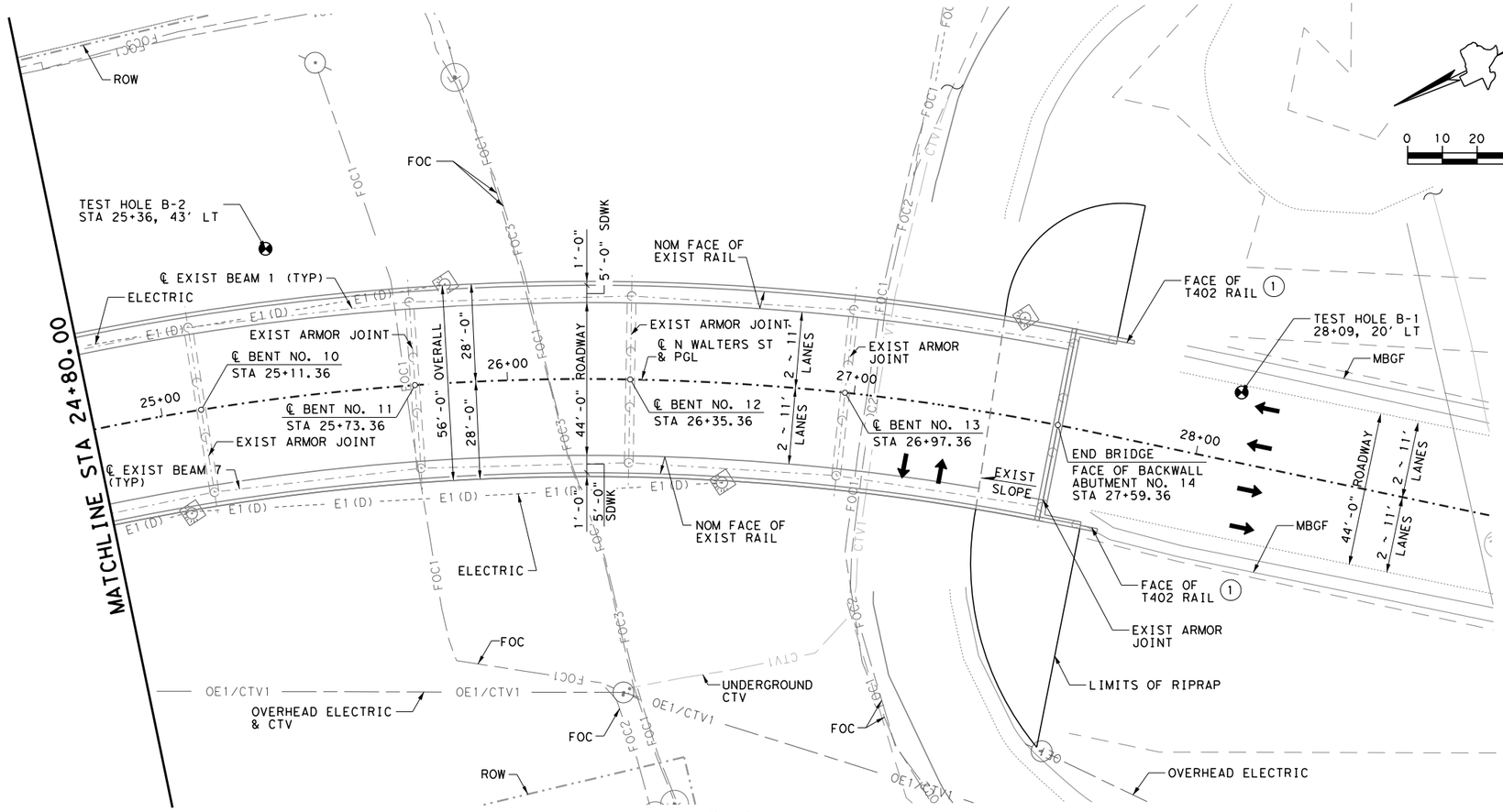
N WALTERS ST

BRIDGE LAYOUT
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 2 OF 3

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	51
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

..\SHT\BRG\5301BRLY02.dgn
11/16/2021 10:23:19 AM



PLAN

(1) T402 RAIL TERMINAL CONNECTION PLACED ON TRF.

UTILITY LEGEND

—T-DUCT1—	TDUCT - ATT
---WW1(D)---	WASTE WATER - SAWS
—FOC1—	FIBER OPTIC - ATT
—FOC2—	FIBER OPTIC - ZAYO
—FOC3—	FIBER OPTIC - WINDSTREAM
---FOC4(D)---	FIBER OPTIC - CENTURYLINK
—FOC5—	FIBER OPTIC - VERIZON BUSINESS
—OE1—	OVERHEAD ELECTRIC - CPS ENERGY
—OE1/CTV1—	OVERHEAD ELECTRIC/CTV - CPS ENERGY/CHARTER
—E1—	ELECTRIC - CPS ENERGY
---E1(D)---	ELECTRIC - CPS ENERGY
—CTV1—	FIBER OPTIC - CHARTER

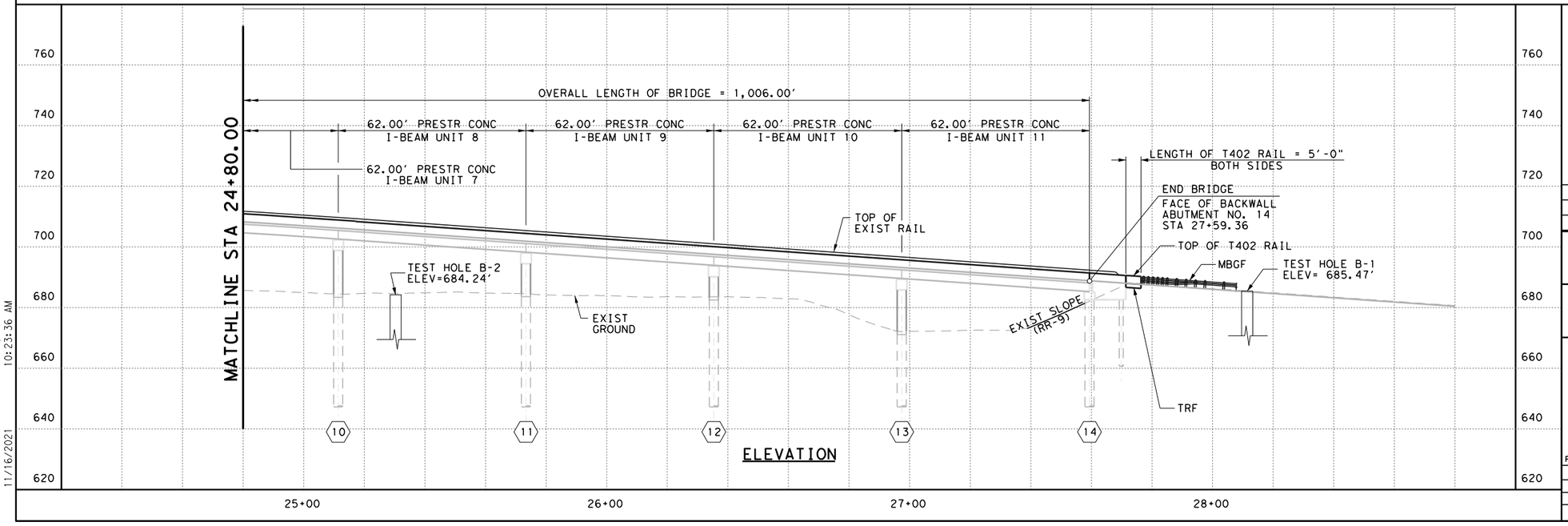
QUALITY LEVEL LEGEND

——WW1(B)——	QUALITY LEVEL "B"
------WW1(D)------	QUALITY LEVEL "D"
------WW1(C)------	QUALITY LEVEL "C"

TYPICAL FOR ALL UTILITIES

SEE "TYPICAL BRIDGE SECTION" FOR TYPICAL TRANSVERSE SECTION.

HS20 LOADING (EXISTING DESIGN LOADING)



ELEVATION

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, PE

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

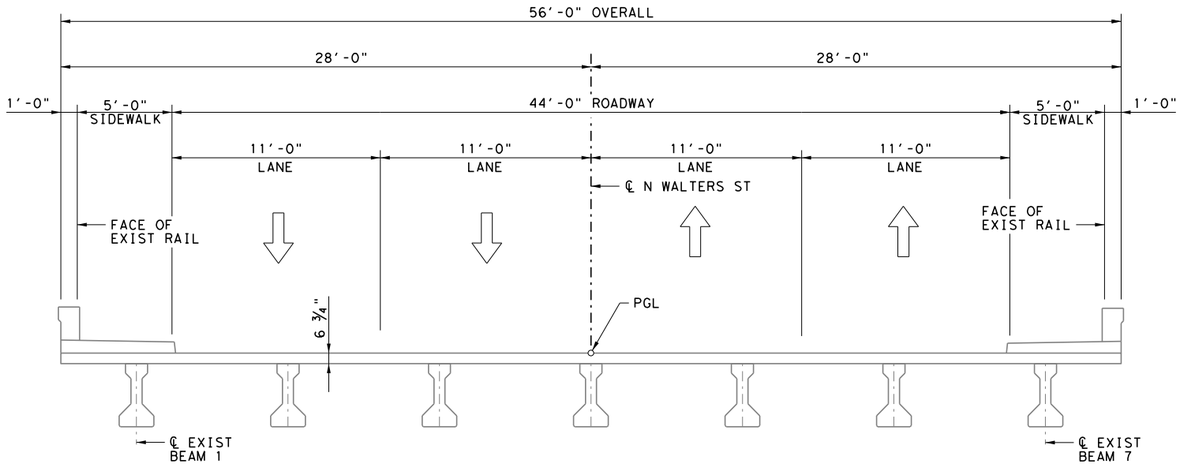
N WALTERS ST

BRIDGE LAYOUT
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 3 OF 3

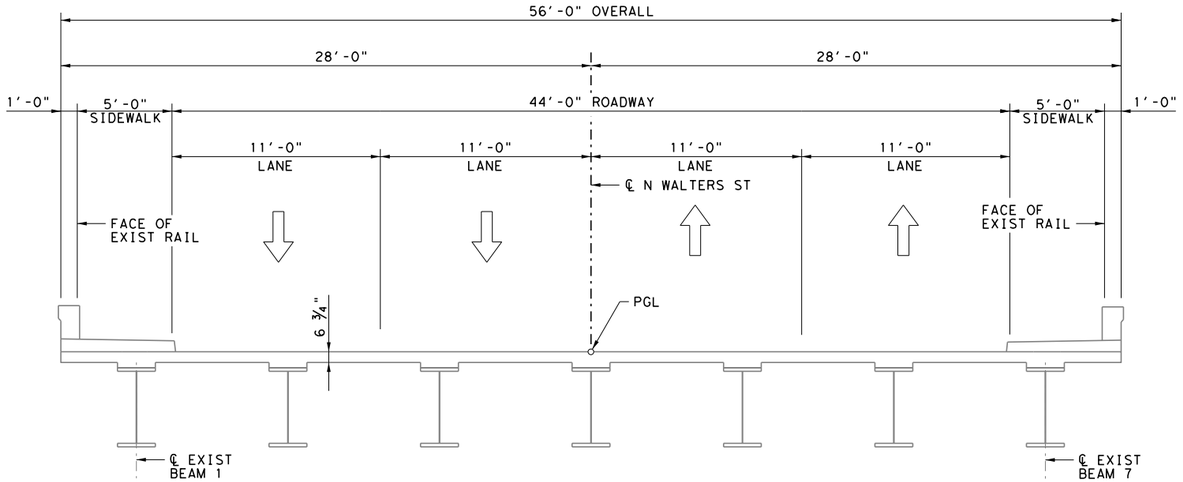
STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	52
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRLY03.dgn
11/16/2021 10:23:36 AM



TYPICAL SECTION - EXISTING

(PRESTR CONC BEAM UNITS SHOWN)



TYPICAL SECTION - EXISTING

(STEEL PLATE GIRDER UNITS SHOWN)

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®

JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

TYPICAL BRIDGE SECTIONS
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	53
SAT	BEXAR		N WALTERS ST	

..\SHT\BRGV5301BRCP01_69'.dgn
11/16/2021 10:23:55 AM

ESTIMATED QUANTITIES

BID ITEM NUMBER	104-6010	420-6066	429-6007	432-6001	434-6002	438-6001	439-6007	450-6010	483-6007	776-6046	784-6055	788-6001	SS 4171-6001
	REMOVING CONC (RIPRAP)	CL C CONC (RAIL FOUNDATION)	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC) (4 IN)	ELASTOMERIC BEARING (LAMINATED)	CLEANING & SEALING EXISTING JOINTS	LATEX-MOD CONC OVERLAY (2 IN)	RAIL (TY T402)	HYDRO-DEMOLITION (2 IN)	REPAIR METAL RAIL (C4) ①	REP STL BRIDGE MEMBER (ROCKER)	CONC BEAM REPAIR	STENCILING STRUCTURE NUMBERS
	CY	CY	SF	CY	EA	LF	SY	LF	SY	LF	EA	EA	EA
2 ~ ABUTMENTS	77			77		89							
12 ~ BENTS						447							
1 ~ 64.00' PRESTR CONC BEAM UNIT 1					14		313		313				
1 ~ 64.00' PRESTR CONC BEAM UNIT 2					14		313		313				
1 ~ 64.00' PRESTR CONC BEAM UNIT 3					14		313		313				
1 ~ 64.00' PRESTR CONC BEAM UNIT 4					14		313		313				
1 ~ 384.00' STEEL PLATE GIRDER UNIT 5							1,878		1,878		7		
1 ~ 56.00' PRESTR CONC BEAM UNIT 6					14		274		274				
1 ~ 62.00' PRESTR CONC BEAM UNIT 7					14		303		303				
1 ~ 62.00' PRESTR CONC BEAM UNIT 8					14		303		303				
1 ~ 62.00' PRESTR CONC BEAM UNIT 9					14		303		303				
1 ~ 62.00' PRESTR CONC BEAM UNIT 10					14		303		303				
1 ~ 62.00' PRESTR CONC BEAM UNIT 11					14		303		303				
TOTAL	77	2.7	200	77	140	536	4,919	20	4,919	100	7	20	2

① QUANTITIES OF RAIL REPAIR TO BE MEASURED IN THE FIELD.

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

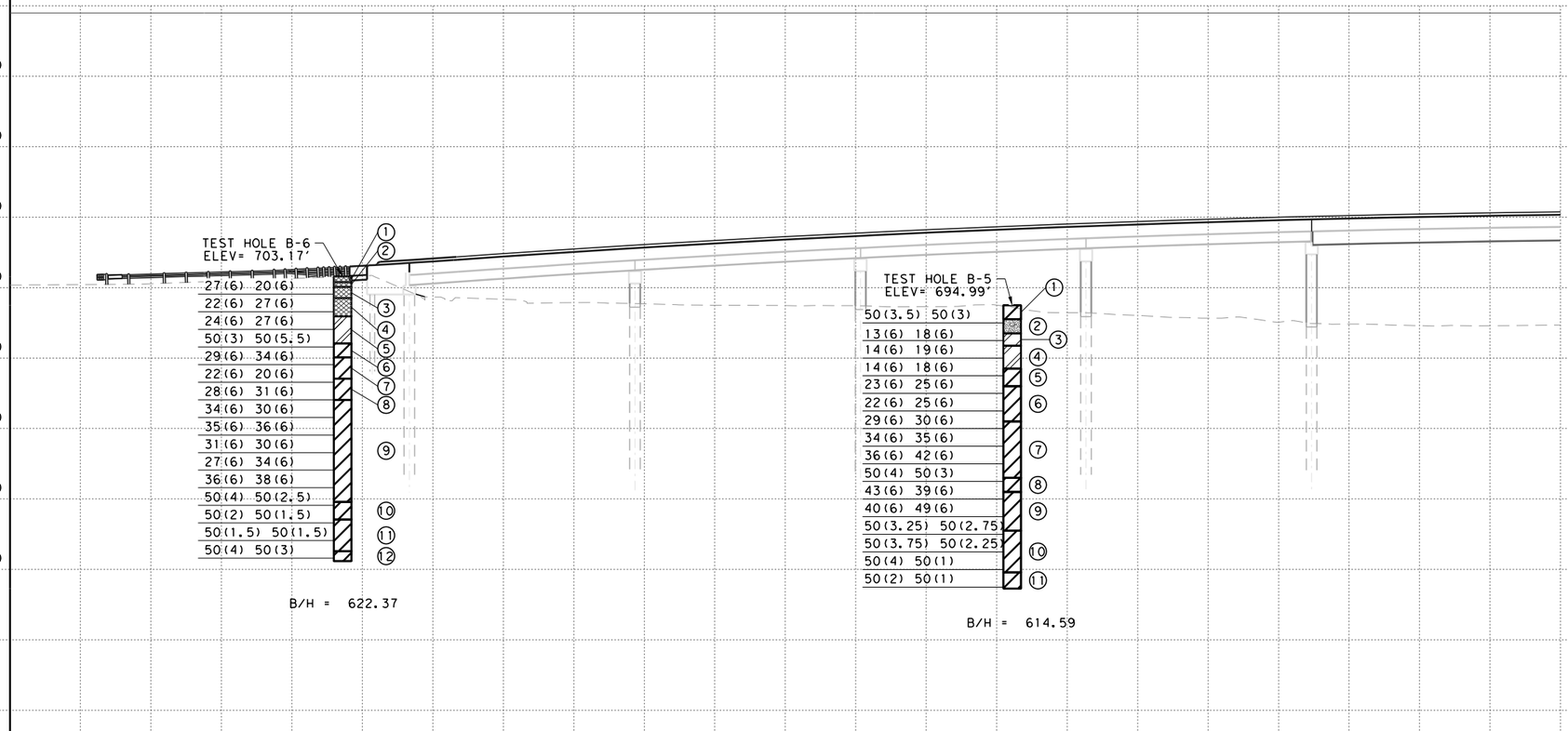
Texas Department of Transportation®

N WALTERS ST

ESTIMATED QUANTITIES
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	54
SAT	BEXAR		N WALTERS ST	



① ASPHALT (6.5 IN.) BASE (12.5 IN.)

② FILL, GRAVEL, Clayey with Sand(GC)

③ FILL, CLAY, Fat with Sand, very stiff, moist, dark brown, few Gravel (CH)

④ FILL, GRAVEL, Clayey with Sand, compact, dry to moist, dark brown to 8', gray and brown below 8.5', fine to coarse grained (GC)

⑤ CLAY, Lean, very stiff, moist, white to 13', white and brown below 16.5', mostly calcareous deposits to 13', some calcareous deposits below 16.5' (CL)

⑥ CLAY, Gravelly Fat, hard, moist, gray (CH)

⑦ CLAY, Fat, very stiff, moist, brown and gray, trace ferrous nodules (CH)

⑧ CLAY, Fat, very stiff, moist, brown and gray, trace ferrous nodules (CH)

⑨ CLAY, Fat, very stiff, moist, brown and gray, trace ferrous nodules to 40' (CH)

⑩ CLAY, Fat, hard, moist, brown and gray (CH)

⑪ CLAY, Fat, very hard, moist, gray (CH)

⑫ CLAY, Fat, hard, moist, gray (CH)

① CLAY, Fat, moist, dark brown, trace Gravel (CH)

② SAND, Clayey with Gravel, dense, dry, brown, fine to coarse grained (SC)

③ CLAY, Gravelly Lean, stiff, moist, light brown, few calcareous deposits (CL)

④ CLAY, Sandy Lean with Gravel, stiff, moist, light brown, trace ferrous nodules, trace calcareous deposits to 13' (CL)

⑤ CLAY, Fat, stiff, moist, gray and brown (CH)

⑥ CLAY, Fat, very stiff, moist, gray and brown (CH)

⑦ CLAY, Fat, very stiff, moist, gray and brown (CH)

⑧ CLAY, Fat, hard, moist, gray and brown, trace Gypsum crystals below 50.7' (CH)

⑨ CLAY, Fat, hard, moist, gray and brown (CH)

⑩ CLAY, Fat, hard, moist, gray (CH)

⑪ CLAY, Fat, very hard, moist, gray (CH)

TEST HOLE DATA PROVIDED BY,
CORSAIR CONSULTING LLC.
REPORT NO. 1700539, 12/11/2018

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®
© 2022

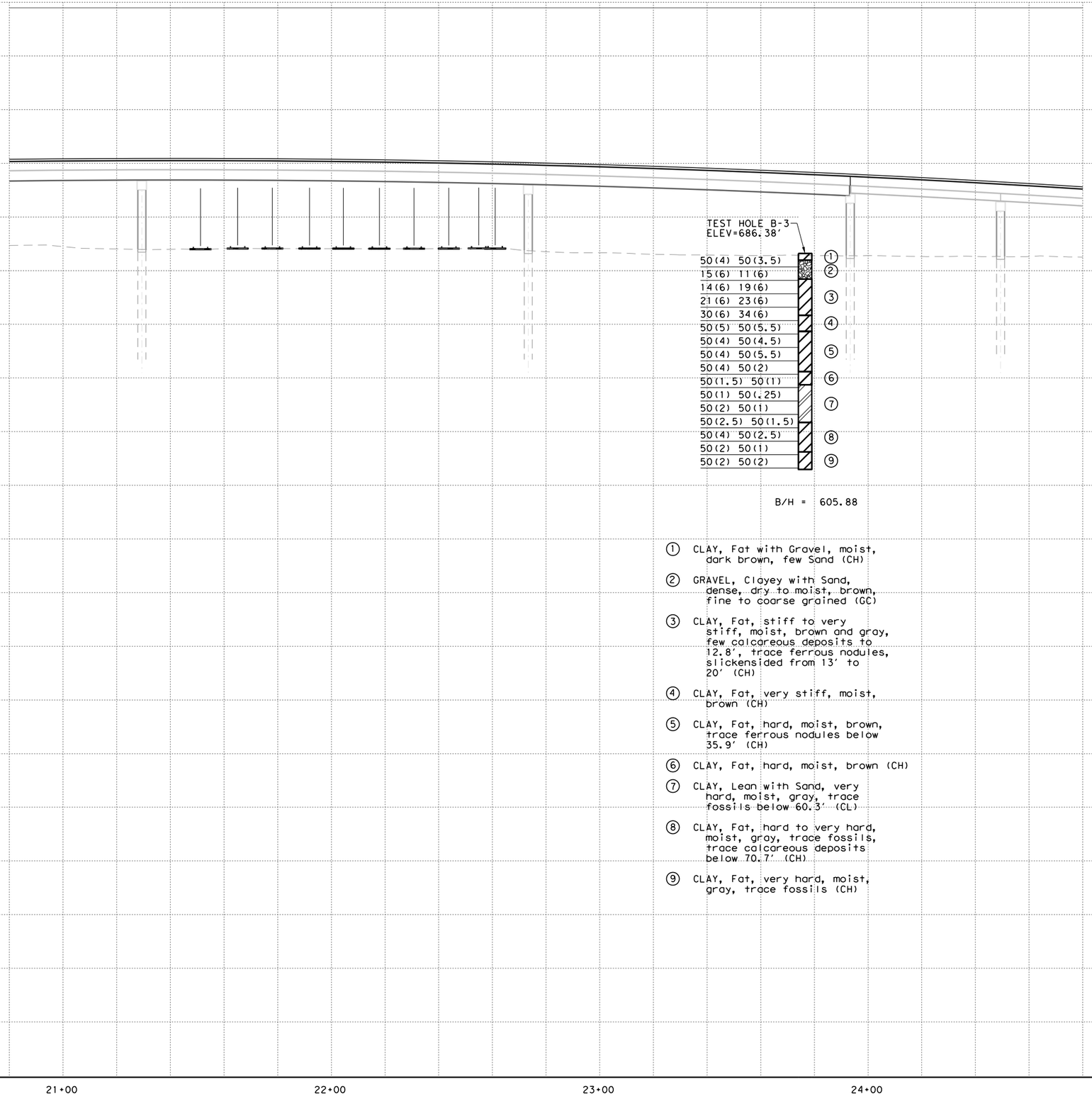
N WALTERS ST

TEST HOLE DATA
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 1 OF 3

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	55
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRTH01.dgn
11/16/2021 10:24:33 AM



① CLAY, Fat with Gravel, moist, dark brown, few Sand (CH)

② GRAVEL, Clayey with Sand, dense, dry to moist, brown, fine to coarse grained (GC)

③ CLAY, Fat, stiff to very stiff, moist, brown and gray, few calcareous deposits to 12.8', trace ferrous nodules, slickensided from 13' to 20' (CH)

④ CLAY, Fat, very stiff, moist, brown (CH)

⑤ CLAY, Fat, hard, moist, brown, trace ferrous nodules below 35.9' (CH)

⑥ CLAY, Fat, hard, moist, brown (CH)

⑦ CLAY, Lean with Sand, very hard, moist, gray, trace fossils below 60.3' (CL)

⑧ CLAY, Fat, hard to very hard, moist, gray, trace fossils, trace calcareous deposits below 70.7' (CH)

⑨ CLAY, Fat, very hard, moist, gray, trace fossils (CH)

TEST HOLE DATA PROVIDED BY,
CORSAIR CONSULTING LLC.
REPORT NO. 1700539, 12/11/2018

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®
© 2022

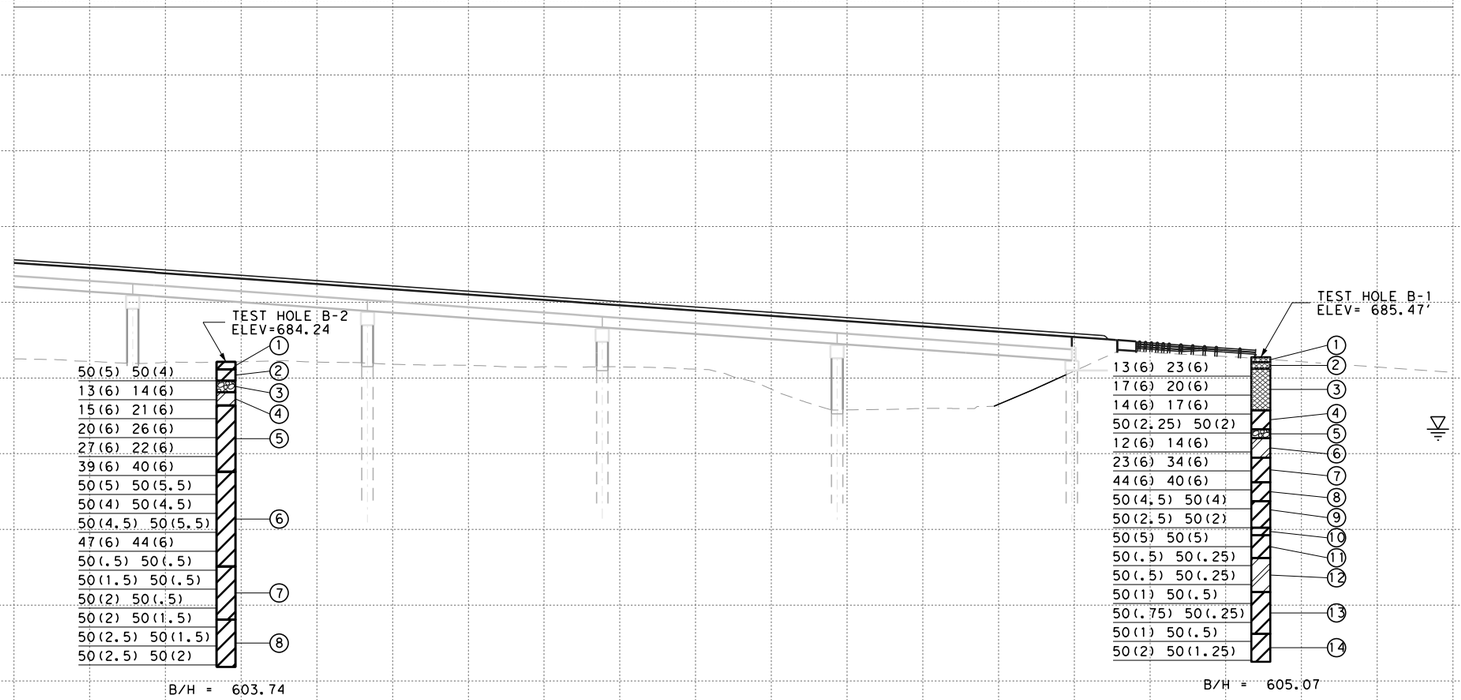
N WALTERS ST

TEST HOLE DATA
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 2 OF 3

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	56
SAT	BEXAR		N WALTERS ST	

..\SHT\BRG\5301BRTH02.dgn
11/16/2021 10:24:53 AM



① CLAY, Sandy Fat, moist, dark brown, traces Gravel and roots (CH)

② CLAY, Fat, moist, dark brown, trace calcareous deposits to 4' (CH)

③ GRAVEL, Silty with Sand, dense, dry, brown, fine to coarse grained (GM)

④ CLAY, Lean, moist, stiff, white and light brown, mostly calcareous deposits (CL)

⑤ CLAY, Fat, stiff to very stiff, moist, light brown and gray to 22.9', light brown below 26.4', slickensided from 13' to 15', trace ferrous nodules to 20' (CH)

⑥ CLAY, Fat, very stiff to hard, moist, light brown to 42.4', brown below 46', trace ferrous nodules below 46' (CH)

⑦ CLAY, Lean, very hard, dry to moist, gray, trace fossils below 65.3' (CH)

⑧ CLAY, Fat, very hard, moist, gray, trace fossils (CH)

① ASPHALT (5 IN.), BASE (11 IN.)

② FILL, CLAY, Sandy Fat, moist (CH)

③ FILL, GRAVEL, Clayey with Sand, slightly compact, moist, dark brown, fine to coarse grained (GC)

④ CLAY, Fat with Sand, stiff, moist, dark brown (CH)

⑤ GRAVEL, Clayey, very dense, wet, gray, fine to coarse grained (GC)

⑥ CLAY, Lean with Sand, stiff, moist, light brown, few calcareous deposits (CL)

⑦ CLAY, Fat, very stiff, moist, brown and gray (CH)

⑧ CLAY, Fat, hard, moist, brown (CH)

⑨ CLAY, Fat, hard, moist, brown and gray (CH)

⑩ CLAY, Fat, very hard, moist, brown and gray (CH)

⑪ CLAY, Fat, hard, moist, brown and gray, trace Gypsum crystals (CH)

⑫ CLAY, Lean, very hard, dry to moist, gray, trace fossils (CL)

⑬ CLAY, Fat with Sand, very hard, dry to moist, gray, trace fossils (CH)

⑭ CLAY, Fat, very hard, moist, gray (CH)

TEST HOLE DATA PROVIDED BY,
CORSAIR CONSULTING LLC.
REPORT NO. 1700539, 12/11/2018

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

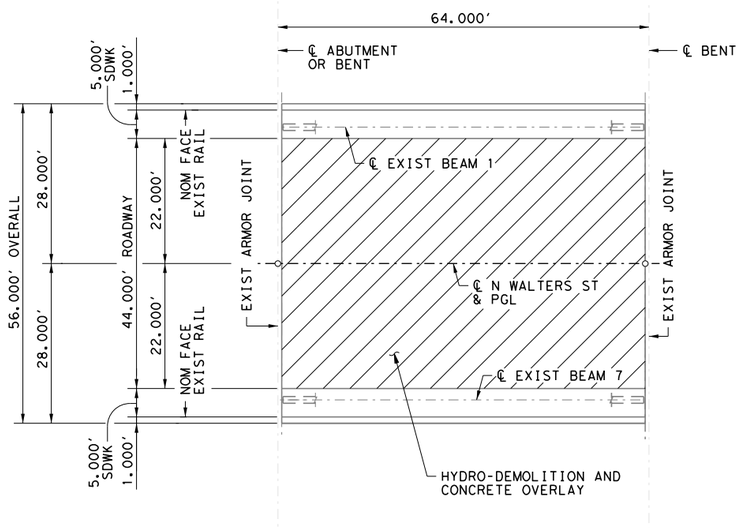
N WALTERS ST

TEST HOLE DATA
N WALTERS ST OVERPASS AT UPRR

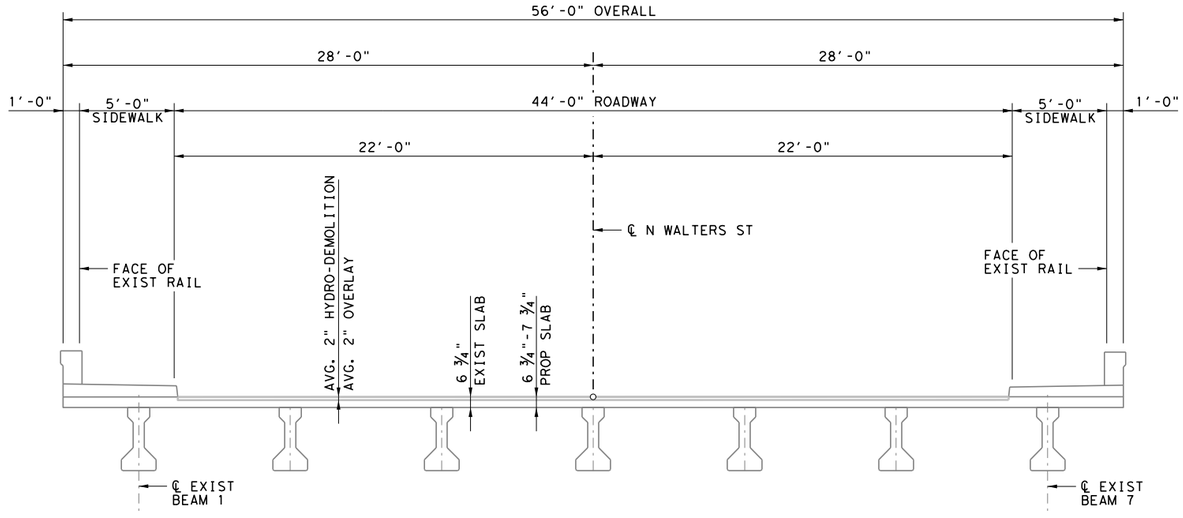
PRINT DATE: 11/16/2021 SHEET 3 OF 3

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	
DIST	COUNTY		HIGHWAY	57
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRTH03.dgn
11/16/2021 10:25:14 AM



PLAN



TYPICAL TRANSVERSE SECTION

TABLE OF ESTIMATED QUANTITIES

SPAN	LATEX-MOD CONC OVERLAY (2 IN)	HYDRO-DEMOLITION (2 IN)	ELASTOMERIC BEARING (LAMINATED)
NO.	SY	SY	EA
1	313	313	14
2	313	313	14
3	313	313	14
4	313	313	14
TOTALS	1,252	1,252	56

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

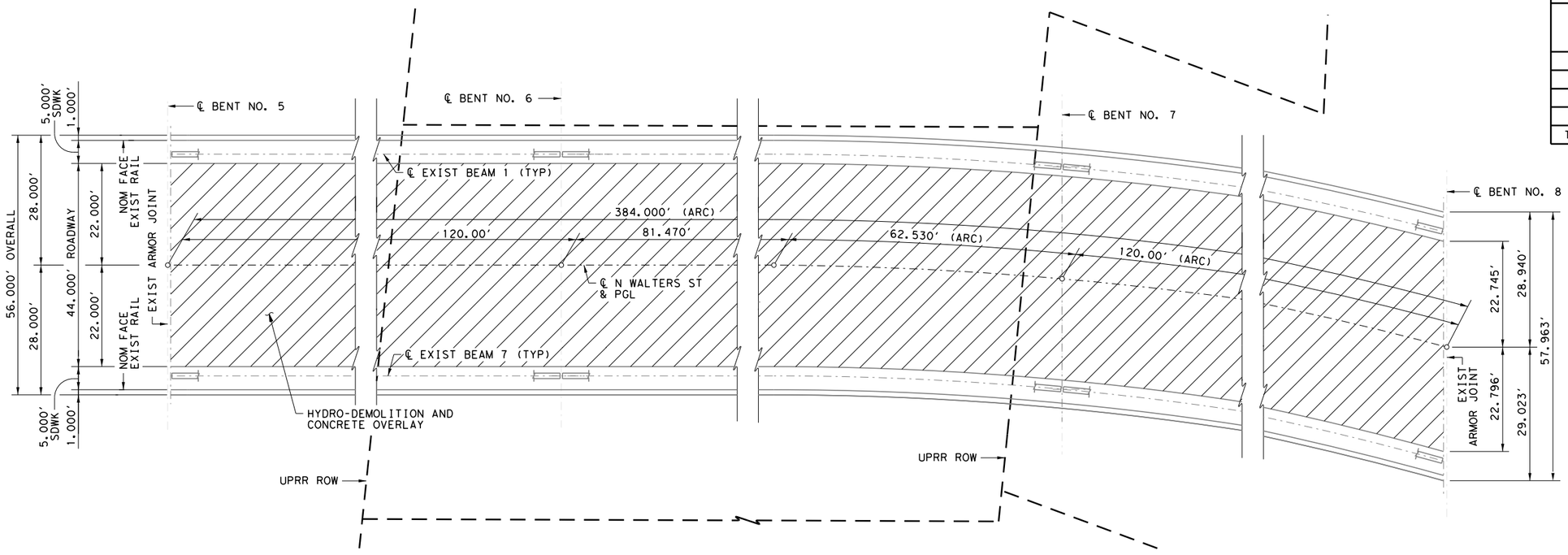
BRIDGE DECK REPAIR DETAILS 64.00' PRESTRESSED CONCRETE BEAM UNIT 1 - 4 (SPANS 1 - 4)

N WALTERS ST OVERPASS AT UPRR

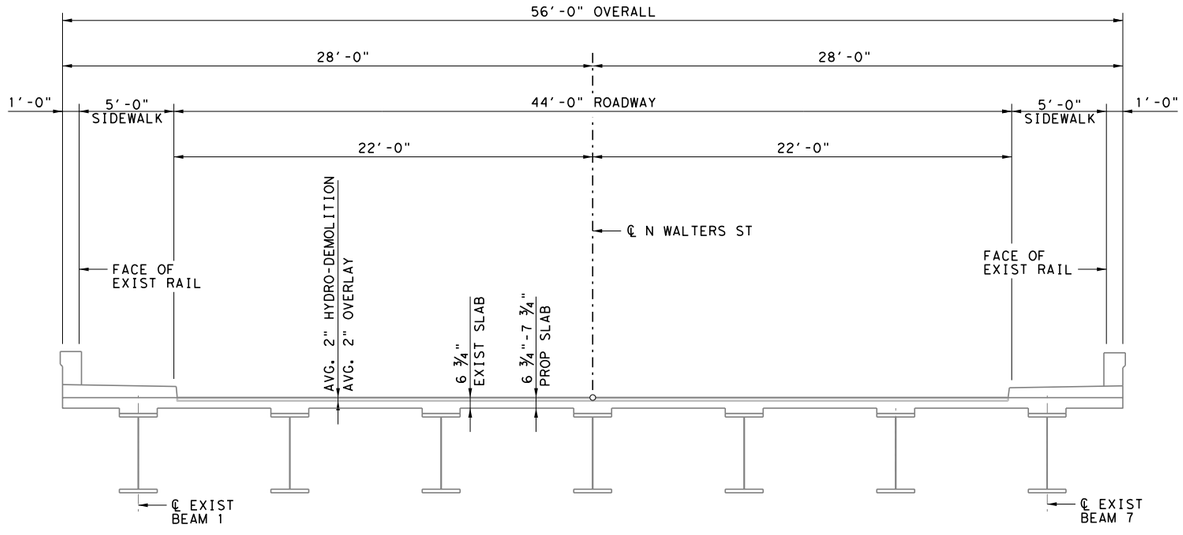
PRINT DATE: 11/16/2021 SHEET 1 OF 5

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	58
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRSP01.dgn
11/16/2021 10:25:30 AM



PLAN



TYPICAL TRANSVERSE SECTION

TABLE OF ESTIMATED QUANTITIES

SPAN	LATEX-MOD CONC OVERLAY (2 IN)	HYDRO-DEMOLITION (2 IN)	REP STL BRIDGE MEMBER (ROCKER)
NO.	SY	SY	EA
5	587	587	
6	704	704	
7	587	587	
TOTALS	1,878	1,878	7

RESETTING EXISTING ROCKER BEARINGS:

JACK STEEL PLATE GIRDERS TO RELIEVE BEARING PRESSURE ON EXISTING STEEL ROCKER BEARINGS TO BE STRAIGHTENED, SUBMIT A JACKING PLAN SIGNED AND SEALED BY A PROFESSIONAL ENGINEER FOR APPROVAL.

REMOVE WELDS TO BOTTOM BEAM FLANGE, GROUND ALL WELDS SMOOTH, CLEAN ALL SURFACES OF BEAM AND BEARING.

RESET ROCKER TO A VERTICAL POSITION, REWELD TO THE BOTTOM FLANGE USING A 5/16" WELD, LOCATIONS AND LENGTHS WILL BE IDENTICAL TO ORIGINAL CONSTRUCTION. WELDING WILL BE PERFORMED AS PER ITEM 448 "STRUCTURAL FIELD WELDING".

PAINT ALL SURFACES CLEANED DURING THE REPAIR OPERATION AS PER ITEM 446 "FIELD CLEANING AND PAINTING STEEL".

QUANTITIES SHOWN ARE FOR BENT 5, FINAL MEASUREMENT WILL BE MADE IN THE FIELD.

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

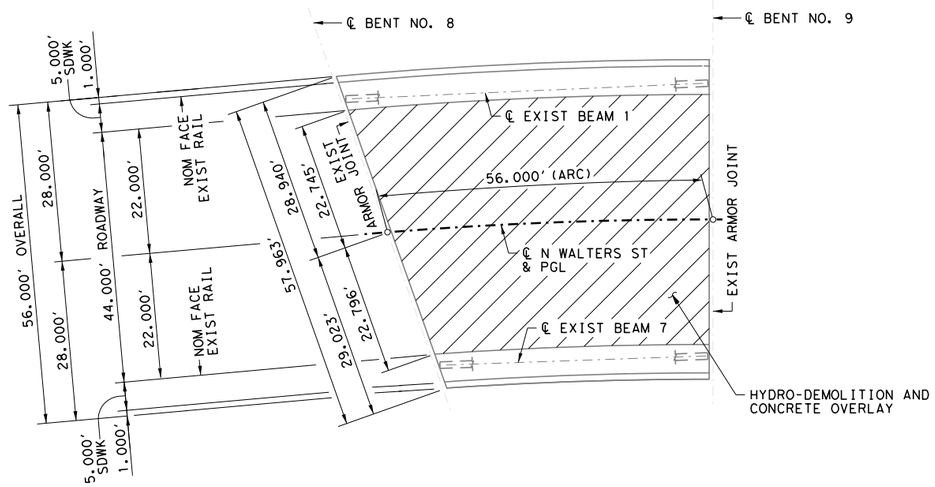
BRIDGE DECK REPAIR DETAILS
384.00' STEEL PLATE GIRDER UNIT 5 (SPANS 5-7)

N WALTERS ST OVERPASS AT UPRR

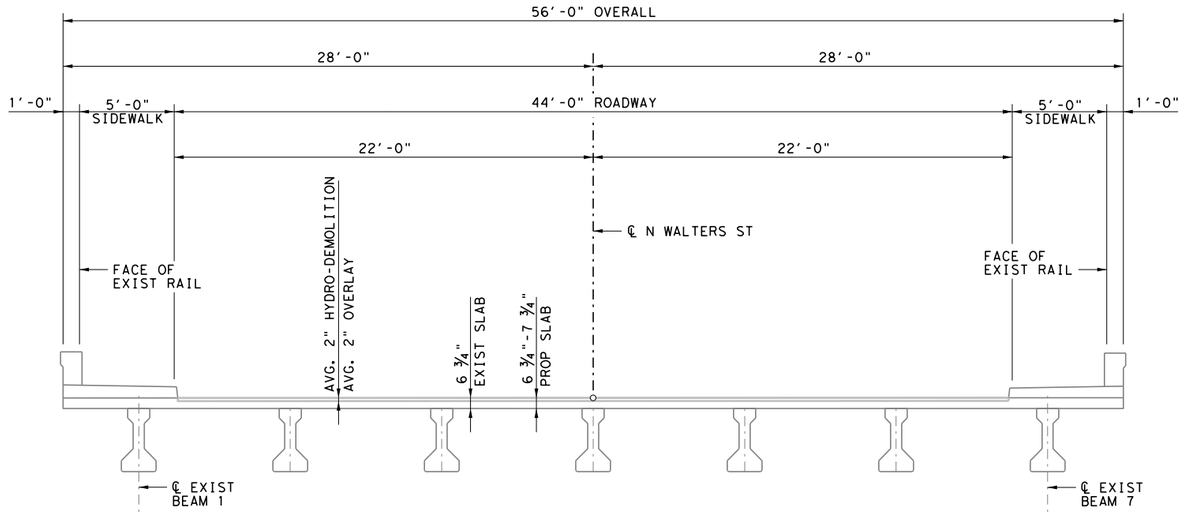
PRINT DATE: 11/16/2021 SHEET 2 OF 5

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	59
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRPGUP01.dgn
11/16/2021 10:25:42 AM



PLAN



TYPICAL TRANSVERSE SECTION

TABLE OF ESTIMATED QUANTITIES

SPAN	LATEX-MOD CONC OVERLAY (2 IN)	HYDRO-DEMOLITION (2 IN)	ELASTOMERIC BEARING (LAMINATED)
NO.	SY	SY	EA
8	274	274	14
TOTALS	274	274	14

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

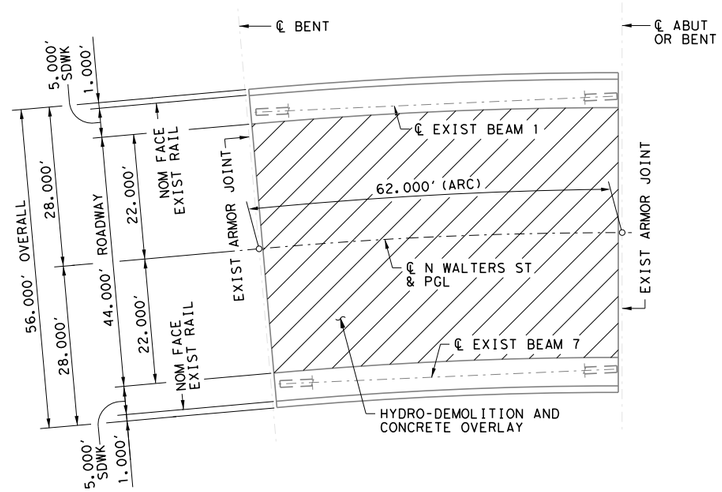
BRIDGE DECK REPAIR DETAILS 56.00' PRESTRESSED CONCRETE BEAM UNIT 6 (SPAN 8)

N WALTERS ST OVERPASS AT UPRR

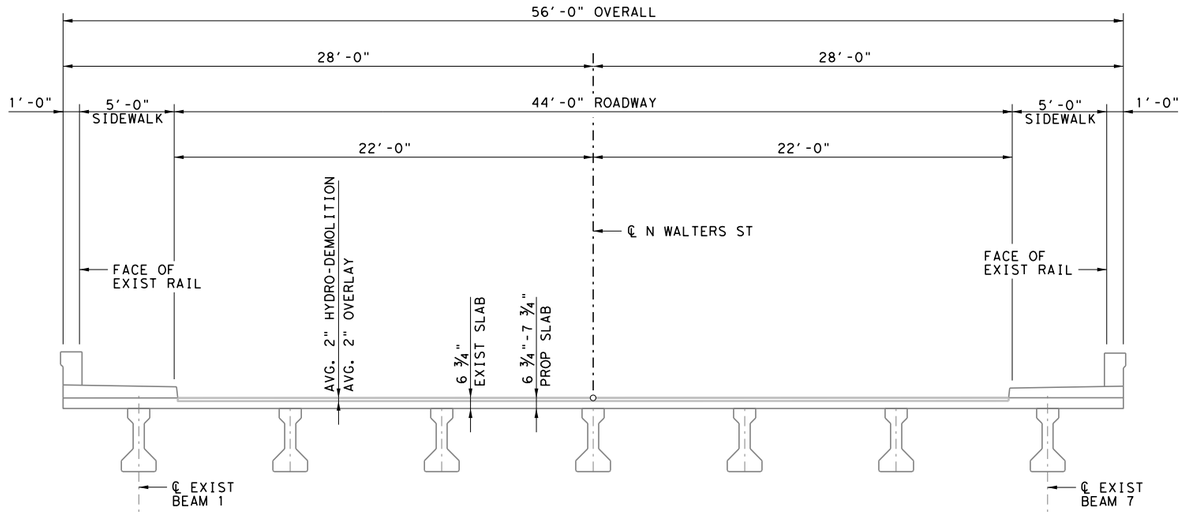
PRINT DATE: 11/16/2021 SHEET 3 OF 5

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	60
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRSP03.dgn
11/16/2021 10:25:53 AM



PLAN



TYPICAL TRANSVERSE SECTION

TABLE OF ESTIMATED QUANTITIES

SPAN	LATEX-MOD CONC OVERLAY (2 IN)	HYDRO-DEMOLITION (2 IN)	ELASTOMERIC BEARING (LAMINATED)
NO.	SY	SY	EA
9	303	303	14
10	303	303	14
11	303	303	14
12	303	303	14
13	303	303	14
TOTALS	1,515	1,515	70

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

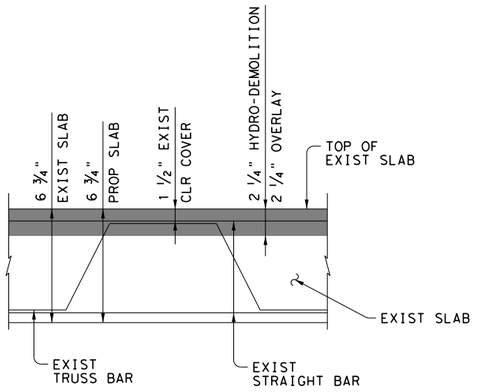
BRIDGE DECK REPAIR DETAILS 62.00' PRESTRESSED CONCRETE BEAM UNIT 7 - 11 (SPANS 9 - 13)

N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 4 OF 5

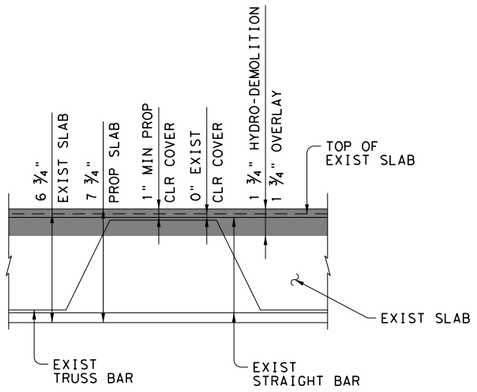
STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	61
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRSP04.dgn
11/16/2021 10:26:05 AM



ADEQUATE EXISTING SLAB COVER

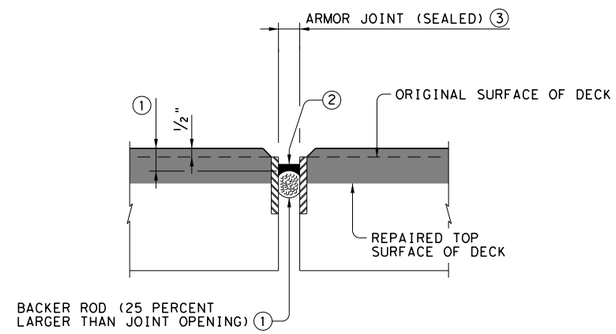
(EXIST LONGITUDINAL REINFORCEMENT NOT SHOWN FOR CLARITY)



INADEQUATE EXISTING SLAB COVER

(EXIST LONGITUDINAL REINFORCEMENT NOT SHOWN FOR CLARITY)

TYPICAL EXISTING SLAB COVER



ARMOR JOINT SECTION

NOTE THAT EXISTING CLEAR COVER TO REINFORCING STEEL MAY BE INADEQUATE. INCREASE THE FINAL SLAB GRADE AS REQUIRED TO PROVIDE A MIN 1" CLEAR COVER.

GENERAL NOTES:

REMOVE EXISTING CONCRETE DECK TO A MIN OF ¾" CLEAR BELOW THE TOP MAT OF REINFORCING STEEL BY HYDRO-DEMOLITION. TOTAL DEPTH OF REMOVAL NEED NOT EXCEED THAT REQUIRED TO PROVIDE THIS CLEAR DISTANCE. PERFORM WORK IN ACCORDANCE WITH ITEM 483, "CONCRETE BRIDGE DECK SURFACING" AND THE TXDOT CONCRETE REPAIR MANUAL.

REMOVAL OF EXISTING ACP ON THE BRIDGE IS SUBSIDIARY TO PAYMENT FOR HYDRO-DEMOLITION, EXISTING ACP MAY BE REMOVED DURING HYDRO-DEMOLITION OPERATIONS OR MILLED BEFOREHAND. DAMAGE TO THE EXISTING ARMOR JOINTS CAUSED BY CONSTRUCTION OPERATIONS WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

DAMAGED REINFORCING STEEL WILL BE REPLACED. PROVIDE LENGTHS SHOWN. PAYMENT FOR THIS WORK IS SUBSIDIARY TO THE ITEM FOR CONCRETE OVERLAY. THE SURFACE AREA WITH DAMAGED REINFORCING STEEL IS APPROXIMATELY 10% OF THE DECK SURFACE AREA.

CONTAIN AND DISPOSE OF, OFF SITE, ALL DEBRIS AND RUNOFF FROM HYDRO-DEMOLITION OPERATIONS. SUBMIT A CONTAINMENT AND DISPOSAL PLAN TO THE ENGINEER FOR APPROVAL, NO WORK WILL BE PERFORMED ON UPRR ROW NOR IMPACT THEIR OPERATIONS.

OVERLAY THE EXISTING DECK WITH LATEX MOD CONCRETE PROVIDING A MIN OF 1" CLEAR COVER ABOVE THE TOP MAT OF REINFORCING STEEL. GRADE DECK SURFACE TO PROVIDE A SMOOTH RIDING SURFACE. PERFORM WORK IN ACCORDANCE WITH ITEM 439, "BRIDGE DECK OVERLAYS".

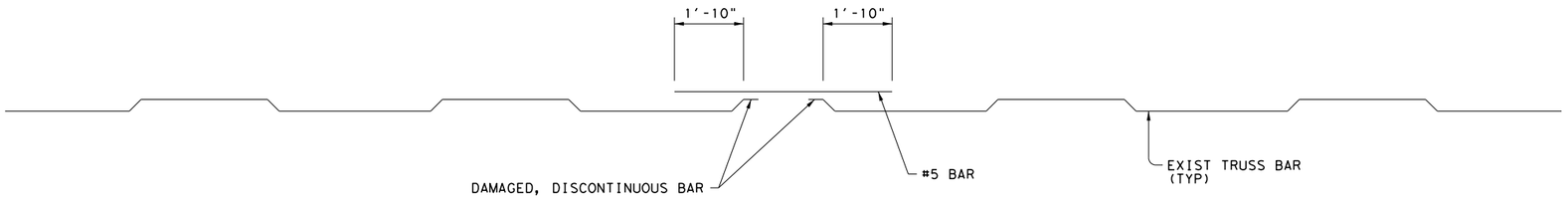
THE 2" REMOVAL OF DECK AND CONCRETE OVERLAY ARE AN AVERAGE, PAYMENT WILL NOT BE ADJUSTED FOR VARIABLE DEPTH.

ALL WORK OVER UPRR ROW IS CONTAINED. EXPANSION JOINTS ARE LOCATED OFF UPRR ROW, WHERE WATER FROM HYDRO-DEMOLITION MAY DRAIN BELOW THE DECK.

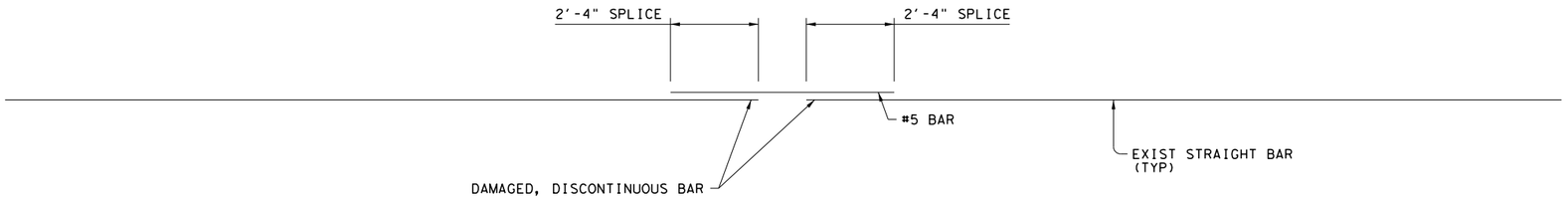
① SET TOP OF BACKER ROD 1" BELOW TOP OF FINAL DECK GRADE. BACKER ROD MUST BE COMPATIBLE WITH JOINT SEALANT. USE OF MULTIPLE PIECES TO CREATE A BACKER ROD CROSS SECTION IS NOT PERMITTED. TOP OF BACKER ROD MUST BE CONVEX AS SHOWN.

② USE CLASS 7 JOINT SEALANT THAT CONFORMS TO DMS-6310.

③ PLACE SEALANT WHILE AMBIENT TEMPERATURE IS BETWEEN 55°F AND 80°F AND IS RISING.



TRUSS BAR



STRAIGHT BAR

TOP MAT REINFORCEMENT REPAIR DETAIL

CONTRACTOR WILL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

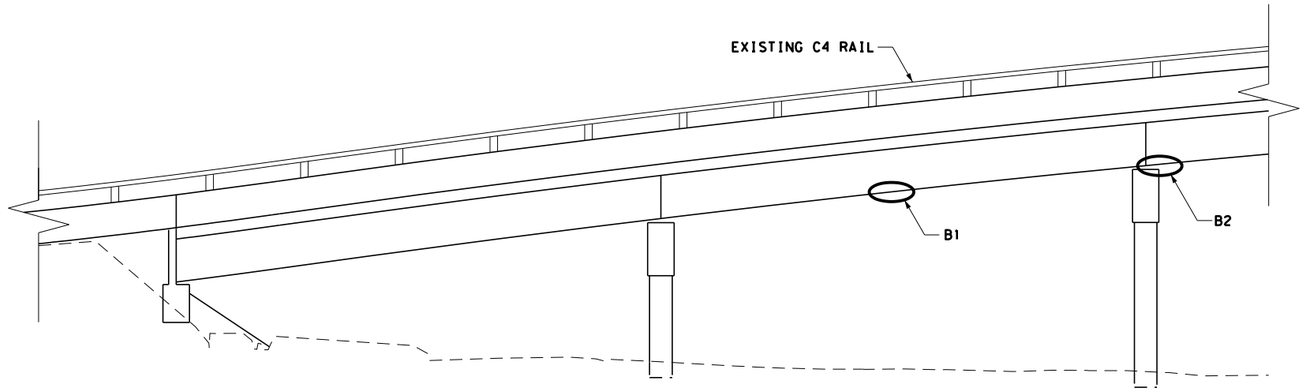
N WALTERS ST

BRIDGE DECK REPAIR DETAILS
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 5 OF 5

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	62
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRPGUP02.dgn
11/16/2021 10:26:17 AM



ELEVATION

B1
MINOR

B2
MINOR TO INTERMEDIATE

C - CONCRETE STRUCTURE REPAIR
B - CONCRETE BEAM REPAIR

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

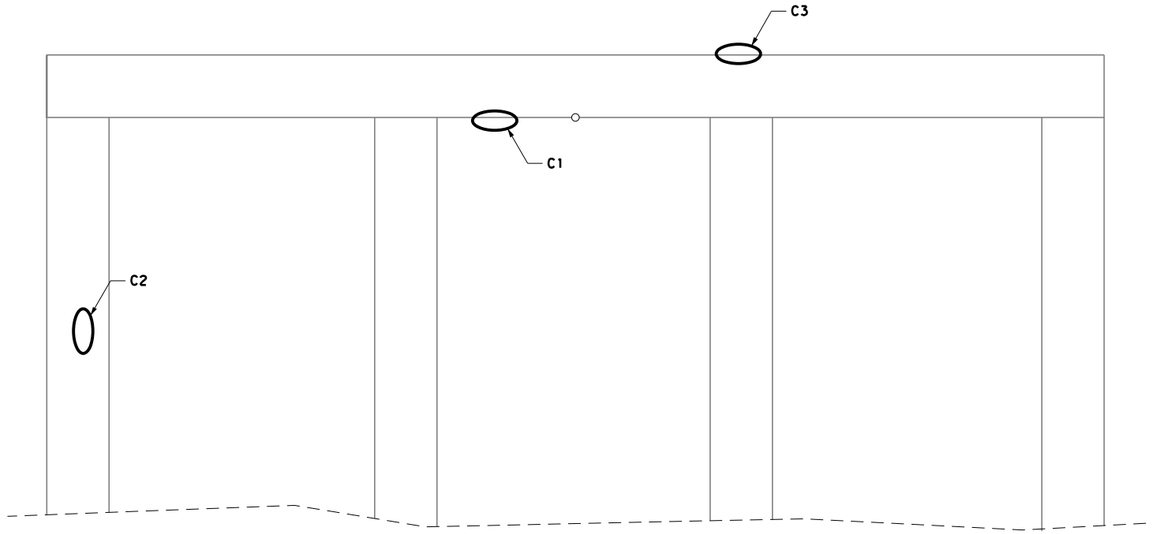
N WALTERS ST

CONCRETE REPAIR DETAILS
N WALTERS ST OVERPASS AT UPRR

PRINT DATE: 11/16/2021 SHEET 1 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	63
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRCONCRDTL01
11/16/2021 10:26:29 AM



INTERIOR BENT

TABLE OF ESTIMATED QUANTITIES		
CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	200
CONC BEAM REPAIR	EA	20

GENERAL NOTES:

PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR WILL VERIFY ALL EXISTING DIMENSIONS AND LIMITS OF REPAIR BY SOUNDING OR OTHER ACCEPTABLE METHOD AS APPROVED BY THE ENGINEER.

DETAILS ARE REPRESENTATIVE OF TYPICAL SPALLING AND DO NOT SHOW ALL DAMAGE. DAMAGE TO THE CONCRETE PORTION OF THE BRIDGE RAILING WILL BE REPAIRED.

MOST SPALLING IS MINOR TO INTERMEDIATE AS DEFINED IN THE TXDOT "CONCRETE REPAIR MANUAL". ALL REPAIRS SHALL BE PERFORMED IN ACCORDANCE WITH ITEM 429 "CONCRETE STRUCTURE REPAIR", ITEM 788 "CONCRETE BEAM REPAIR" AND THE CONCRETE REPAIR MANUAL. ALL MINOR REPAIRS THAT HAVE A DEPTH LESS THAN 1" SHALL BE PERFORMED USING AN EPOXY MORTOR.

NOTIFY THE ENGINEER IF SIGNIFICANT CORROSION OF STRUCTURAL REINFORCEMENT THAT IMPACTS THE CAPACITY OF THE BRIDGE IS ENCOUNTERED. A METHOD OF REPAIR OF DAMAGED REINFORCEMENT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

REPAIR MATERIALS FOR MILDLY REINFORCED CONCRETE SHALL HAVE COMPRESSIVE STRENGTHS SIMILAR TO THE EXISTING CONCRETE, 3000 PSI, AND SHALL NOT EXCEED 5000 PSI. DESIREABLE MODULUS OF ELASTICITY IS 3000 KSI AND SHALL NOT EXCEED 5000 KSI.

REPAIR MATERIALS FOR PRESTRESSED CONCRETE BEAMS SHALL MEET THE REQUIREMENTS OF ITEM 788.

WORK WILL BE PAID FOR BY THE SQUARE FOOT AS PER ITEM 429 AND BY EACH BEAM AS PER ITEM 788.

MINOR SPALL
NO REINFORCEMENT EXPOSED
LESS THAN 2 INCH DEPTH

INTERMEDIATE SPALL
REINFORCEMENT EXPOSED LESS THAN 50 % OF DIAMETER
LESS THAN 6 INCH DEPTH

MAJOR SPALL
REINFORCEMENT EXPOSED GREATER THAN 50% OF DIAMETER

C - CONCRETE STRUCTURE REPAIR
B - CONCRETE BEAM REPAIR

C1
MINOR TO INTERMEDIATE

C2
INTERMEDIATE TO MAJOR

C3
MINOR

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

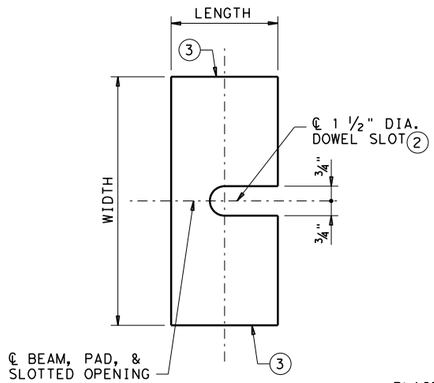
N WALTERS ST

CONCRETE REPAIR DETAILS
N WALTERS ST OVERPASS AT UPRR

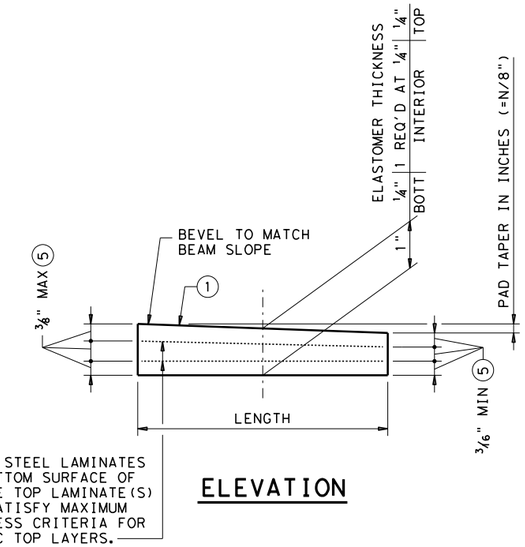
PRINT DATE: 11/16/2021 SHEET 2 OF 2

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	64
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

...\SHT\BRG\5301BRCONCROTL02
11/16/2021 10:26:42 AM



PLAN (4)

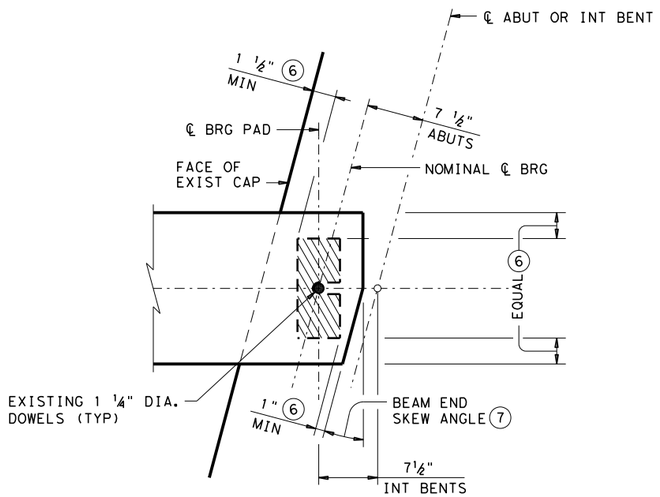


PLACE 0.105" THICK STEEL LAMINATES PARALLEL TO THE BOTTOM SURFACE OF THE PAD, EXCEPT THE TOP LAMINATE(S) MAY BE SLOPED TO SATISFY MAXIMUM AND MINIMUM THICKNESS CRITERIA FOR TAPERED ELASTOMERIC TOP LAYERS.

ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



BEARING PAD PLACEMENT DIAGRAMS

(SKEWED BEAM ENDS AT INT BENTS OR FACE OF BKWL)

TABLE OF BEARING PAD DIMENSIONS						
BENT TYPE	BEAM TYPE	BEARING TYPE (1)	BEAM END SKEW ANGLE RANGE	PAD SIZE LGTH x WDTH	PAD CLIP DIMENSIONS	
					"A"	"B"
CONVENTIONAL AND SKEWED INTERIOR BENTS AND ABUTMENTS	EXISTING TYPE C BEAMS	B-1-"N"	0° THRU 20°	7" x 19"	N/A	N/A

GENERAL NOTES:

CONTRACTOR TO VERIFY BEAM SLOPES, SKEWS, AND PROPOSED PAD DIMENSIONS IN THE FIELD PRIOR TO ORDERING MATERIALS. IMMEDIATELY NOTIFY ENGINEER OF CONFLICTS.

SUBMIT SIGNED AND SEALED BEAM JACKING PROCEDURE TO THE ENGINEER FOR APPROVAL. THE WORK PERFORMED, MATERIALS FURNISHED, EQUIPMENT, LABOR, TOOLS, AND INCIDENTALS FOR THE REMOVAL OF THE EXISTING BEARING PADS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE BID ITEM FOR BRIDGE BEARINGS.

REMOVAL OF EXISTING BEARING PAD MUST NOT DAMAGE EXISTING DOWEL BARS.

SHOP DRAWINGS FOR APPROVAL ARE REQUIRED.

A BEARING LAYOUT WHICH IDENTIFIES LOCATION AND ORIENTATION OF ALL BEARINGS MUST BE DEVELOPED BY THE BEARING FABRICATOR. PERMANENTLY MARK EACH BEARING IN ACCORDANCE WITH THE BEARING LAYOUT. A COPY OF THE BEARING LAYOUT IS TO BE PROVIDED TO THE ENGINEER.

(1) INDICATE BEARING TYPE ON ALL PADS. FOR TAPERED PADS, LOCATE BEARING TYPE ON THE HIGH SIDE. THE FABRICATOR MUST INCLUDE THE VALUE OF "N" (AMOUNT OF TAPER IN ⅛" INCREMENTS) IN THIS MARK.
EXAMPLES: N=0, (FOR 0" TAPER)
N=1, (FOR ⅛" TAPER)
N=2, (FOR ¼" TAPER)
(ETC.)
FABRICATED PAD TOP SURFACE SLOPE MUST NOT VARY FROM EXISTING BEAM SLOPE BY MORE THAN $\left(\frac{0.0625"}{\text{LENGTH OR DIA}}\right)$ IN/IN.

(2) PROVIDE DOWEL SLOT FOR EVERY BEARING PAD.

(3) LOCATE PERMANENT MARK HERE.

(4) SEE TABLE OF BEARING PAD DIMENSIONS FOR DIMENSIONS.

(5) MAXIMUM AND MINIMUM LAYER THICKNESS SHOWN ARE FOR ELASTOMER ONLY, ON TAPERED LAYERS.

(6) PLACE CENTERLINE PAD AS NEAR NOMINAL CENTERLINE BEARING AS POSSIBLE BETWEEN LIMITS SHOWN.

(7) BEAM END SKEW ANGLE IS EQUAL TO 90° MINUS THE BEAM ANGLE EXCEPT AT SOME CONFLICTING BEAMS.

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

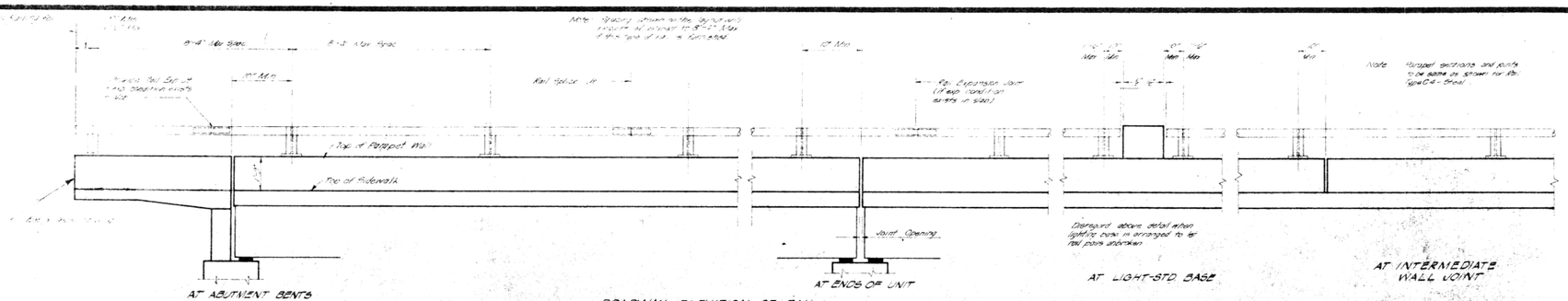
ELASTOMERIC BEARING PAD
N WALTERS ST OVERPASS AT UPRR

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

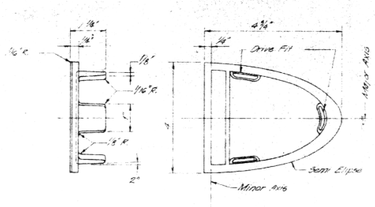
PRINT DATE: 11/16/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	65
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

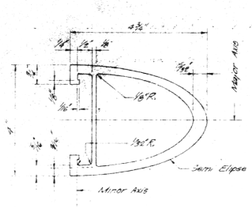
...\SHT\BRG\5301BRMD01.dgn
11/16/2021 10:26:54 AM



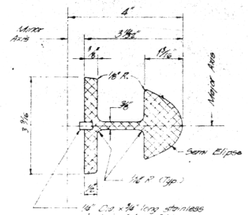
ROADWAY ELEVATION OF RAIL



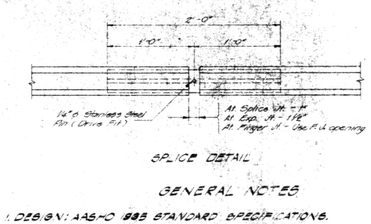
END PLUG DETAILS



RAIL EXTRUSION



EXP. THRU SPLICE MEMBER

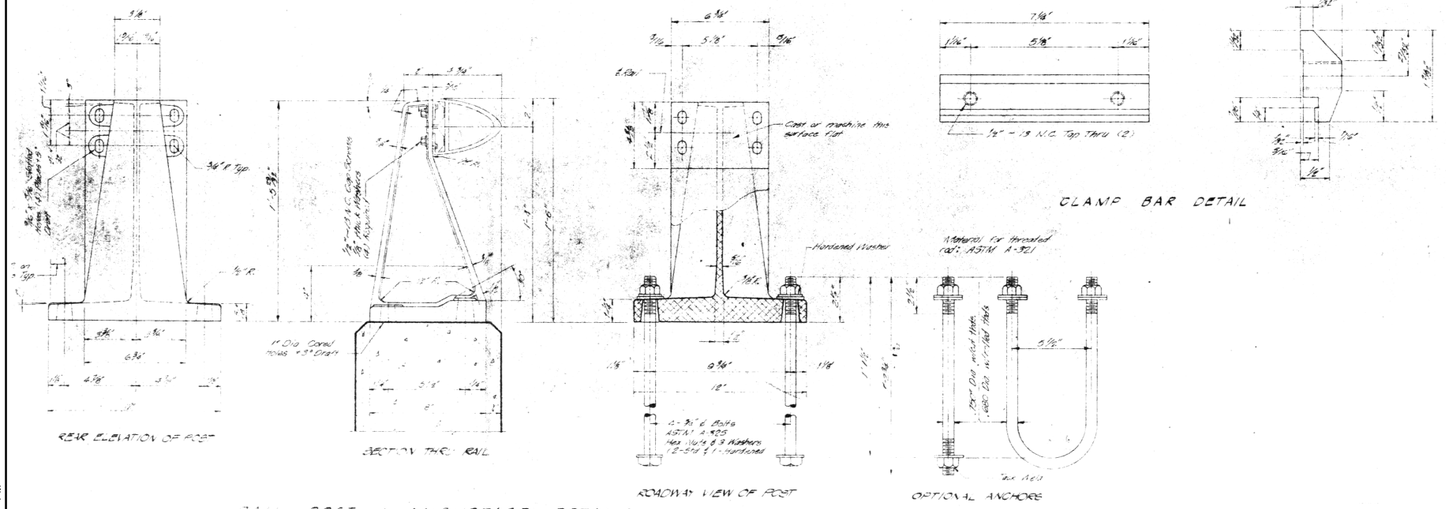


SPLICE DETAIL

RAIL MEMBER DETAILS

GENERAL NOTES

1. DESIGN: AASHTO 1985 STANDARD SPECIFICATIONS.
2. All open ends of the rail shall be capped.
3. Rail posts and" be seated on elastomeric pads having the same dimensions as post base and 1/8" thick. Additional pads or half pads may be used for shimming for alignment. Post heights shall increase by the thickness of the pad.
4. Rail post shall be set perpendicular to top of parapet wall.
5. Panel length of rail shall be attached to a minimum of three posts except at abutment wingwalls.
6. Anchor bolts hdg galvanized after fabrication.
7. Posts shall be cast aluminum, alloy A344-T6. Material for rails shall be aluminum - ASTM B221 - alloy 6061-T6.
8. Machine screws for rail attachment shall be stainless steel.
9. For horizontal curves of radius less than 1000 ft the rail members shall be fabricated to follow the curvature of the roadway.
10. Copings shall have a maximum slope of 8% and a minimum radius of fillet of 1/2 unless otherwise shown.
11. Unit bid Price for Rail Type C-4 includes: Metal Railing, Posts, Connectors, Anchor Bolts, and Elastomeric Pads.



RAIL POST & ANCHORAGE DETAILS

CLAMP BAR DETAIL

HS20 LOADING (EXISTING DESIGN LOADING)

NO.	DATE	REVISION	BY

WALTERS - MOORE OVERPASS STRUCTURE
CITY OF SAN ANTONIO

STANDARD BRIDGE RAILING
TYPE C4 - ALUMINUM

DES.	C.B.	DATE	3-2-92
DET.	P.B.H.		
CK.	C.B.		
QA.	S.B.H.	ENGINEERING DIVISION	33-A

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®

N WALTERS ST

AS BUILT C4 RAIL STANDARD
N WALTERS ST OVERPASS AT UPRR

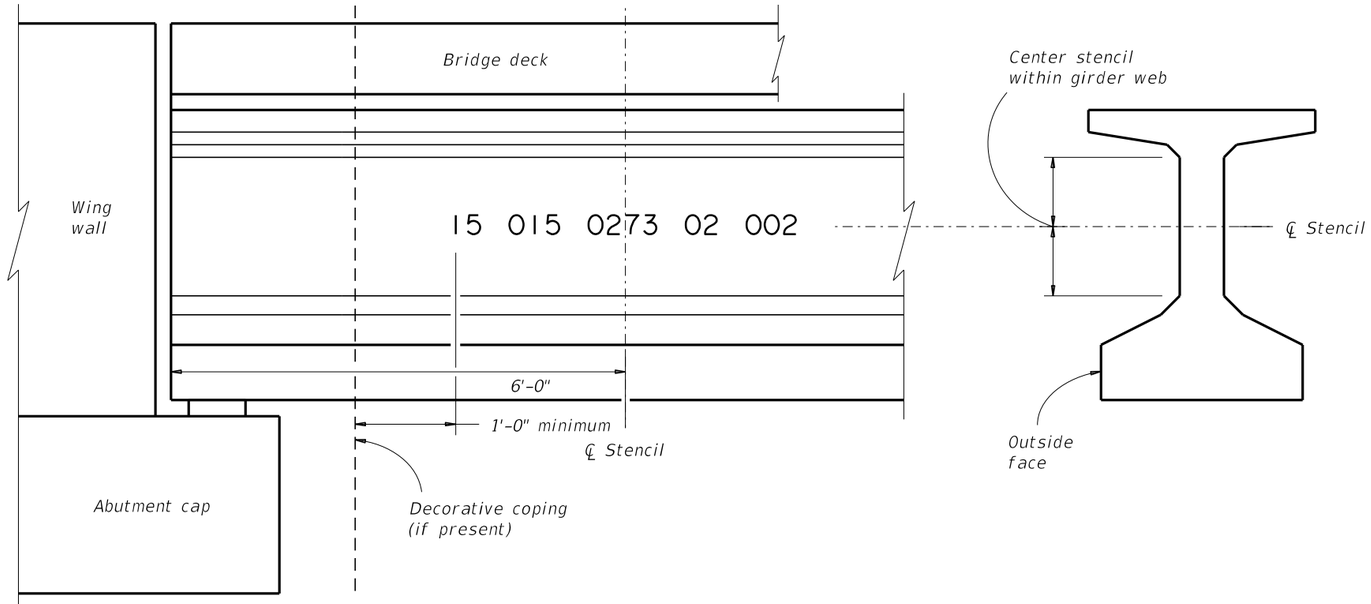
PRINT DATE: 12/22/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	66
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST	

15 015 0273 02 002

San Antonio District designation	County designation	Control number	Section nunber	Structure number

PAINTED STRUCTURE NUMBER DETAIL



TYPICAL BRIDGE CORNER (ELEVATION)

SAN ANTONIO DISTRICT COUNTY DESIGNATIONS

Atascosa 007
Bandera 010
Bexar 015
Comal 046
Frio 083
Guadalupe 095
Kendall 131
Kerr 133
McMullen 162
Medina 163
Uvalde 232
Wilson 247

STATE OF TEXAS
JON KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
11/16/2021
, P.E

GENERAL NOTES:
Apply stucture number in accordance with Special Specification for Stenciling Permanent Structure Numbers.

NBI number shown is for demonstration purposes only, see the bridge layout for the NBI number to be placed on this bridge.

Two NBI numbers will be stenciled on the bridge, at each abutment and on opposite sides of the bridge from each other.

SAN ANTONIO DISTRICT STANDARD

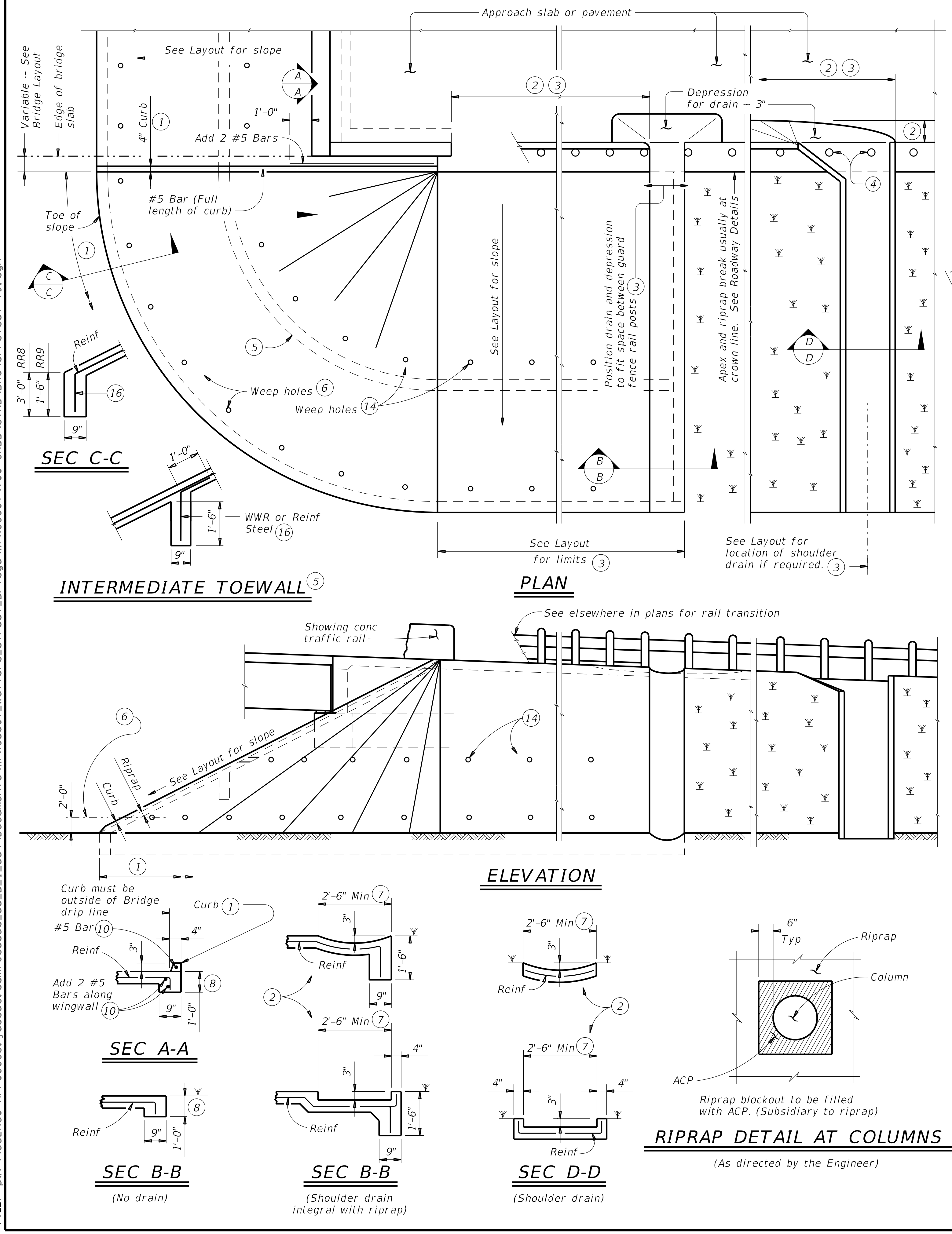
Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

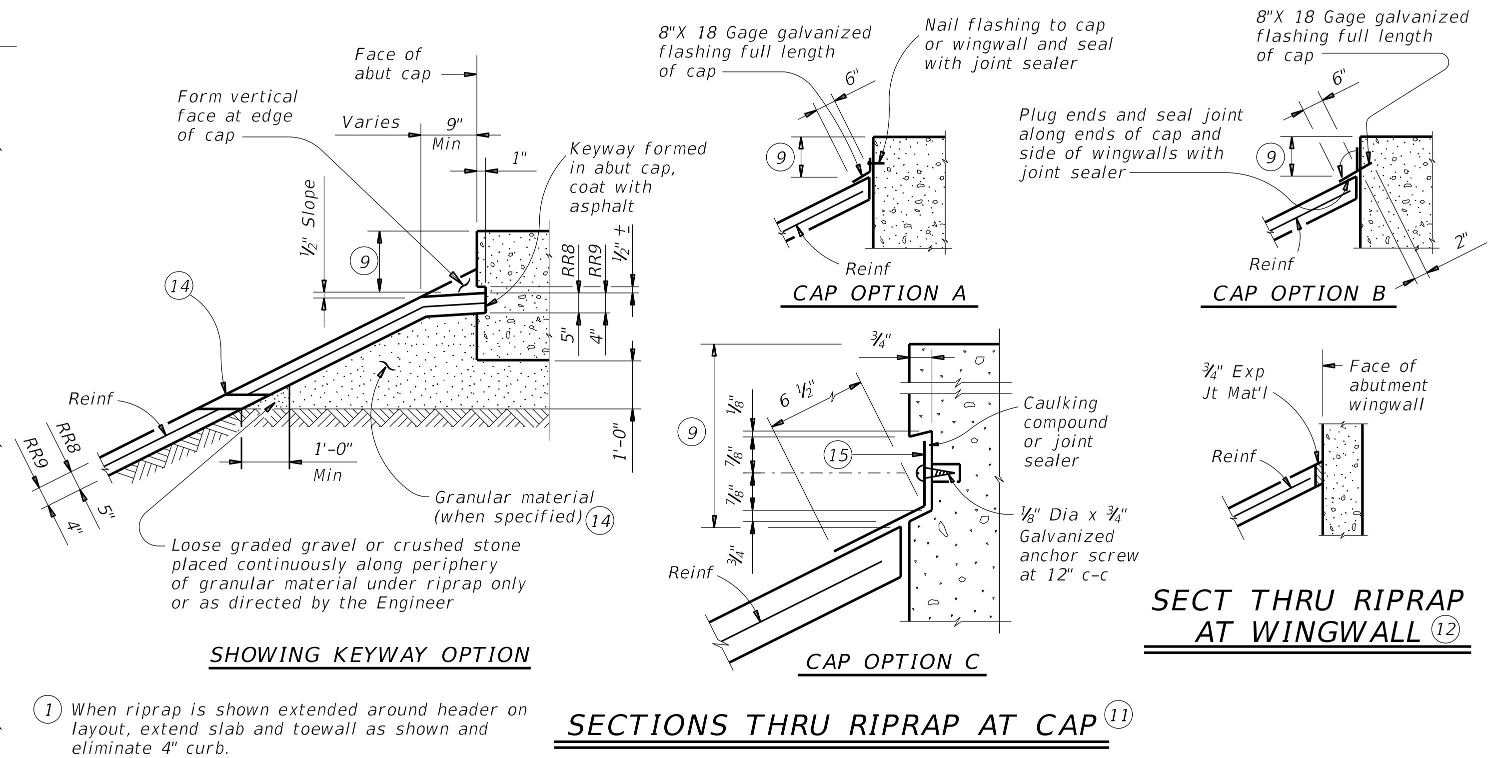
BRIDGE NBI NUMBER STENCIL (MOD)

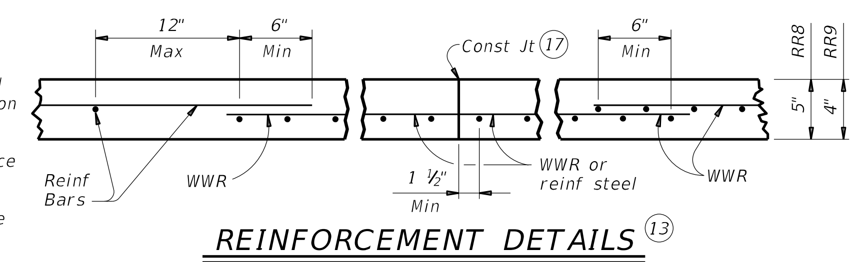
DN: BCL	CK: XXX	FILENAME: 000000000 SA District Stencil.dgn		
DW: SRF	CK: XXX	ORIGINAL DRAWING DATE: August 2019		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6			BEXAR
CONTROL	SECTION	JOB	SHEET NO.	ROUTE
0915	12	532	67	N WALTERS ST

REVISIONS:
ADDED NOTES FOR NBI NUMBER AND NBI PLACEMENT.

DATE: 11/16/2021 10:27:30 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFXO5301







See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

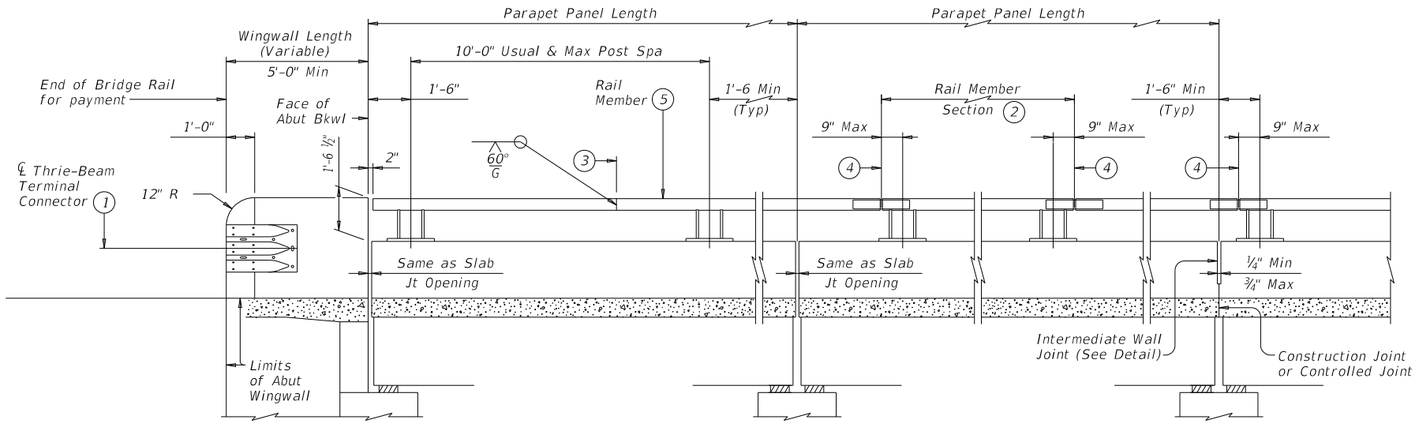
Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
Provide Grade 60 reinforcing steel.
Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".
See Layout for limits of riprap.
RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

Texas Department of Transportation — Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)
CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	68

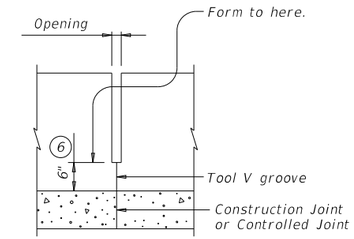
DATE: 11/15/2021 7:59:56 AM
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301.1\d1\rlstd007-19.dgn



AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

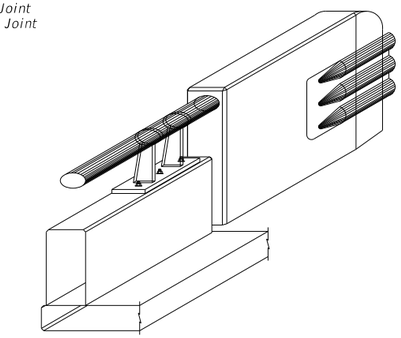
ROADWAY ELEVATION OF RAIL

(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).



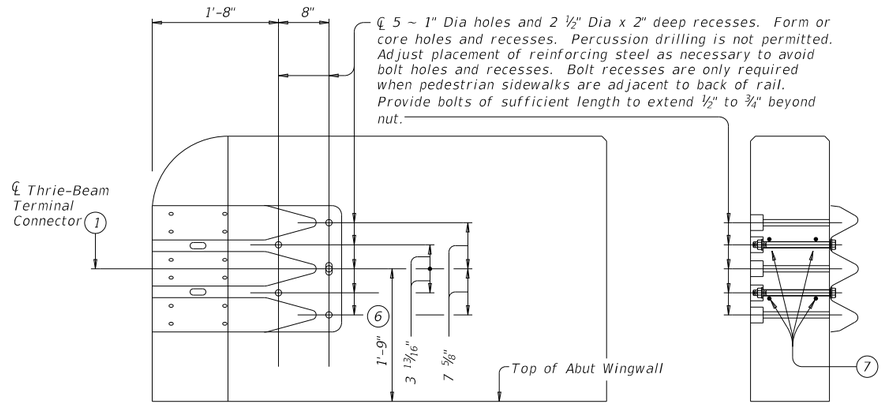
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



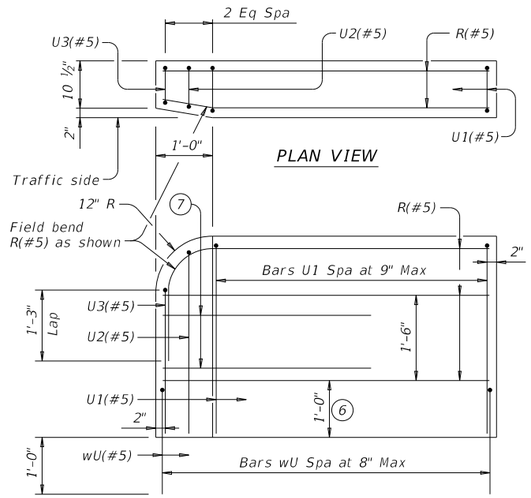
ISOMETRIC VIEW AT END OF BRIDGE

(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).

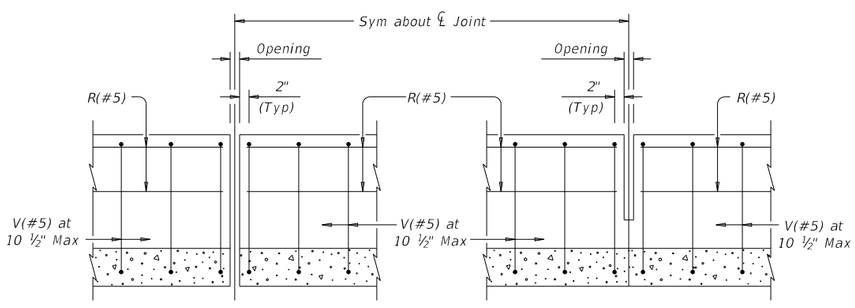


ELEVATION | SECTION

TERMINAL CONNECTION DETAILS

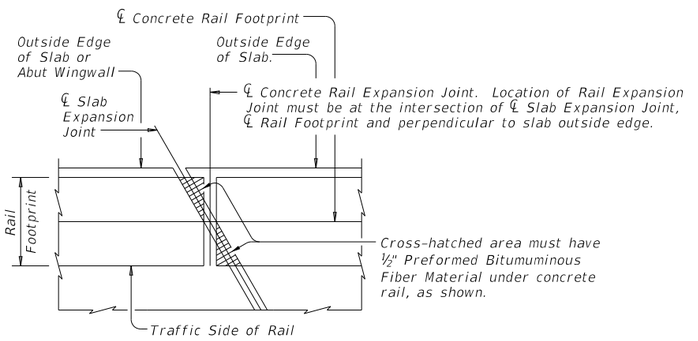


AT ABUT WINGWALL



AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Rail member sections must have at least two posts but not more than four.
3. One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. ℄ Exp Jt or Splice Jt as required.
5. Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.
6. Increase 2" for structures with overlay.
7. Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

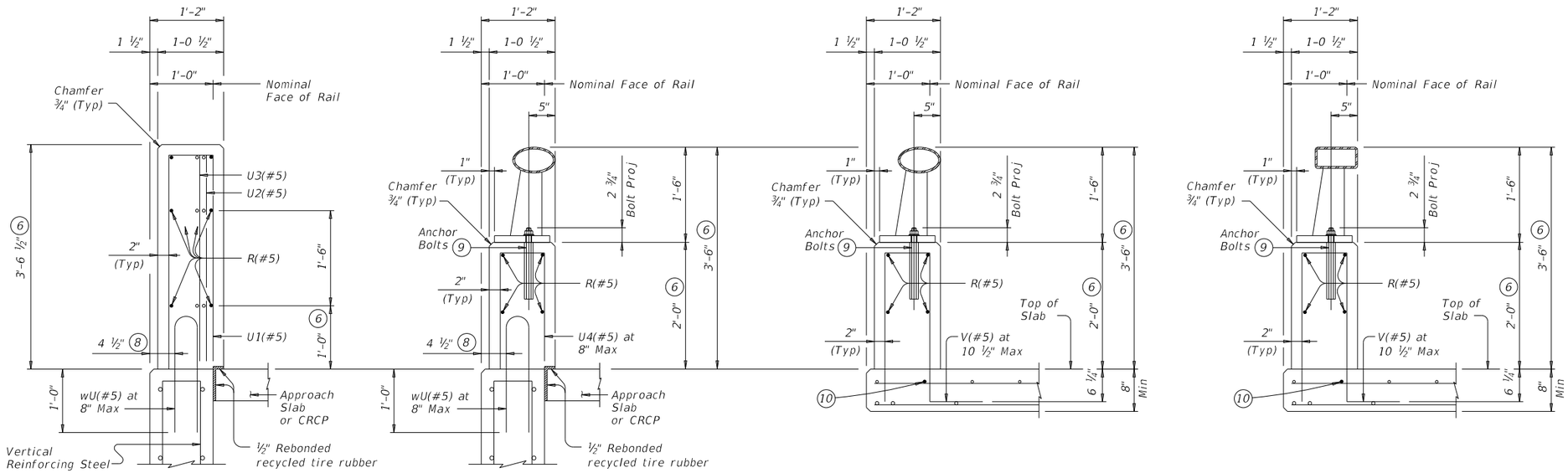
Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

TYPE T402

FILE: rlstd007-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		69

DATE: 11/15/2021 7:59:57 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301.1\d1\rlstd007-19.dgn



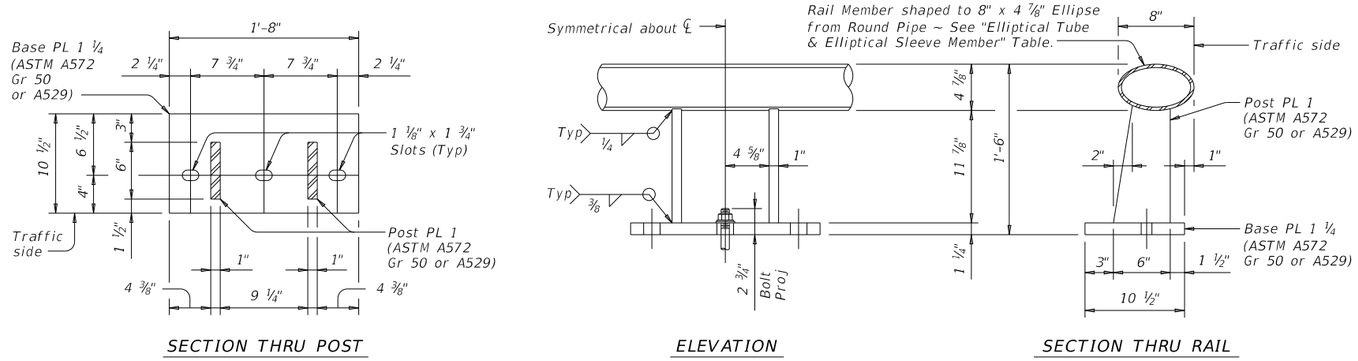
ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

ON CIP RETAINING WALLS
(Showing Elliptical Tube Option)

ON BRIDGE SLAB
(Showing Elliptical Tube Option)

ON BRIDGE SLAB
(Showing Rectangular Tube Option)

SECTIONS THRU RAIL (5)



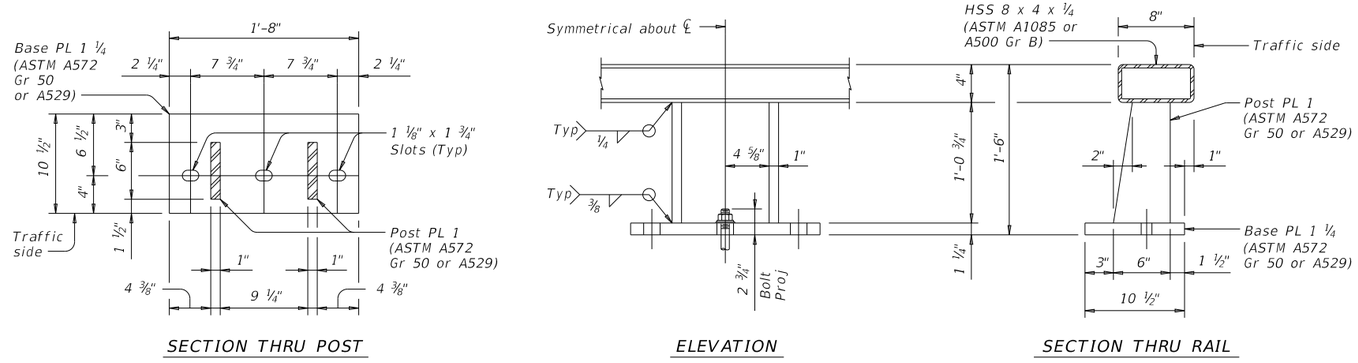
SECTION THRU POST

ELEVATION

SECTION THRU RAIL

ELLIPTICAL TUBE WITH RAIL POST & ANCHORAGE DETAILS

(Showing Elliptical Tube Option)



SECTION THRU POST

ELEVATION

SECTION THRU RAIL

RECTANGULAR TUBE WITH RAIL POST & ANCHORAGE DETAILS (5)

(Showing Rectangular Tube Option)

(5) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(6) Increase 2" for structures with overlay.

(8) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(9) See "Material Notes" for anchor bolt information.

(10) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

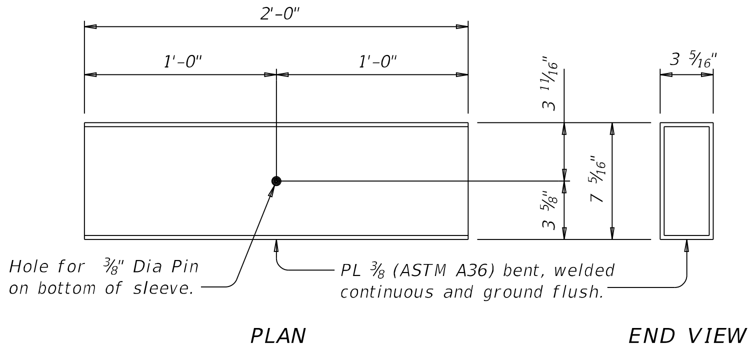
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

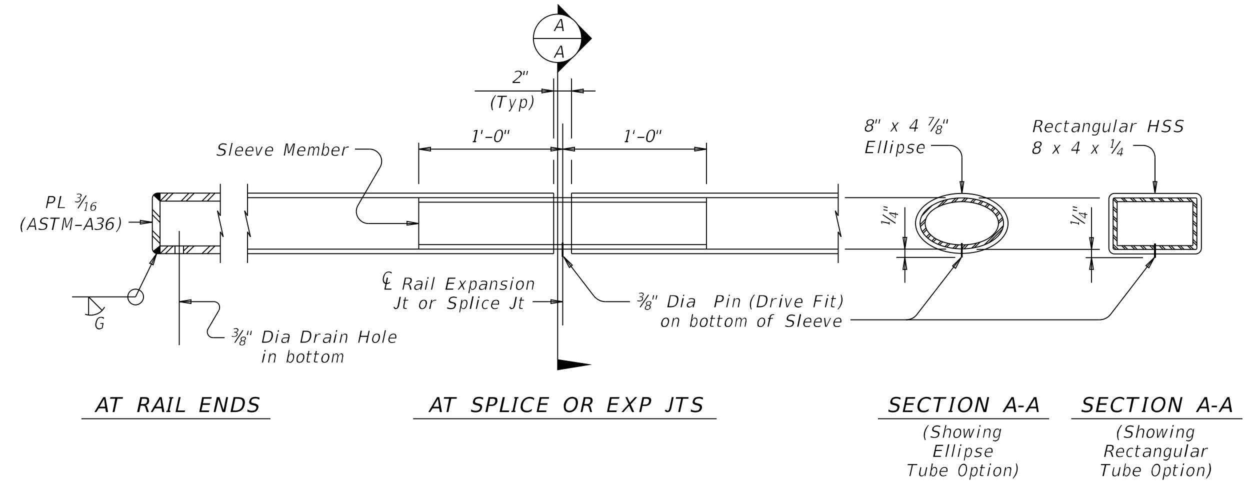
TYPE T402

FILE: rlstd007-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		70



RECTANGULAR TUBE SLEEVE MEMBER DETAIL

(See Tube Fabrication Detail)



TUBE FABRICATION DETAILS (5)

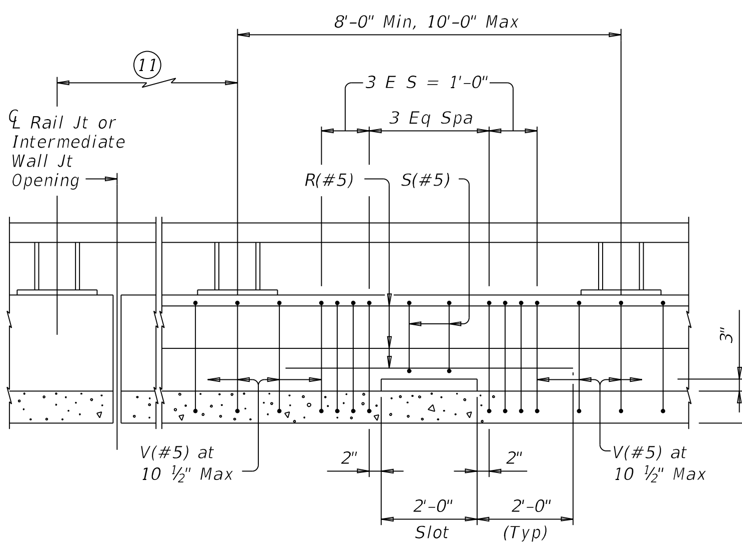
RAIL DATA FOR HORIZONTAL CURVES

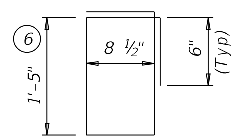
	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
Rail Members	Over 2800'	29'-0"	Straight rail sections
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown (13)
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius (13)

ELLIPTICAL TUBE & ELLIPTICAL SLEEVE MEMBER

8" x 4 7/8" Ellipse	Elliptical Sleeve Member	
Material	Material	Thickness
6" Dia Std Pipe ASTM A53 E or S Gr B)	ASTM A53 Gr B	0.353"
	ASTM A36 or A500 Gr B	0.339"
	API-5LX52	0.224"
6 5/8" O.D. Pipe x 0.188" API-5LX52	ASTM A53 Gr B	0.339"
	ASTM A36 or A500 Gr B	0.325"
	API-5LX52	0.188"

Notes: Other sections of equal or greater strength are acceptable for elliptical sleeves. The major and minor diameters of the rail member may vary +/- 0.1875" from plan dimension. However, the difference between the outside diameters of the elliptical sleeve and the inside diameters of the rail member must not exceed 0.25 inches.

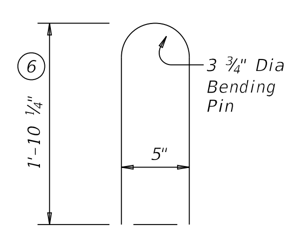




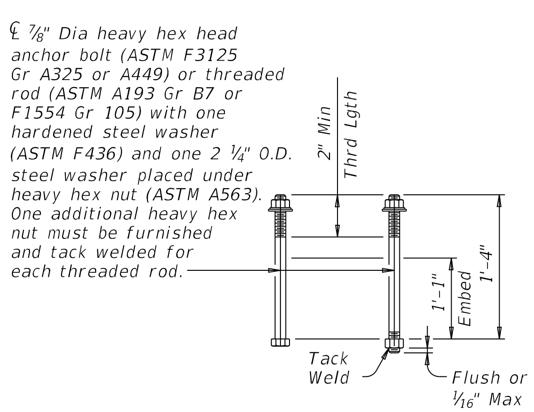
BARS S(#5)

OPTIONAL SIDE SLOT DRAIN DETAILS

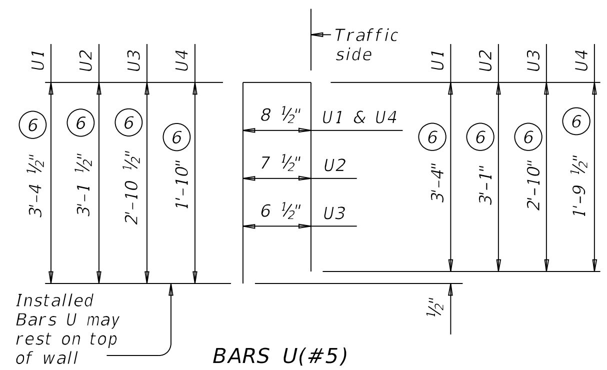
Note: Center Side Slot Drains between rail posts within the limits shown. Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



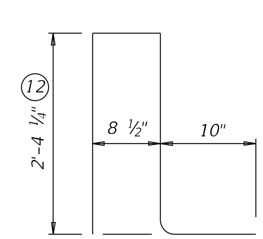
BARS wU(#5)



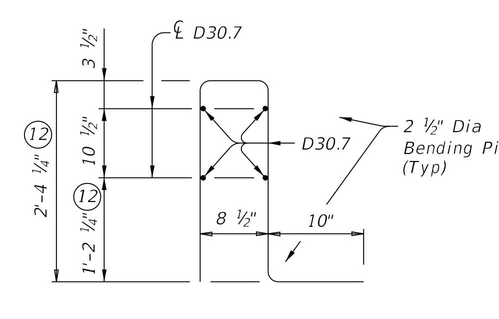
CAST-IN-PLACE ANCHOR BOLT OPTIONS (9)



BARS U(#5)



BARS V(#5)



OPTIONAL WELDED WIRE REINFORCING (WWR)

(5) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(6) Increase 2" for structures with overlay.

(9) See "Material Notes" for anchor bolt information.

(11) Slots are not allowed in areas where there is a joint in the concrete parapet between rail post.

(12) Length shown for 6 1/4" Min bar embedment with no overlay. Adjust as required.

(13) Shop drawings for approval required for tubular steel sections.

CONSTRUCTION NOTES:

This rail may be slipformed if approved by the Engineer when adhesive anchor bolts are used. At the Contractor's option anchor bolts may be cast with the parapet (See Cast-in-Place Anchor Bolt Options).
Slipforming parapet is not allowed if anchor bolts are cast with parapet wall.
If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a 3/8" width x 1/4" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.
Rail parapet must be plumb unless otherwise approved. Steel posts must be square to the top of parapet. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.
Cap all ends of tubular steel sections at parapet.
Rail member sections must have at least two posts but not more than four.
Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.
Chamfer all exposed concrete corners.

MATERIAL NOTES:

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.
Anchor bolts must be 7/8" Dia ASTM A193 Gr B7 fully threaded rods with heavy hex nuts, one hardened steel washer (ASTM F436), and one (2 1/4" O.D.) steel washer each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 17 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
Optional cast-in-place anchor bolts must be 7/8" Dia ASTM F3125 Gr A325 or A449 bolts (or A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one heavy hex nut and one hardened steel washer (ASTM F436) plus one (2 1/4" O.D.) steel washer at each bolt. Nuts must conform to ASTM A563 requirements.
Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Deformed Welded Wire Reinforcement (WWR) ASTM A1064 may be substituted for Bars R, and V, as shown. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows: Uncoated or galvanized ~ #5 = 2'-0"; Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated and approved to be of equal strength to railing with like geometry, which have been crash tested to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
Do not use this railing on bridges with expansion joints providing more than 5" movement.
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.
Average weight of railing with no overlay: 343 plf total; 313 plf (Conc); 30 plf (Steel).

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

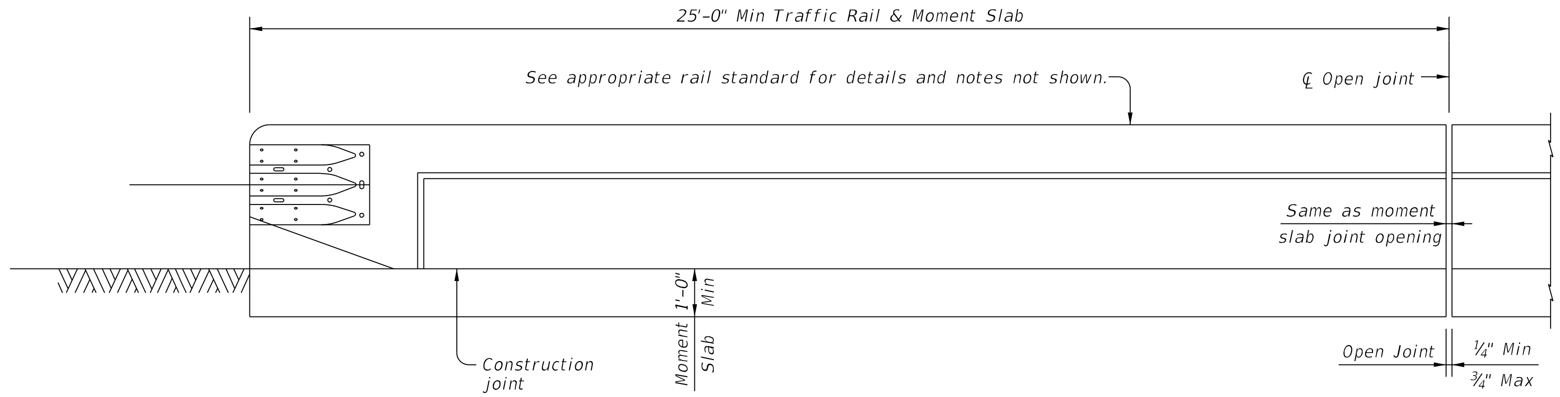
Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL

TYPE T402

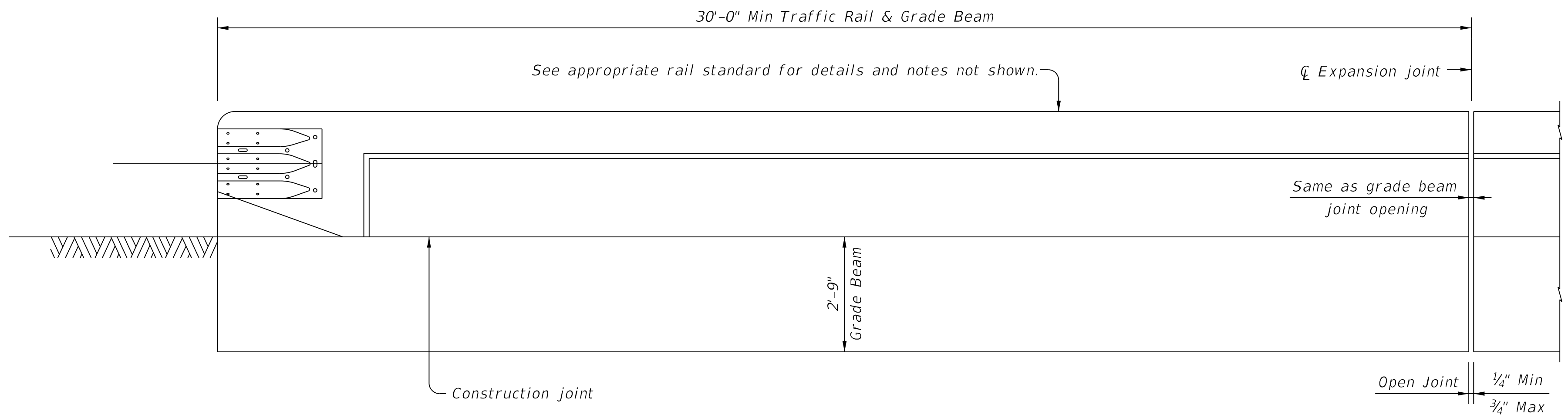
FILE: rlstd007-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	71

DATE: 11/15/2021 8:01:36 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD\STND\BRG\rlstd027-20.dgn



ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



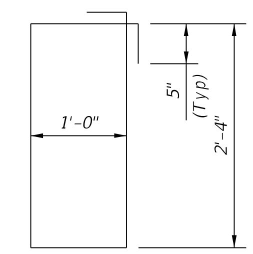
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)

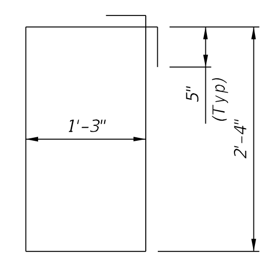
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

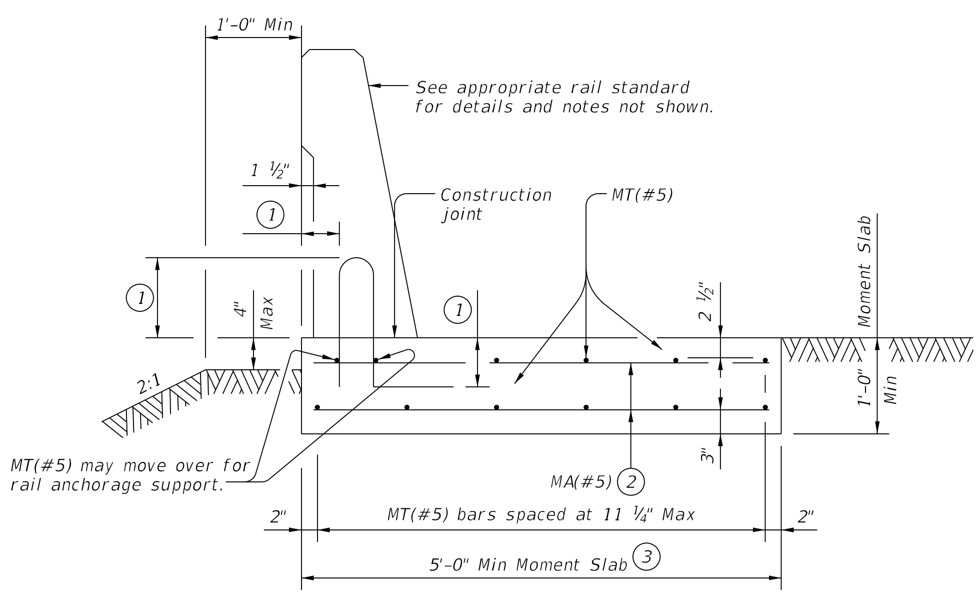
MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if required elsewhere.
Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

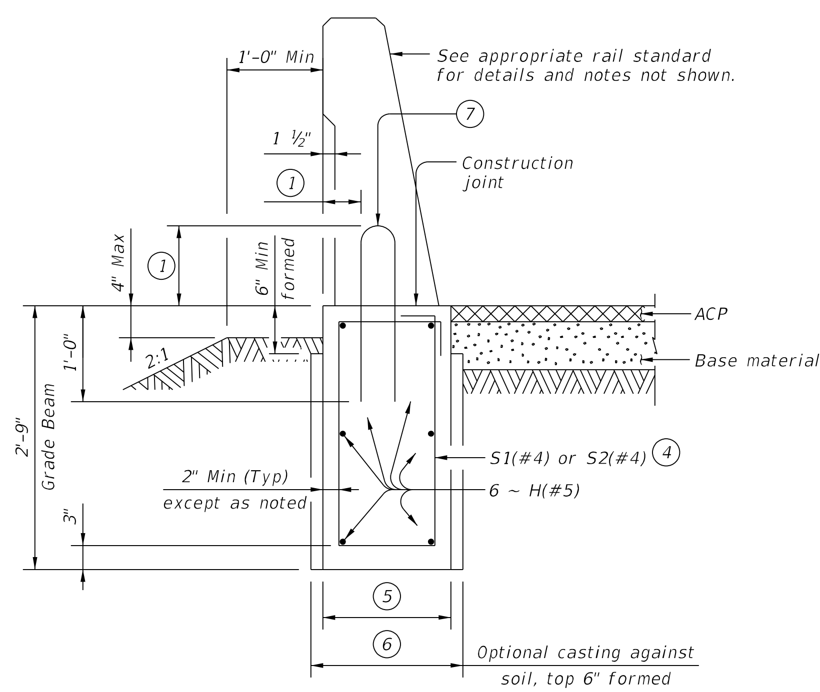
Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.
See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).
The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.
See appropriate rail standard for details and notes not shown.
This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.
Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.
The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.
Excavation will be subsidiary to other Items.

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



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

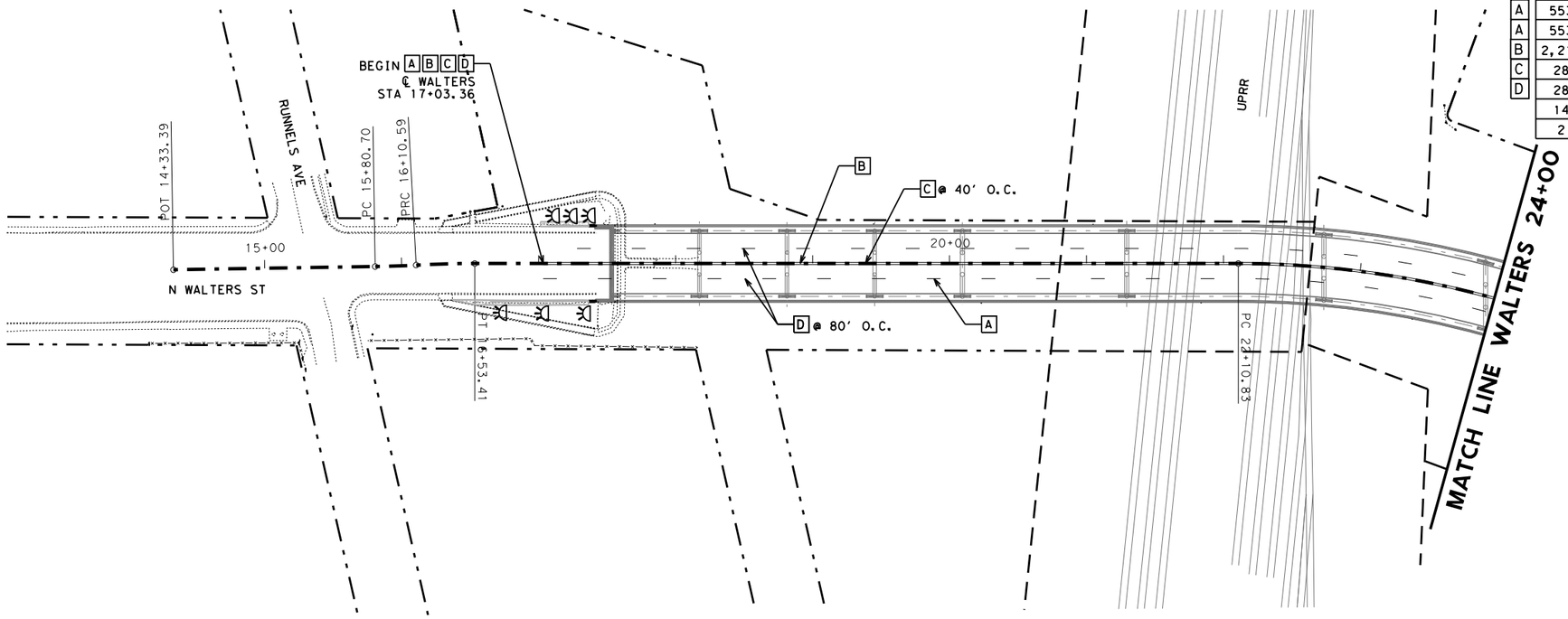
(Showing SSTR rail other rails are similar.)

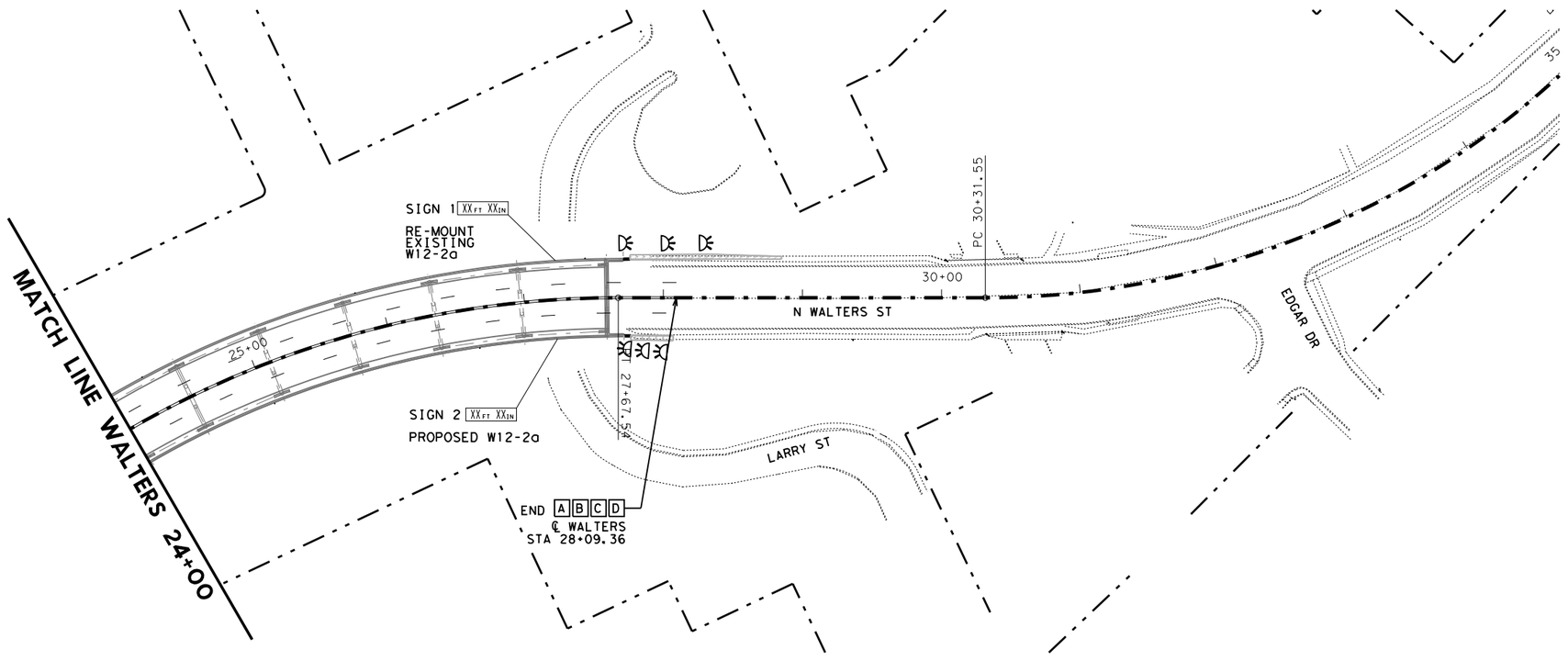
Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	N WALTERS ST
07-20: Added moment slab with rail foundation lengths.	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	72





SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION
14		SF	ALUMINUM SIGNS (TY A)
2		EA	IN SM RD SN SUP&AM (RAIL MOUNT)
12		EA	INSTL DEL ASSM (D-SW)SZ 1(FLX)GND
A 553		LF	RE PV MRK TY I (BLACK)4"(SHADOW)(100MIL)
A 553		LF	RE PM W/ RET REQ TY I (W)4"(BRK)(100MIL)
B 2,212		LF	RE PM W/ RET REQ TY I (Y)4"(SLD)(100MIL)
C 28		EA	REFL PAV MRKR TY II-A-A
D 28		EA	REFL PAV MRKR TY II-C-R
14		SF	ALUMINUM SIGNS (TY A)
2		EA	IN SM RD SN SUP&AM (RAIL MOUNT)

0 50 100

1. EXISTING SIGNS SHALL REMAIN IN PLACE, UNLESS DIRECTED BY THE ENGINEER.

LEGEND

- PROPOSED DELINEATOR
- A RE PV MRK TY I (BLACK)4"(SHADOW)(100MIL)
- A RE PM W/ RET REQ TY I (W)4"(BRK)(100MIL)
- B RE PM W/ RET REQ TY I (Y)4"(SLD)(100MIL)
- C REFL PAV MRKR TY II-A-A
- D REFL PAV MRKR TY II-C-R

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

SIGNING AND PAVEMENT MARKINGS

BEGIN PROJECT TO END PROJECT

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	73
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

...\SHT\SPM\0534_SPM01.dgn
11/12/2021 11:00:27 AM

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION: PREFABRICATED	MOUNTING DESIGNATION	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							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"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY = TYPE TY N TY S
73	1	W12-2a	(XX FT XX IN) (EXISTING SIGN TO REMAIN)	84" X 24"	X		BRIDGE MOUNT - EXISTING SIGN TO REMAIN					N
	2	W12-2a	(XX FT XX IN)	84" X 24"	X		BRIDGE MOUNT - PROPOSED SIGN					N

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 installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.

3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: 11/12/2021 11:00:56 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_[illegible]

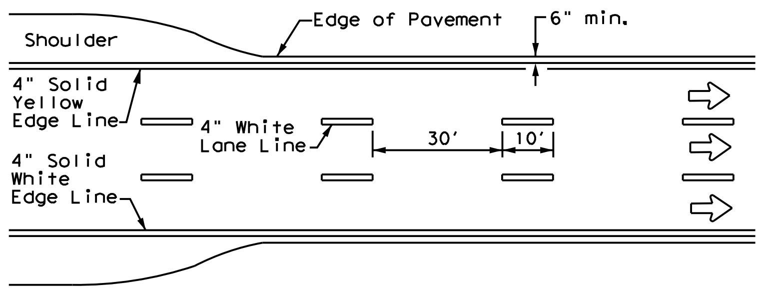
Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

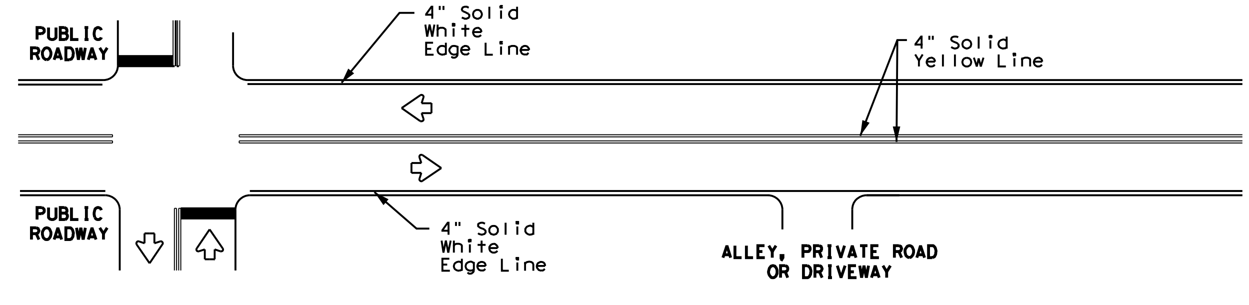
SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST
REVISIONS 4-16 8-16	DIST SAT	COUNTY BEXAR		SHEET NO. 74

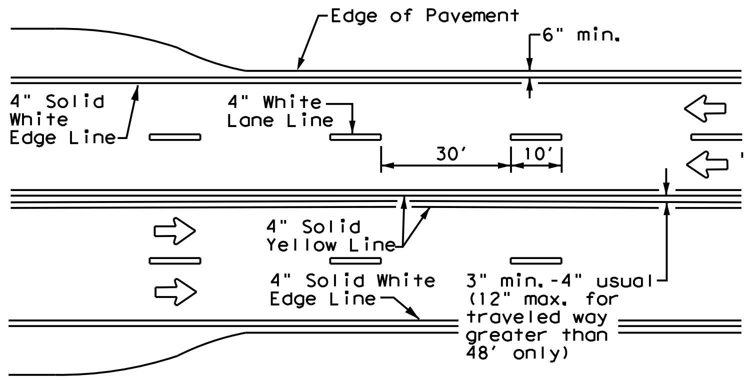
18



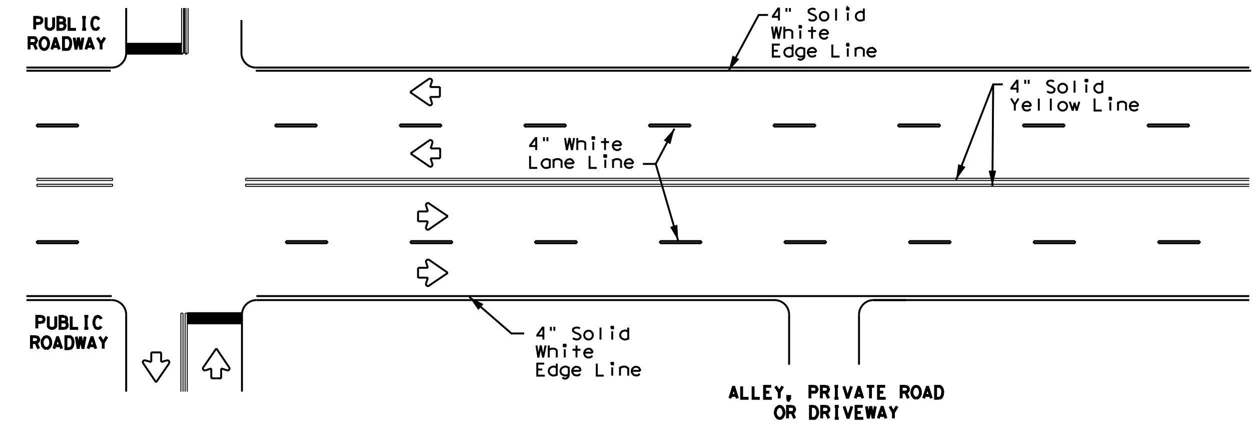
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



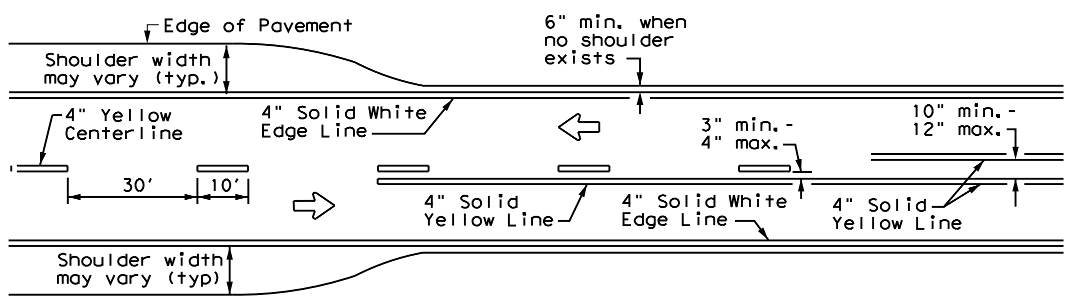
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



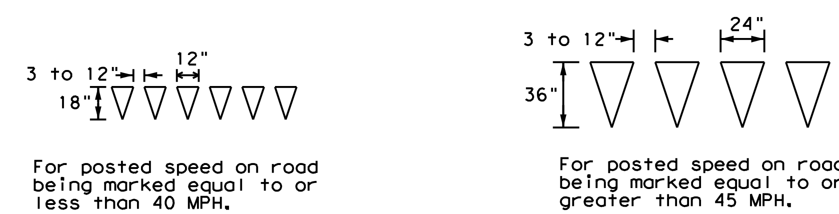
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



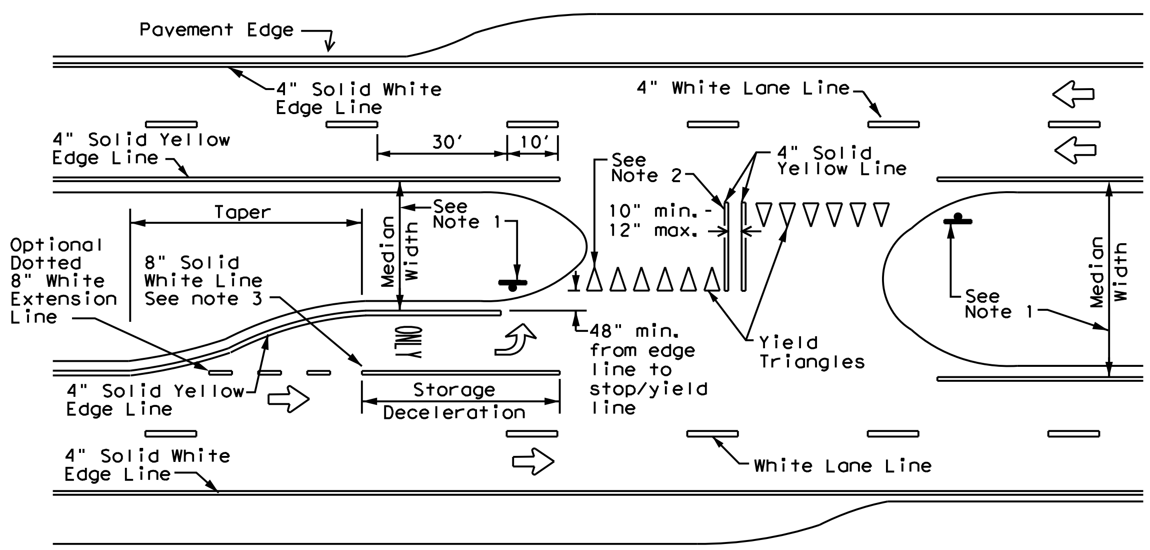
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

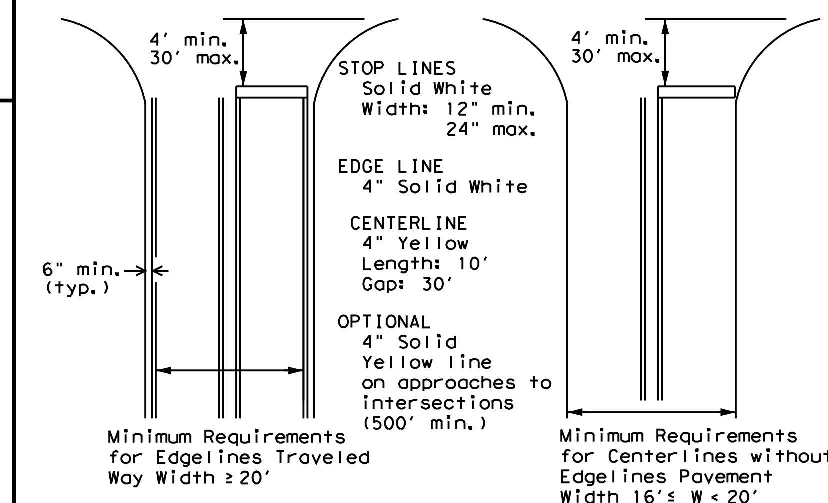
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles 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. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines 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 inside of edgeline to the inside of edgeline 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.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

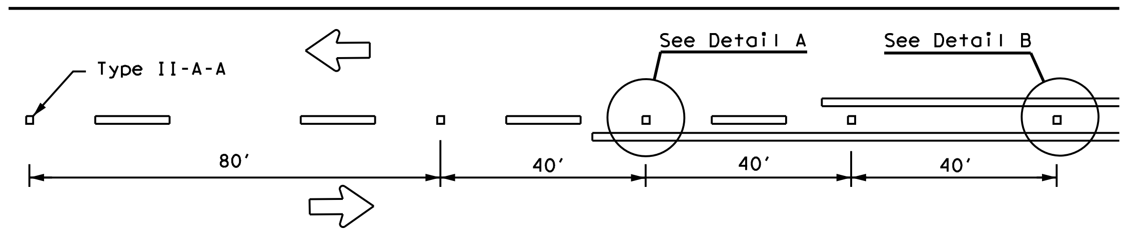
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

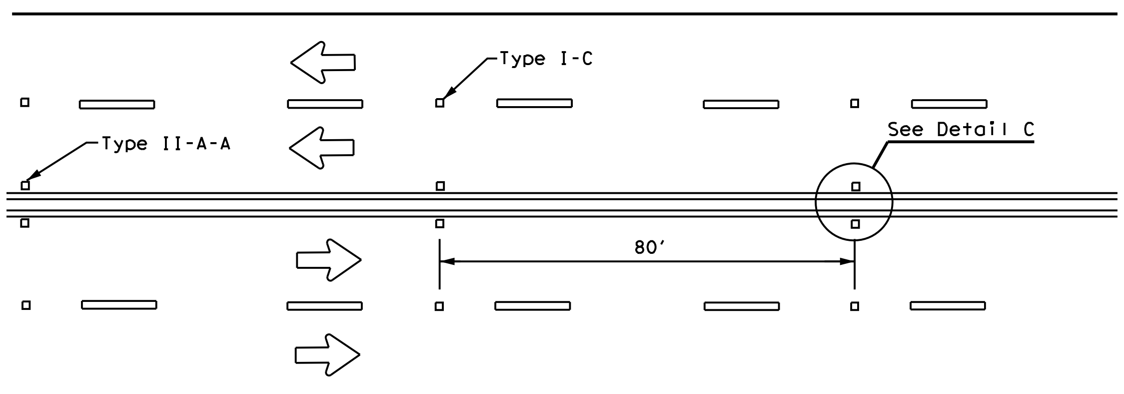
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0915	12	532	WALTERS ST
5-00 2-12	DIST		COUNTY	SHEET NO.
8-00 6-20	SAT		BEXAR	75

22A

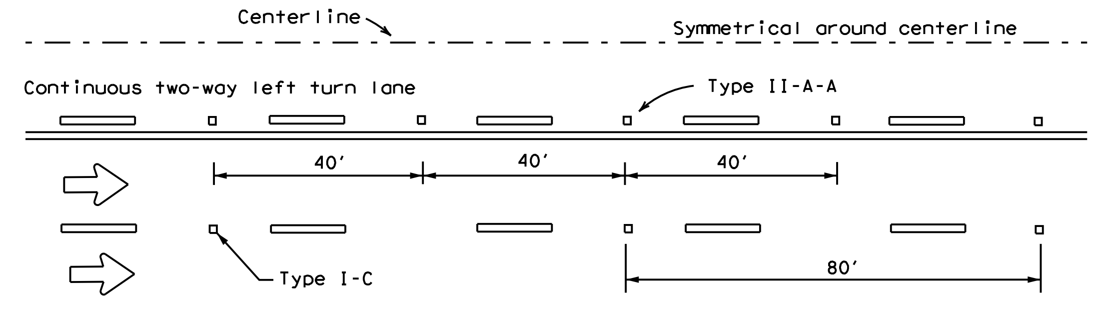
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



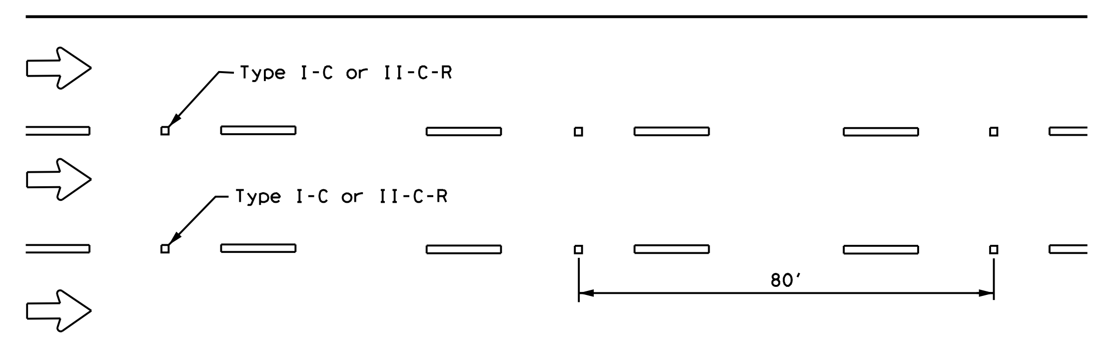
CENTERLINE FOR ALL TWO LANE ROADWAYS



CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

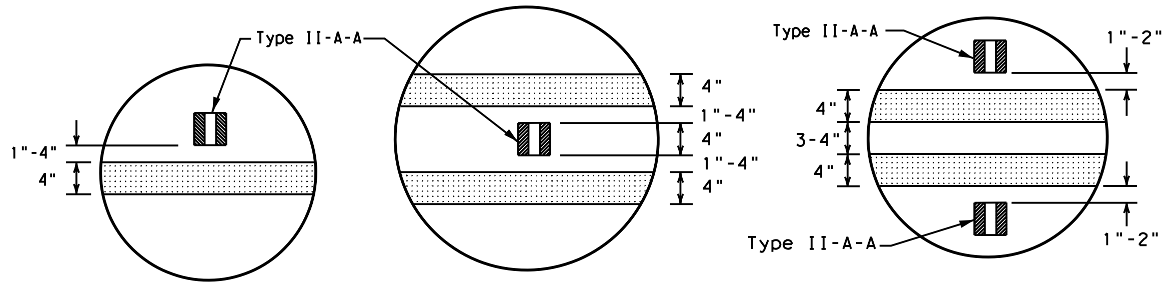


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

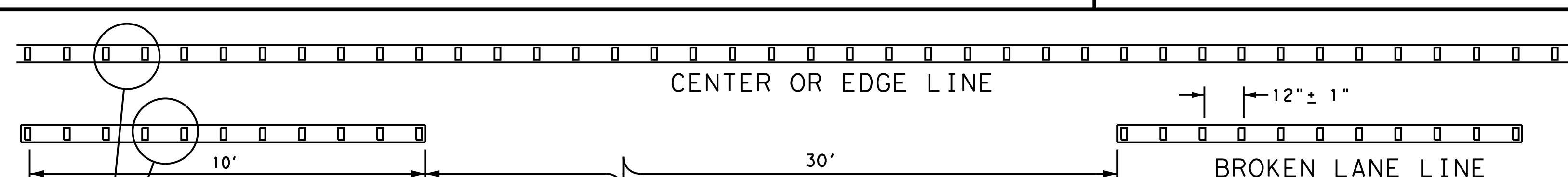


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

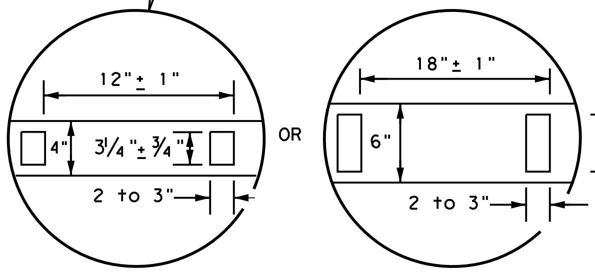


DETAIL "A" DETAIL "B" DETAIL "C"



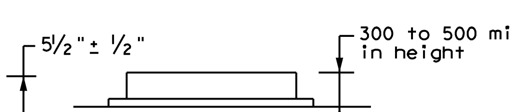
REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE



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.

NOTE

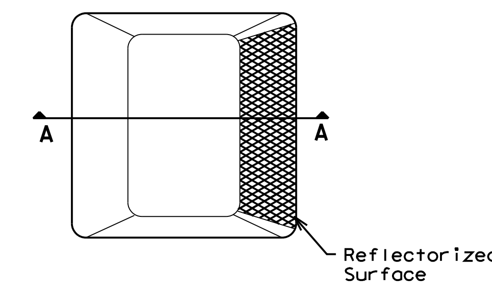
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

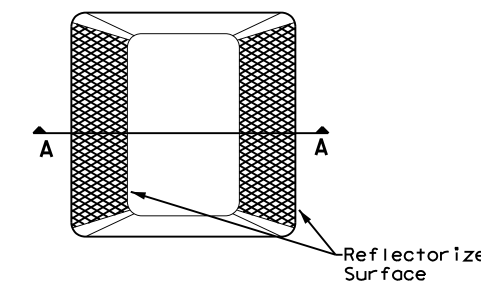
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

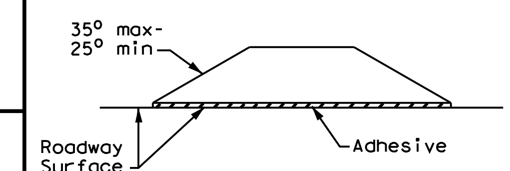
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

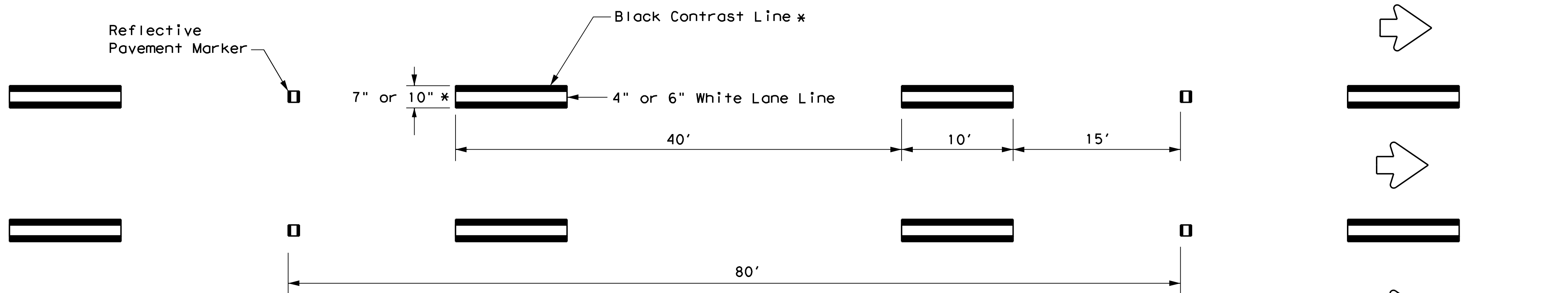
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0915	12	532	WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	76

22B

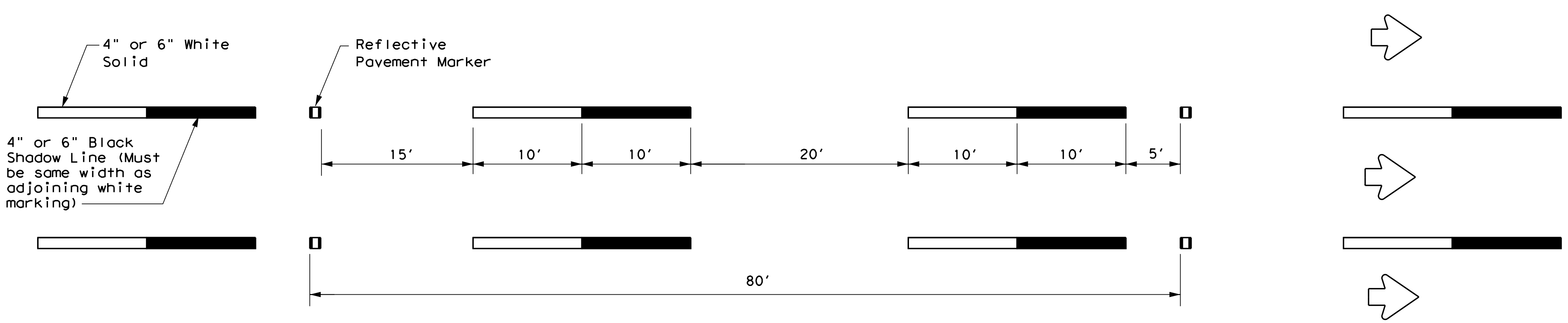
DATE: 11/12/2021 11:01:15 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301



CONTRAST LANE LINE DESIGN

* See contrast line dimensions table for width of black line.

CONTRAST LINE DIMENSIONS		
White	Black (per side)	Total Width
4"	1.5"	7"
6"	2"	10"



SHADOW LANE LINE DESIGN

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

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.

Texas Department of Transportation

Traffic Operations Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

CPM(1)-14

FILE: CPM(1)14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		77

22N

DATE: 11/12/2021 11:01:29 AM
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301...

DATE: 11/12/2021 11:01:38 AM
FILE: pw:\USLAS0-APP06CS.jacobs.com Jacobs*US*Bal*SS4\Documents\WFX05301*Walters*Street*Bridge\WFX05301\700 CADD-Subs\STNDTRF\smdgen.dgn

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)

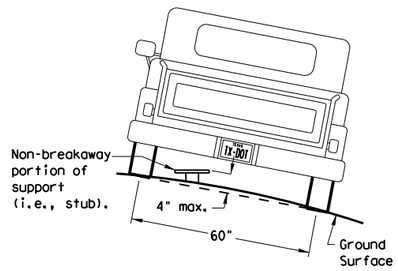
Anchor Type

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) to (SLIP-3))

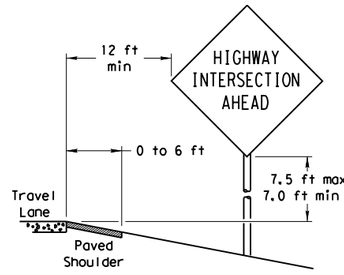
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

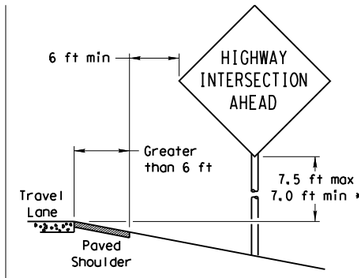
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

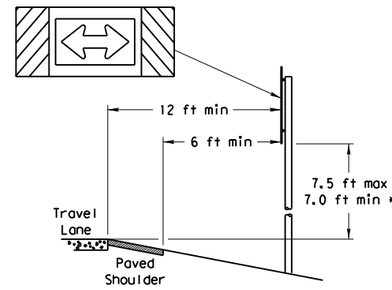
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



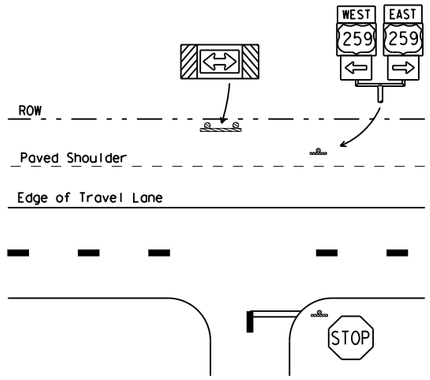
GREATER THAN 6 FT. WIDE

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.

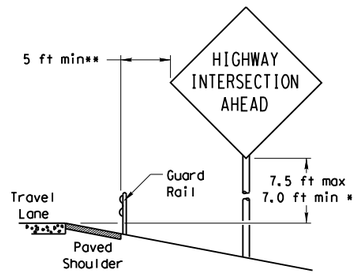
T-INTERSECTION



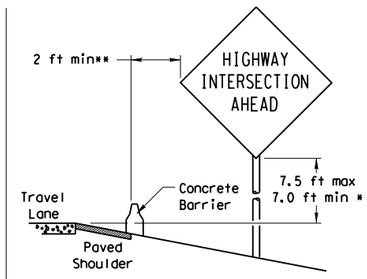
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



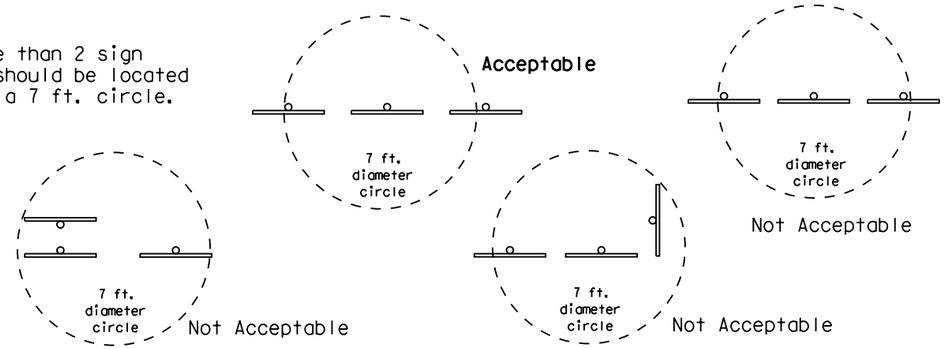
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

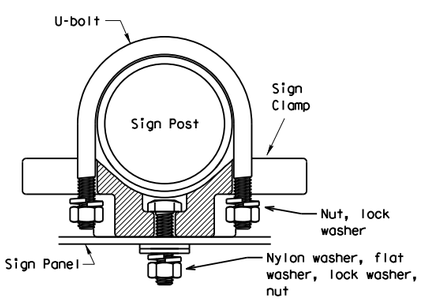
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

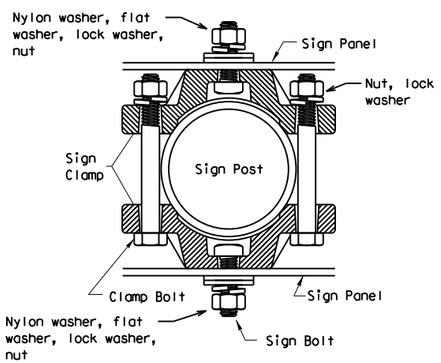


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

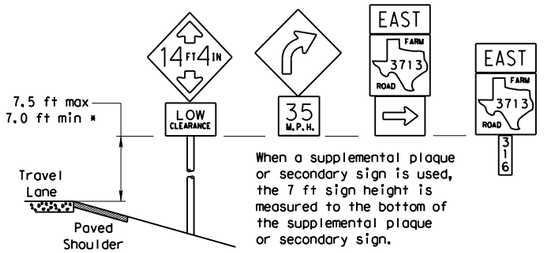
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



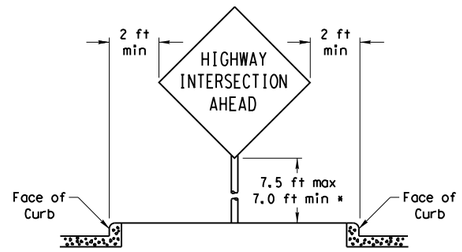
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



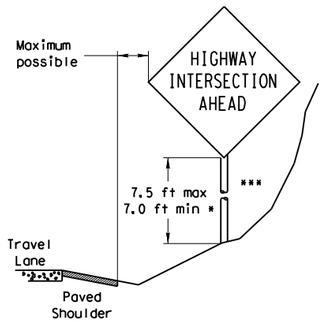
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

* 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

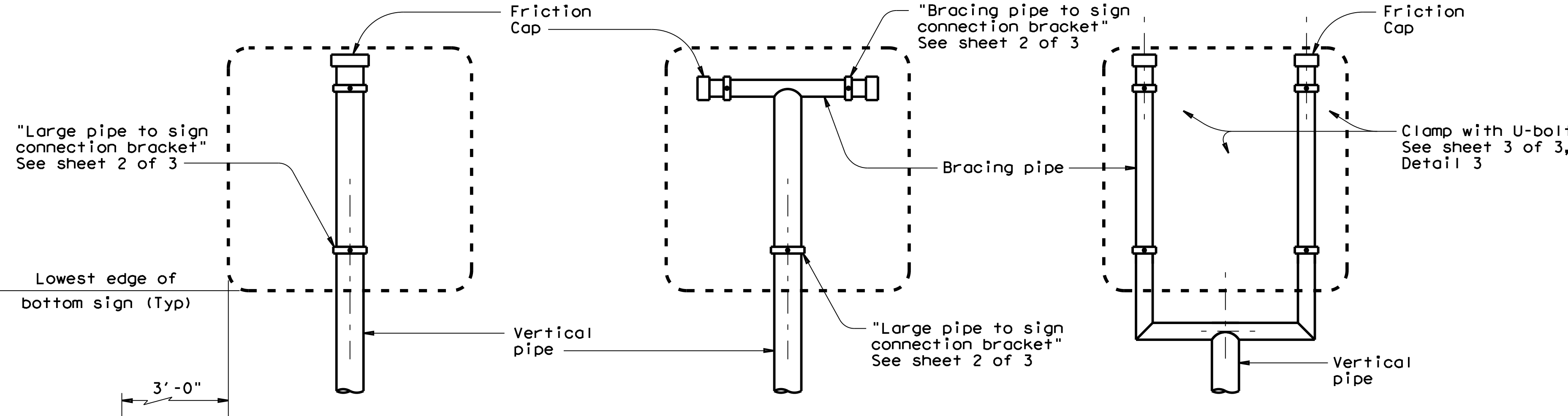
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

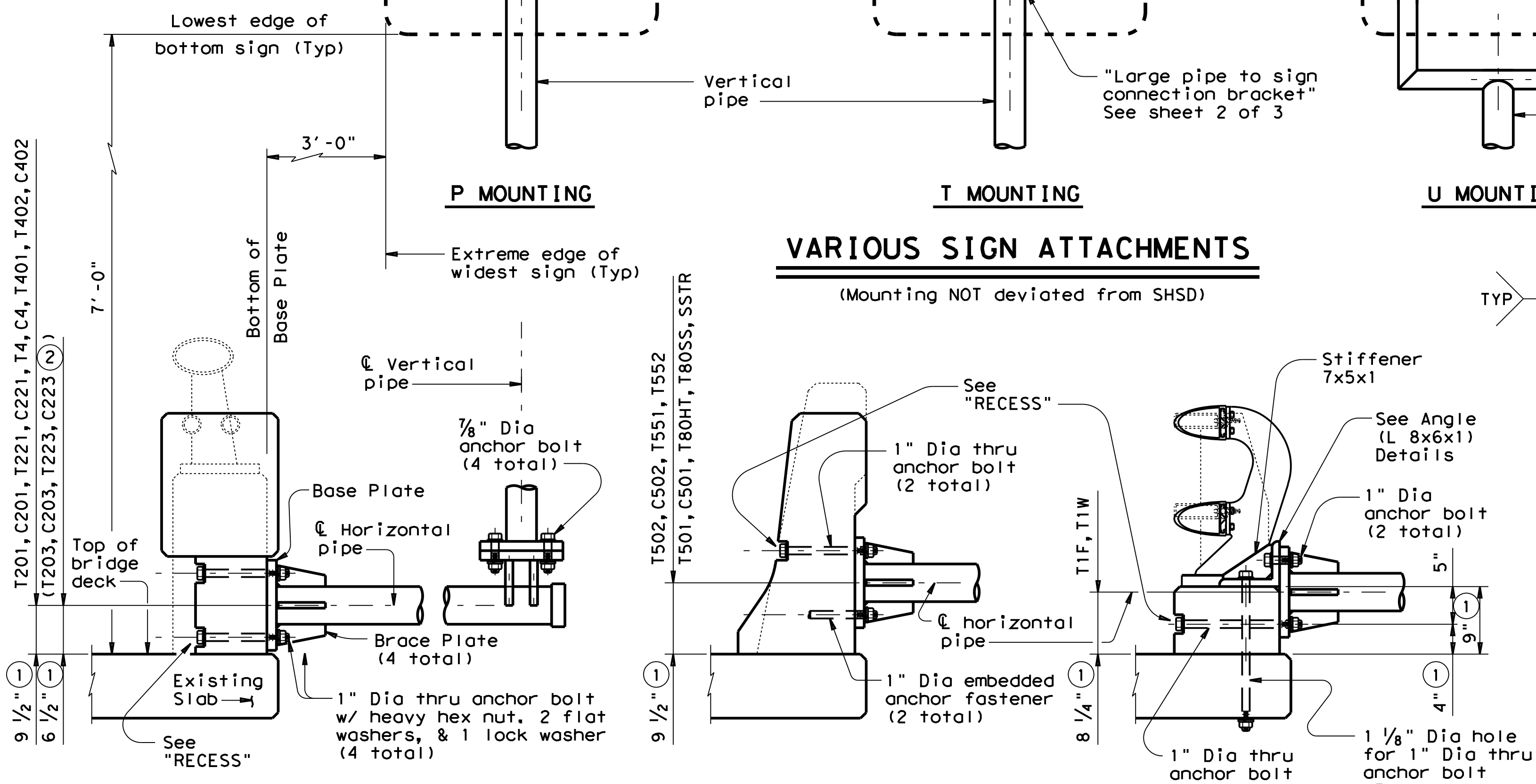
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		78



VARIOUS SIGN ATTACHMENTS

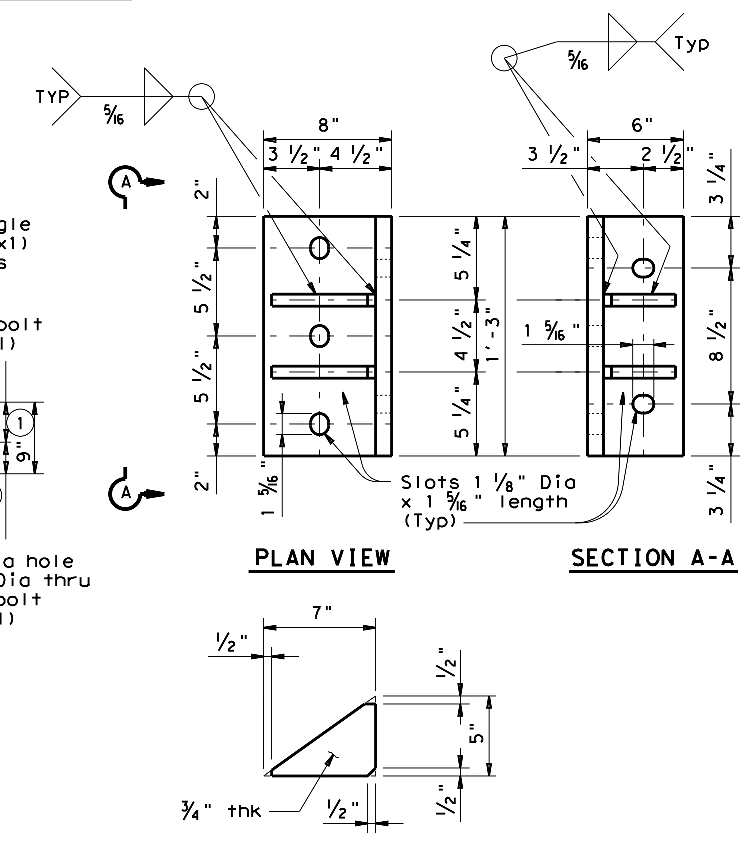
(Mounting NOT deviated from SHSD)



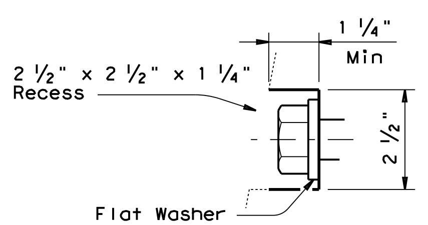
LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT

① Increase 2" for structure with overlay.

② Attached at ℄ post.



ANGLE (L 8x6x1) DETAILS



RECESS

PIPE SIZE AND THICKNESS			
Pipe Placement / Design Wind Speed	Horizontal	Vertical	Bracing
90 mph	5" X-Strong (.375")	4" X-Strong (.337")	2 ½" Standard (.203")
130 mph	6" X-Strong (.432")	5" X-Strong (.375")	3" X-Strong (.300")

GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

	130 mph	90 mph
Tension	12.5 kips	7.5 kips
Shear	9.0 kips	5.0 kips

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.

SHEET 1 OF 3

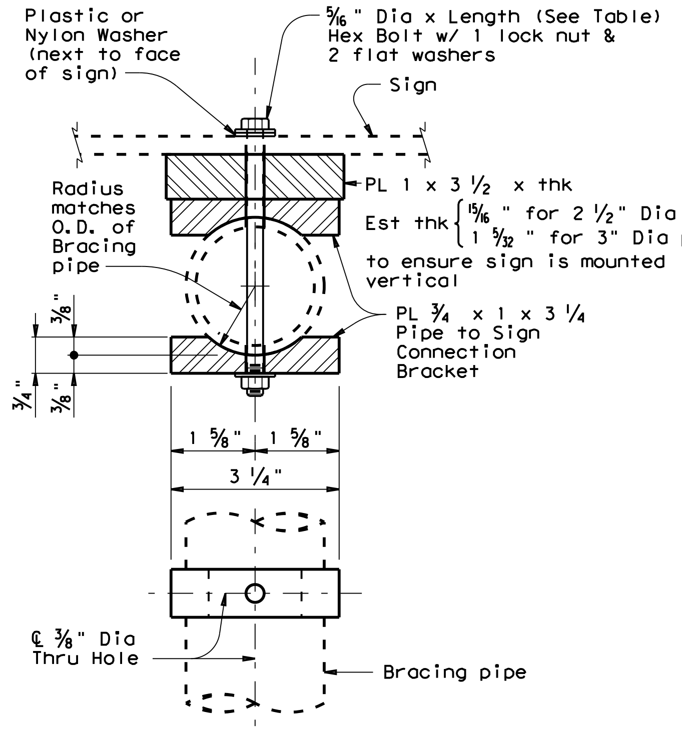
Texas Department of Transportation — Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-1)-14

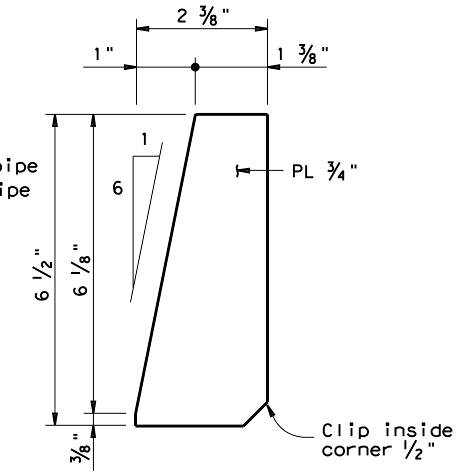
FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	79

266

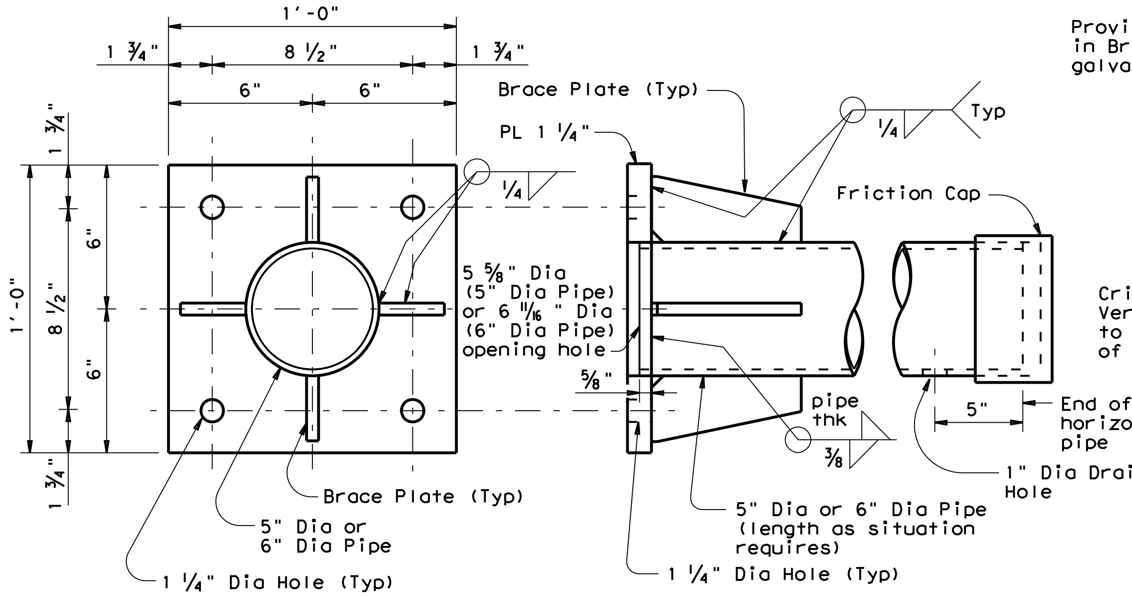


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

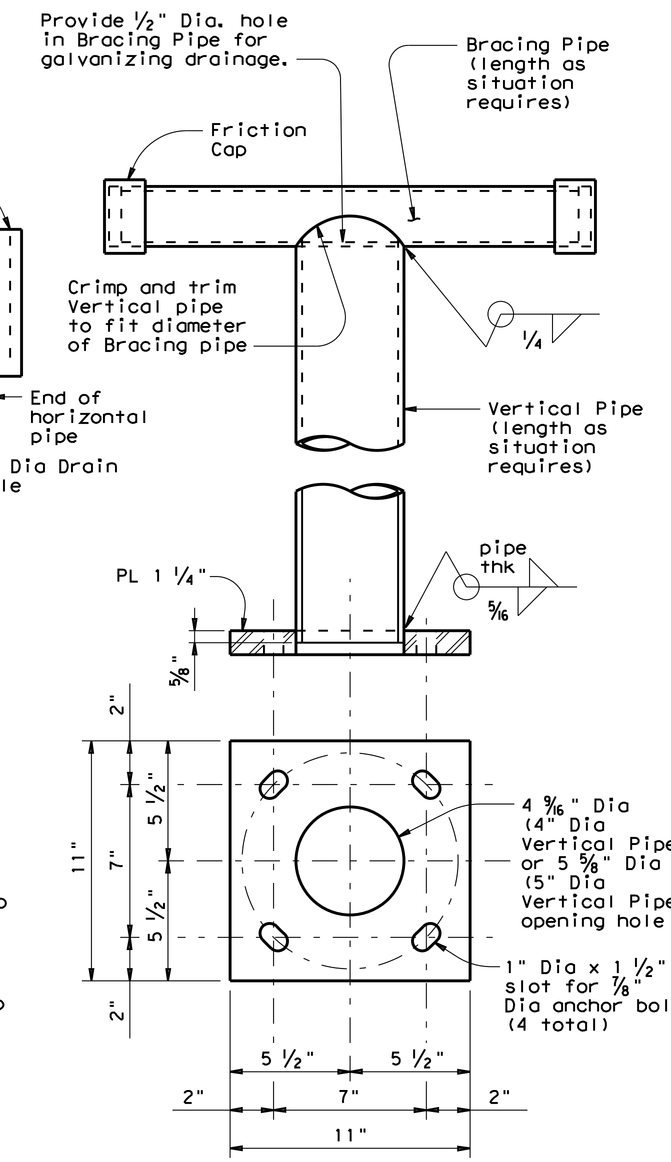
(Showing T Mounting)



BRACE PLATE DETAILS

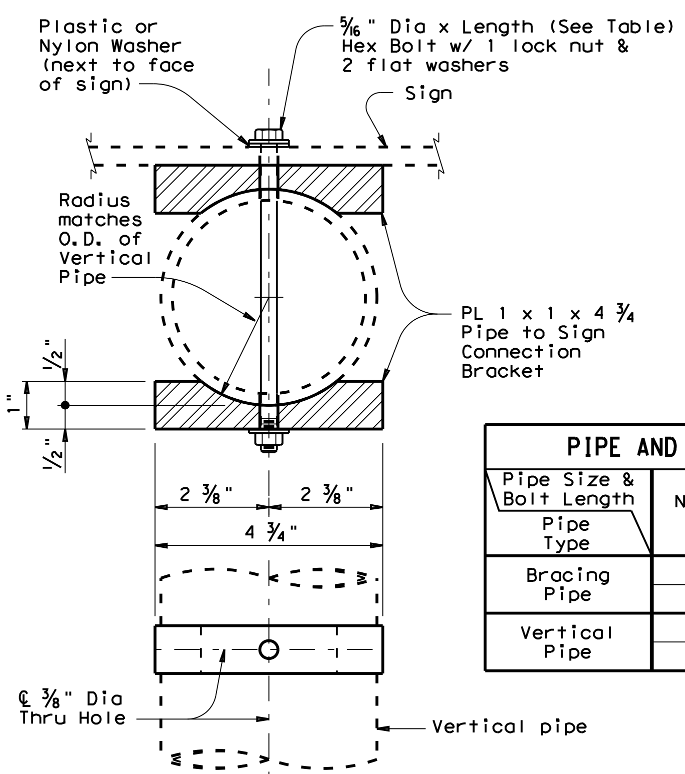


BASE PLATE DETAILS



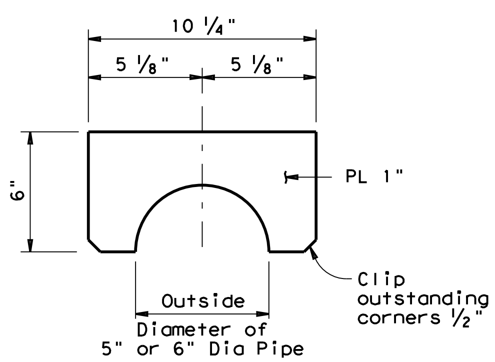
SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



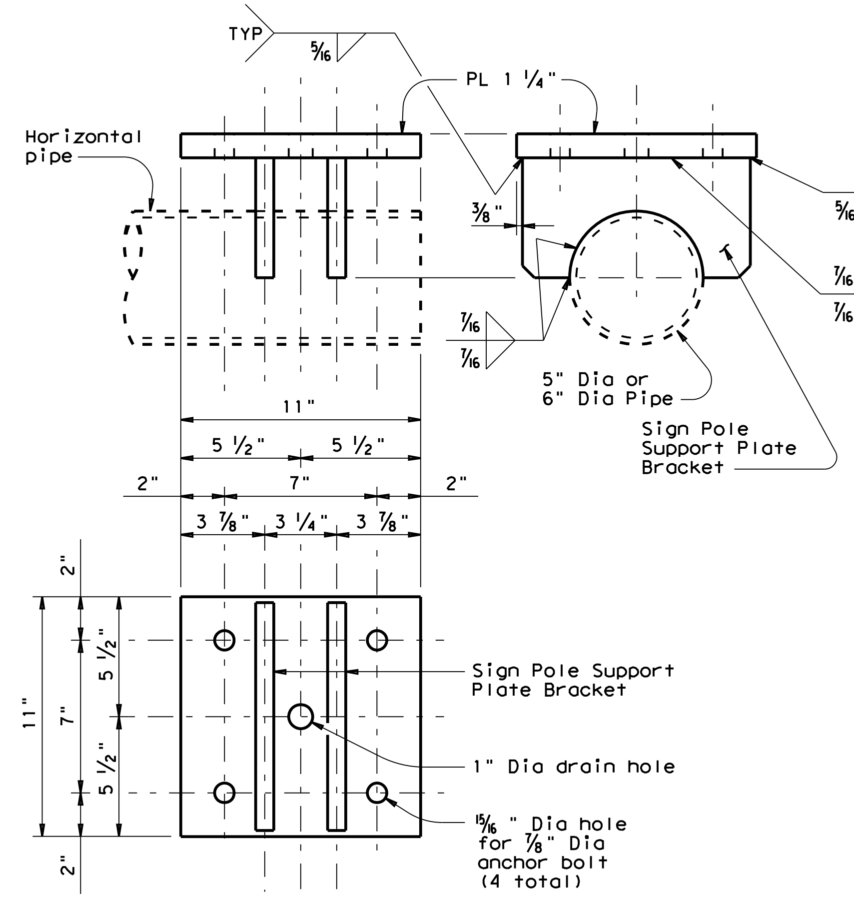
LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)



SIGN POLE SUPPORT PLATE BRACKET DETAILS

PIPE AND BOLT SPECIFICATIONS		
Pipe Size & Bolt Length / Pipe Type	Nominal Pipe Dia (in.)	Bolt Length (in.)
Bracing Pipe	2 1/2	6
	3	7
Vertical Pipe	4	7
	5	8



SIGN POLE SUPPORT PLATE DETAILS

SHEET 2 OF 3

Texas Department of Transportation — Traffic Operations Division Standard

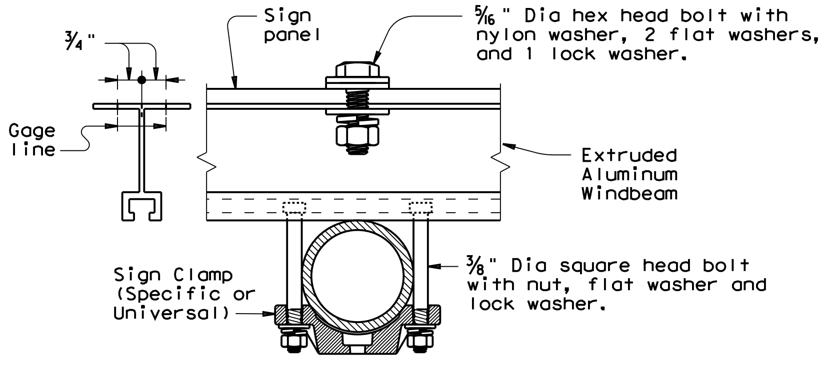
BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-2)-14

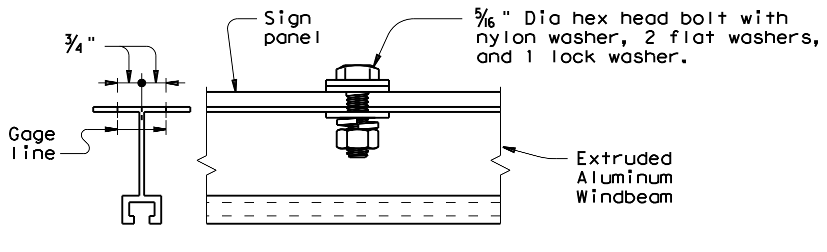
FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST
REVISIONS	DIST SAT		COUNTY BEXAR	SHEET NO. 80

26H

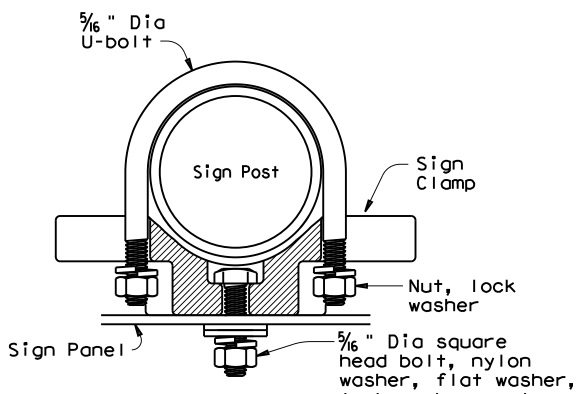
DATE: 11/12/2021 11:01:47 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301...



DETAIL 1



DETAIL 2

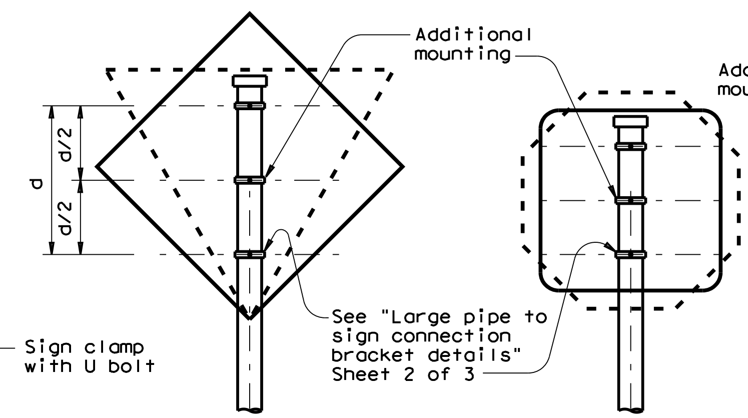


DETAIL 3

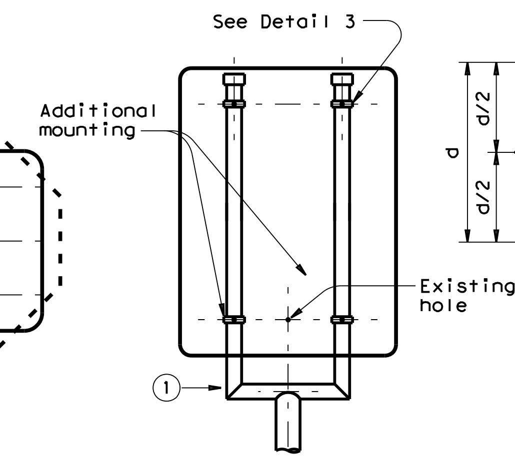
SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"		(Type 2) 36"x48" (Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72" (Type 3) 48"x84"			(Type 3) 60"x60"								(Type Special) 45"x36"		
130 mph	(Type 1) 30"x30" 36"x36"	(Type 3) 48"x48"		(Type 1) 36"x24" 36"x30"	(Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24" (Type 3) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"	(Type 1) 30"x36" 30"x42"	(Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" (Type 4) 48"x72" 48"x84"	(Type 3) 48"x60"	(Type 1) 36"x36"	(Type 3) 48"x48" 60"x60"					(Type 1) 48"x48"			(Type Special) 36"x36" 45"x36"		

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

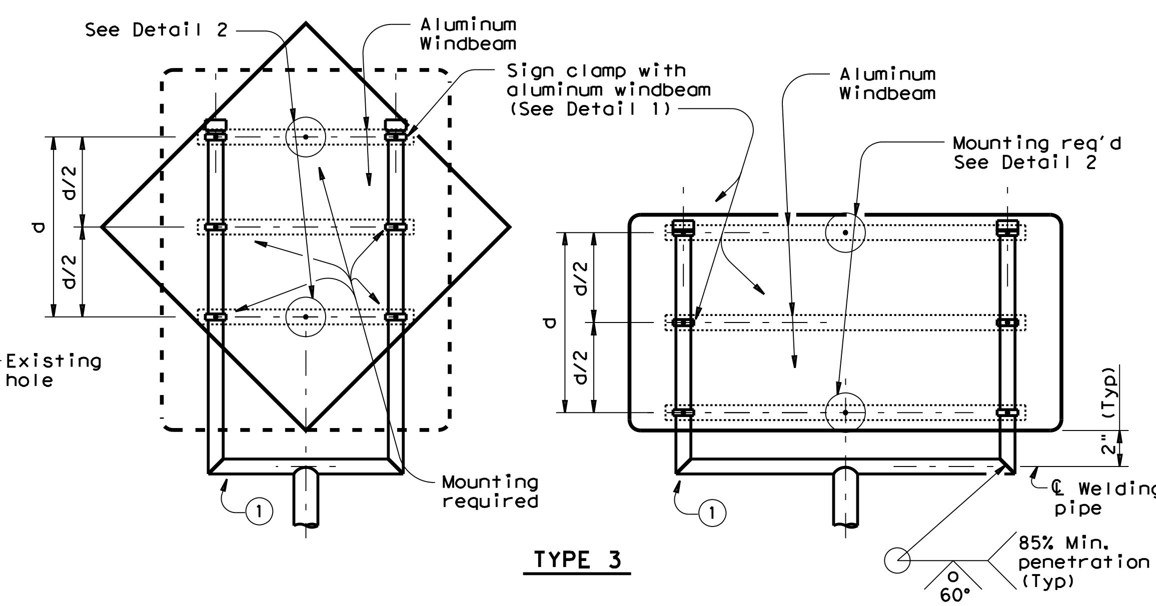
(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.



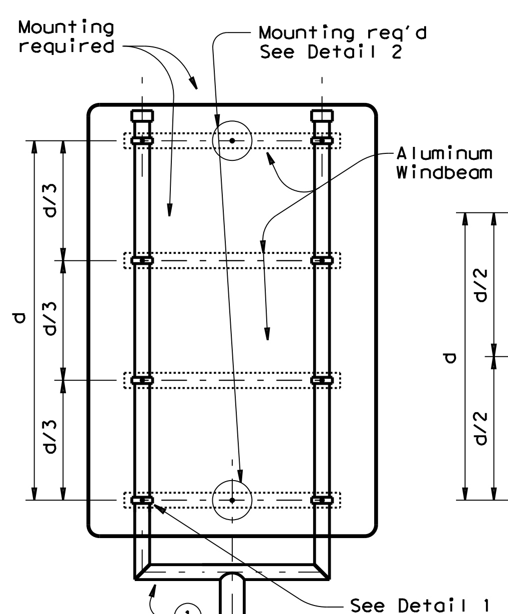
TYPE 1



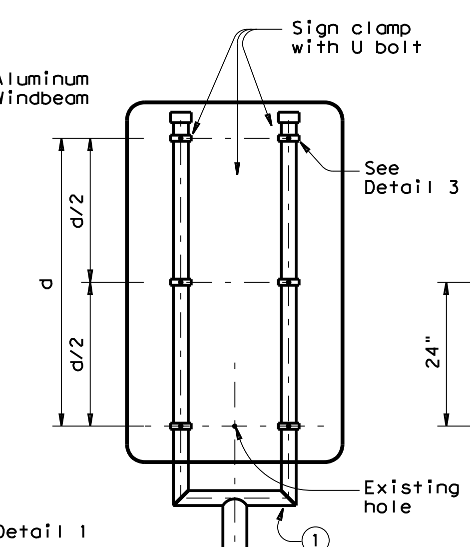
TYPE 2



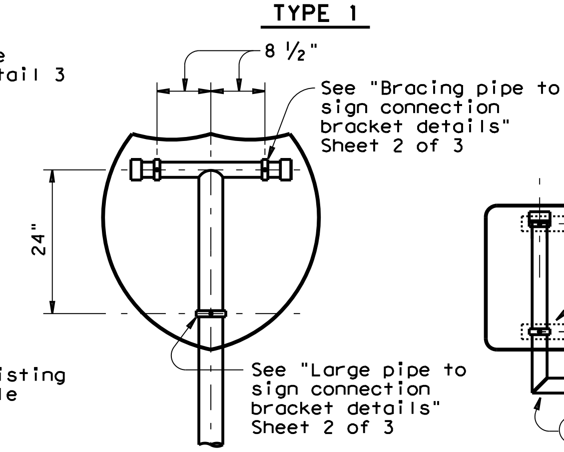
TYPE 3



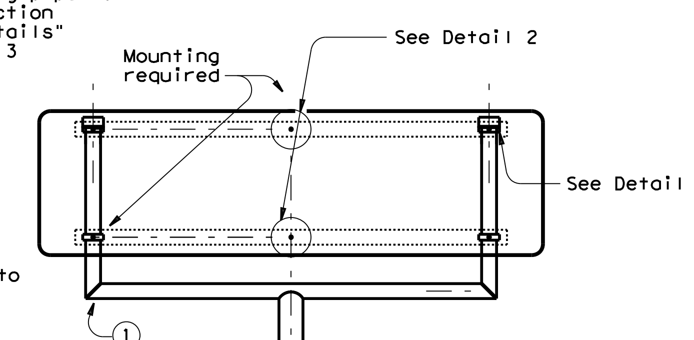
TYPE 4



TYPE 32



TYPE SPECIAL



TYPE 23

SHEET 3 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

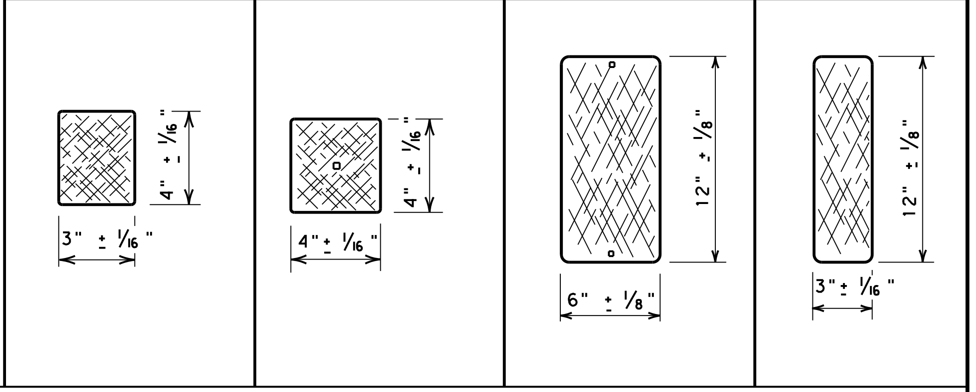
SMD(BR-3)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	81

26J

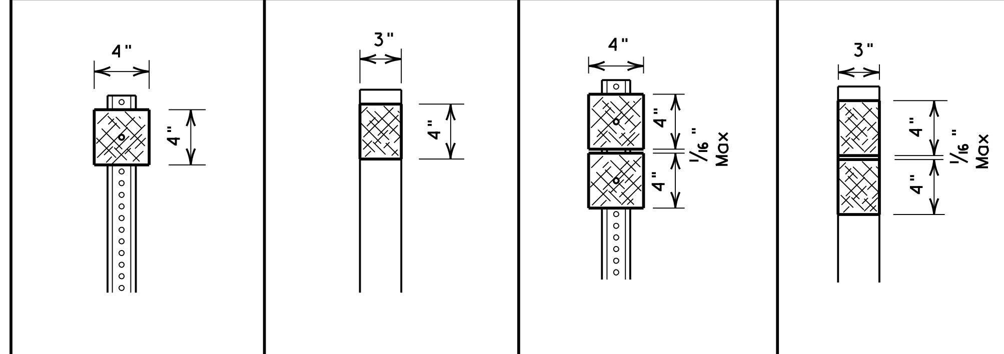
DATE: 11/12/2021 11:01:47 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301...

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS



	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE	(see drawing)			
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

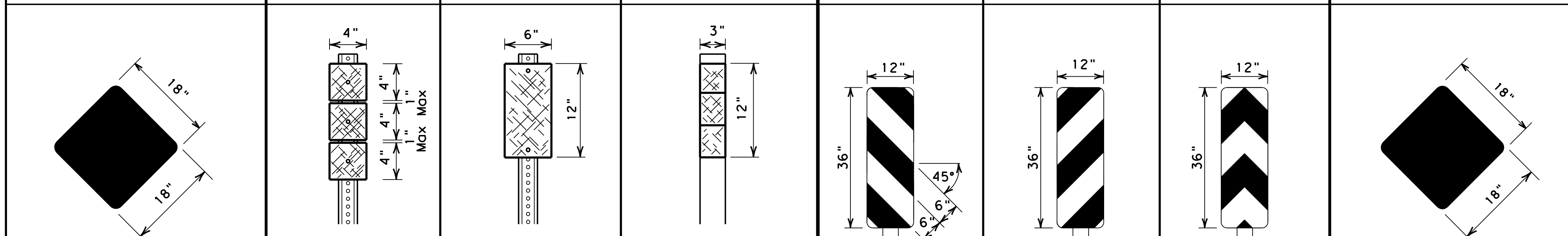
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

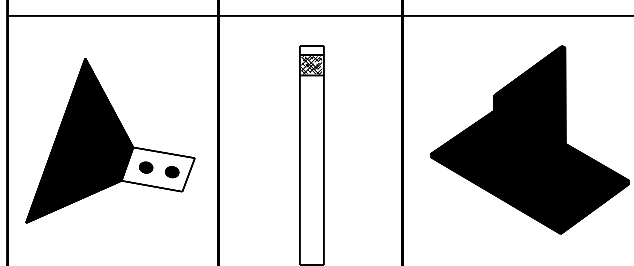


	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating 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

DEPARTMENTAL MATERIAL SPECIFICATIONS

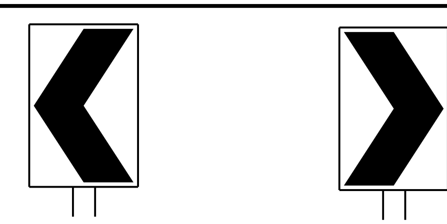
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)



	GF1	GF2	CTB
DEVICE	(see drawing)		
	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.		

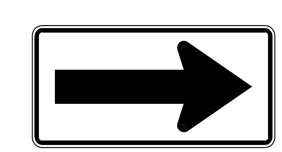
CHEVRONS



W1-8

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



W1-6

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).

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

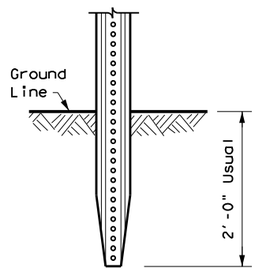
FILE: doml-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
© TxDOT August 2004	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST	
REVISIONS 10-09 3-15 4-10 7-20	DIST SAT		COUNTY BEXAR		SHEET NO. 82

DATE: 11/12/2021 11:02:06 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Mather signee

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

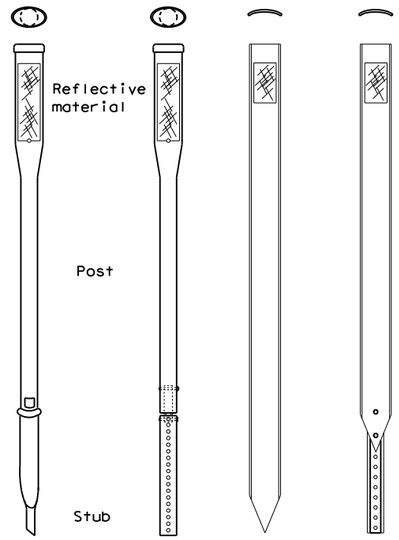


NOTES

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.

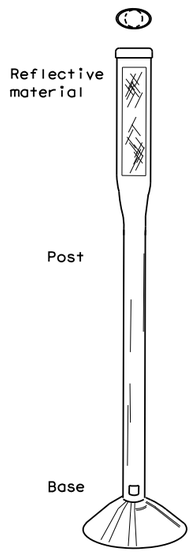
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



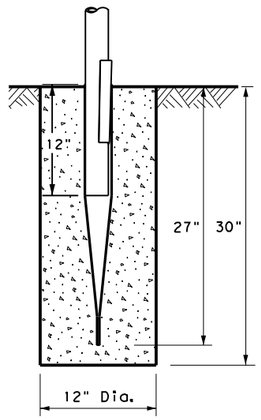
SURFACE MOUNT

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.

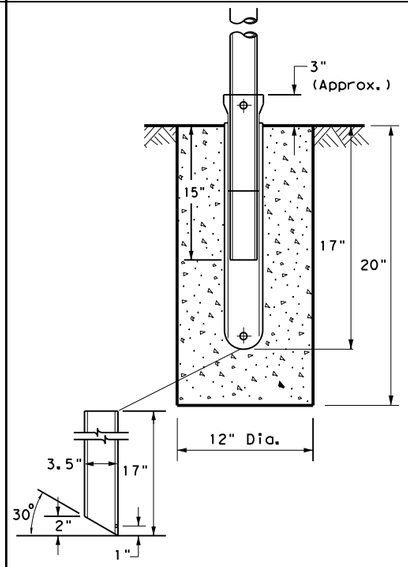
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

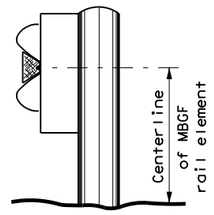
NOTE

1. Install per manufacturer's recommendations.

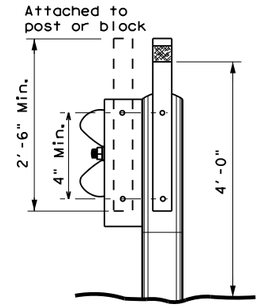
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

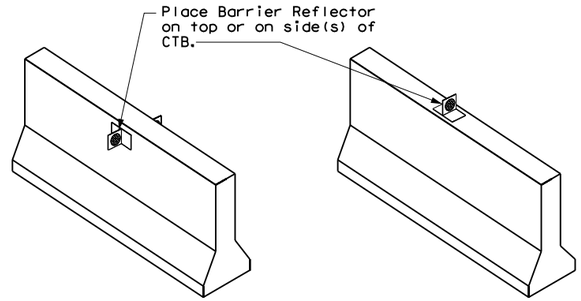
GF1



GF2



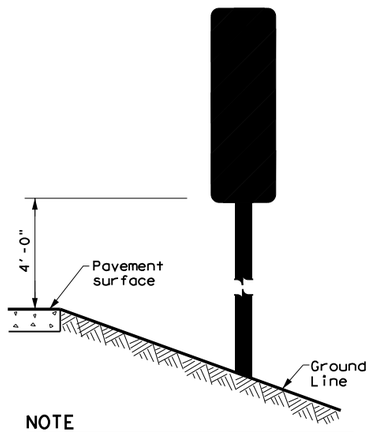
CONCRETE TRAFFIC BARRIER (CTB)



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.

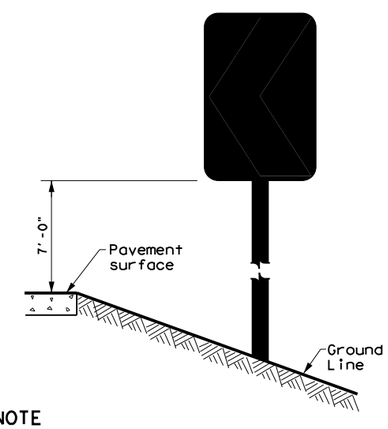
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

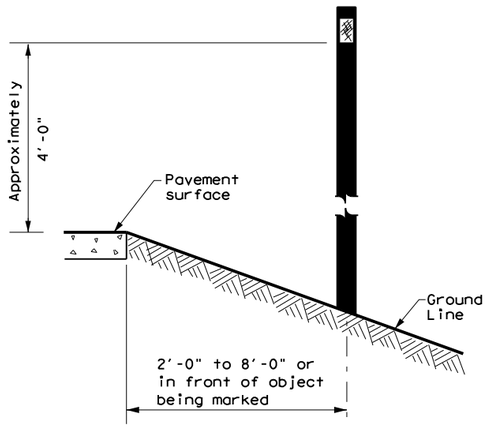
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

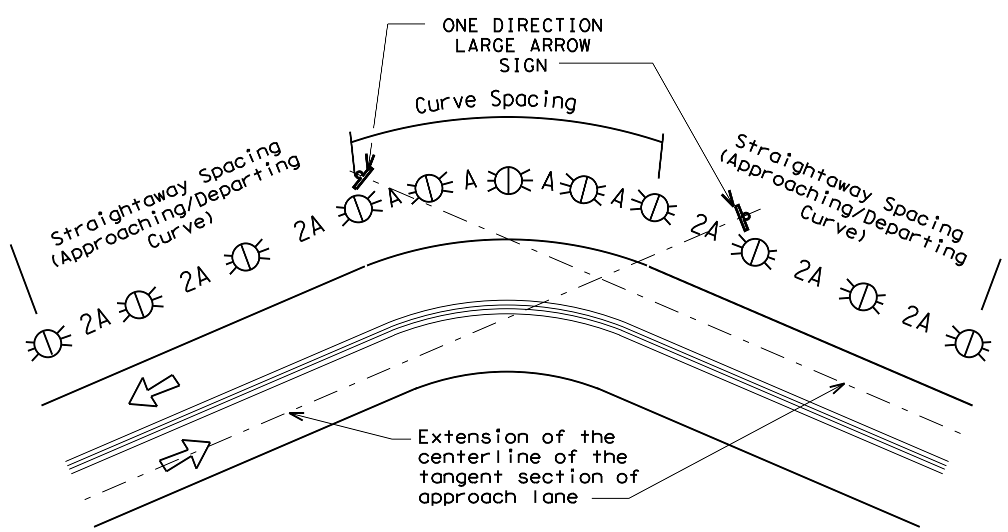
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	BEXAR		83

20B

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

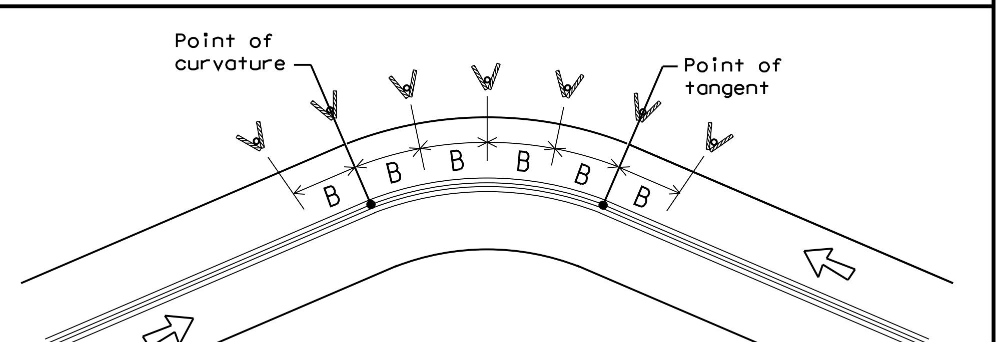
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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	Radius of Curve (FEET)	Spacing in Curve (FEET)	Spacing in Straightaway (FEET)	Chevron Spacing in Curve (FEET)
		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

Symbol	Meaning
(symbol)	Bi-directional Delineator
(symbol)	Delineator
(symbol)	Sign

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

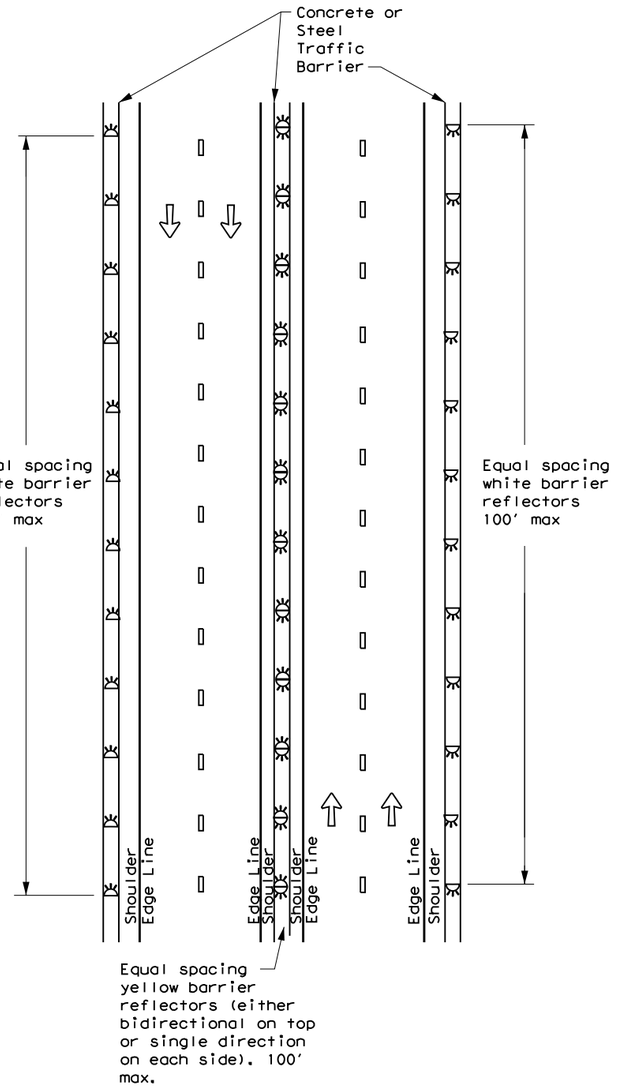
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT 0915	SECT 12	JOB 532	HIGHWAY WALTERS ST
REVISIONS 3-15 8-15 8-15 7-20	DIST SAT		COUNTY BEXAR	SHEET NO. 84

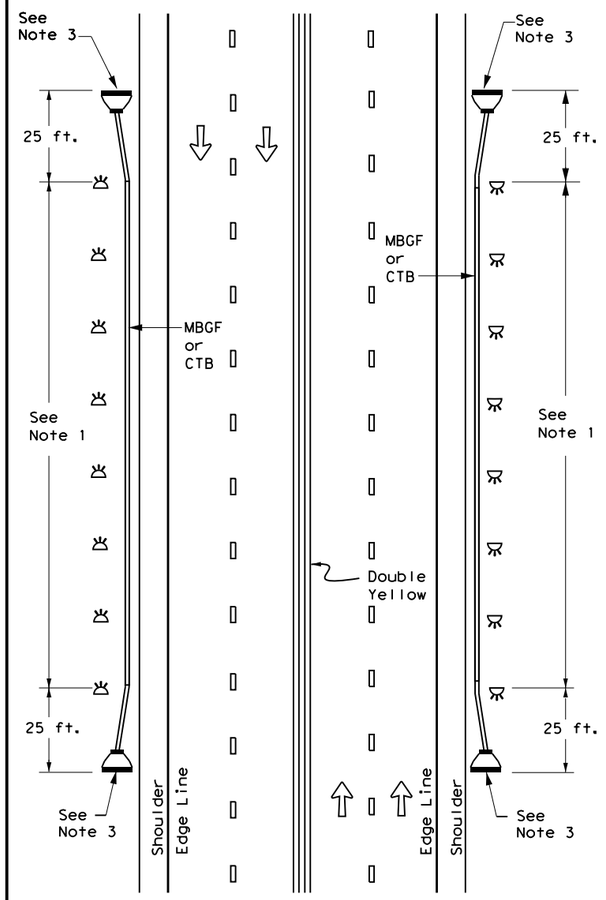
20C

DATE: 11/12/2021 11:02:26 AM
FILE: dw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Other_Stds\dom6-20.dgn

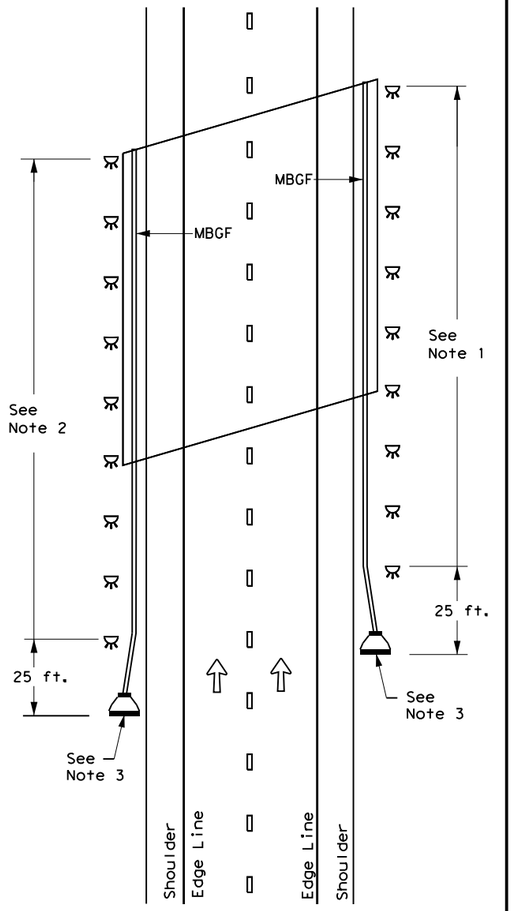
CONTINUOUS CONCRETE OR STEEL BARRIER



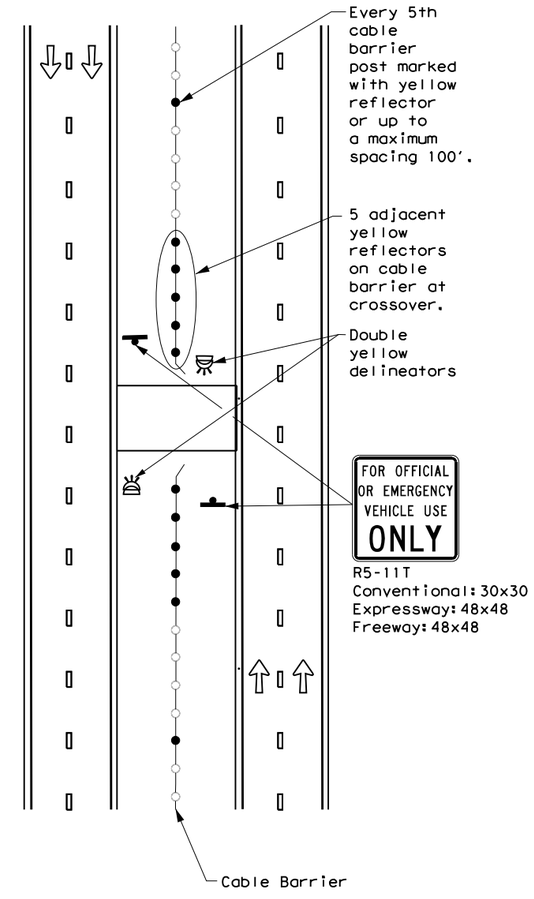
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

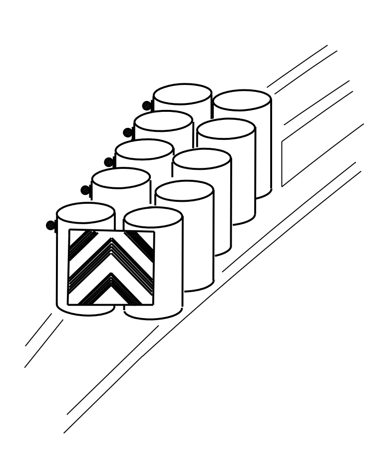
Traffic Safety Division Standard

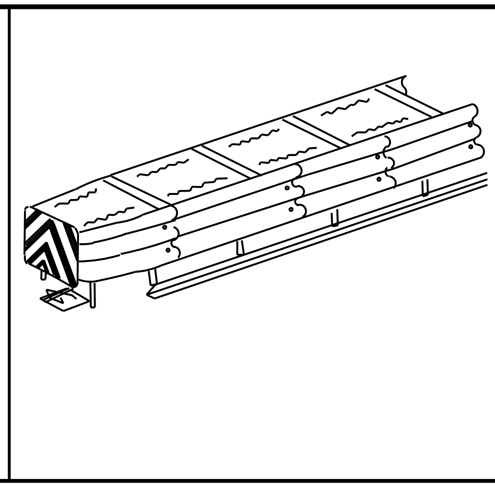
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

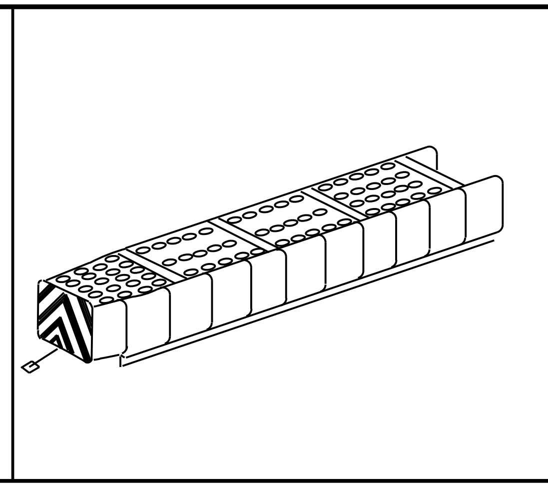
D & OM(6)-20

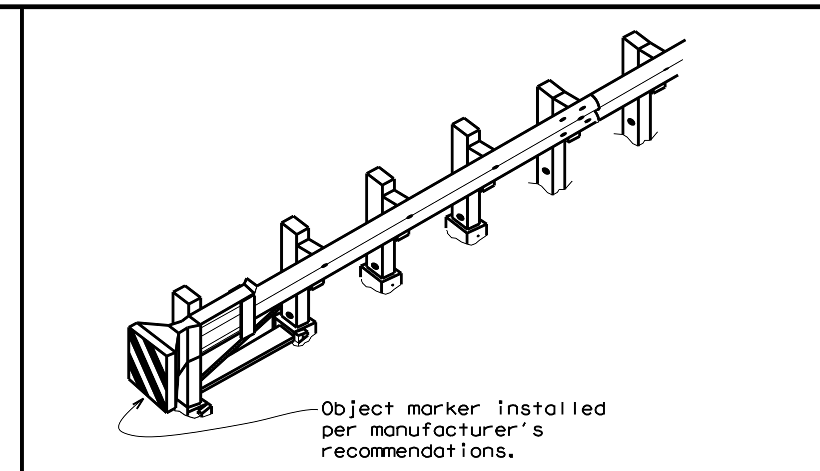
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
7-20	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		85

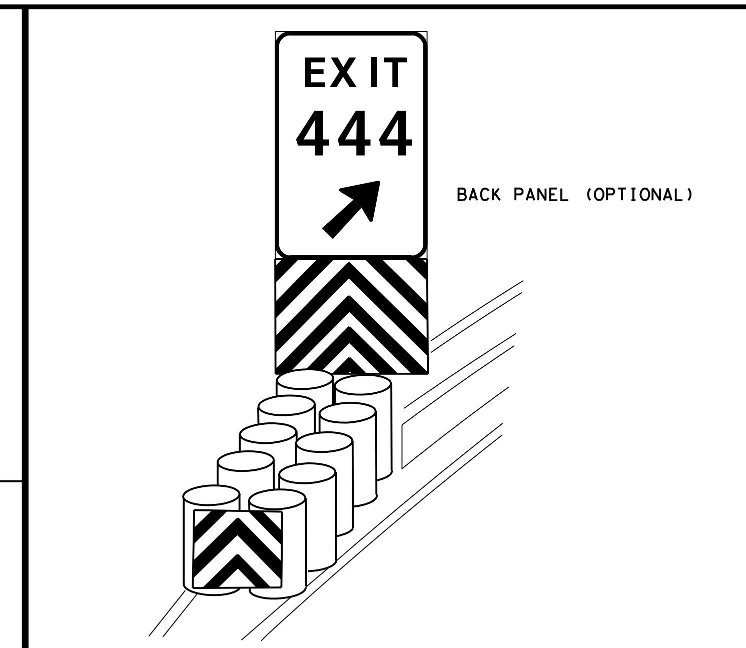
20F

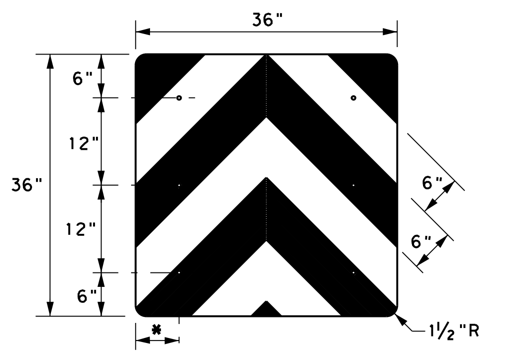


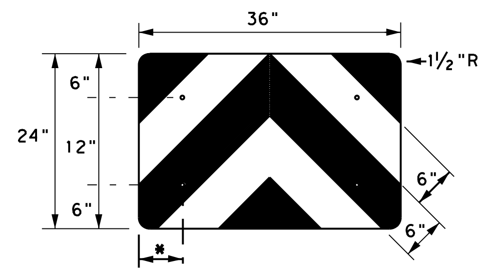




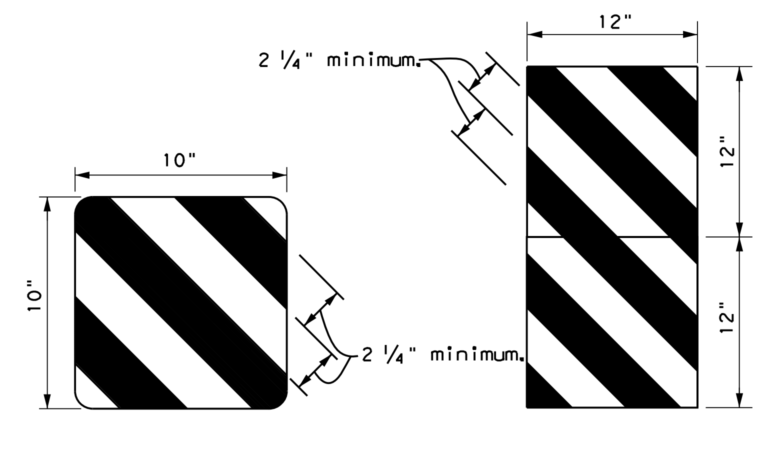




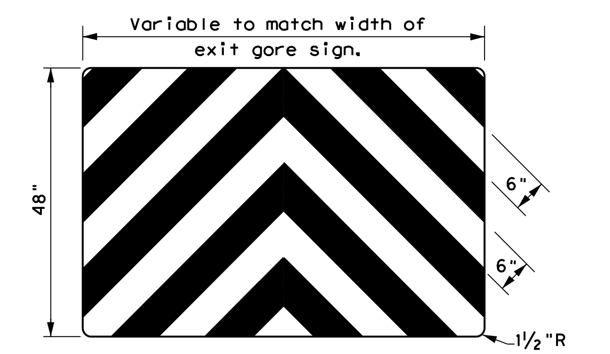


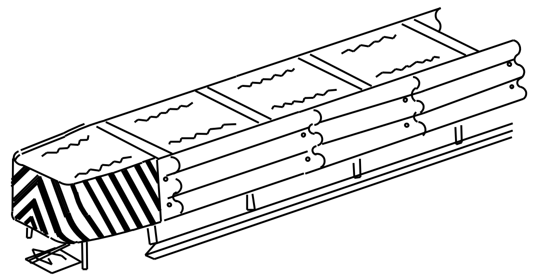


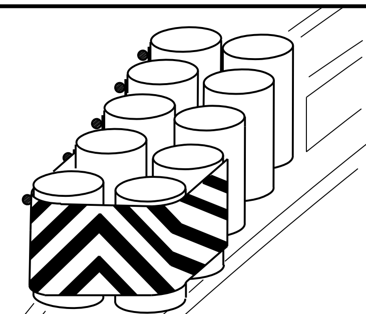
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

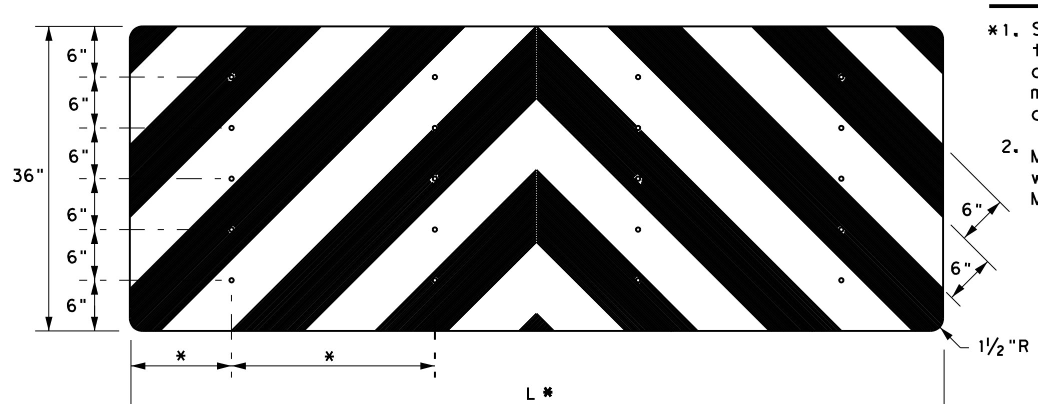


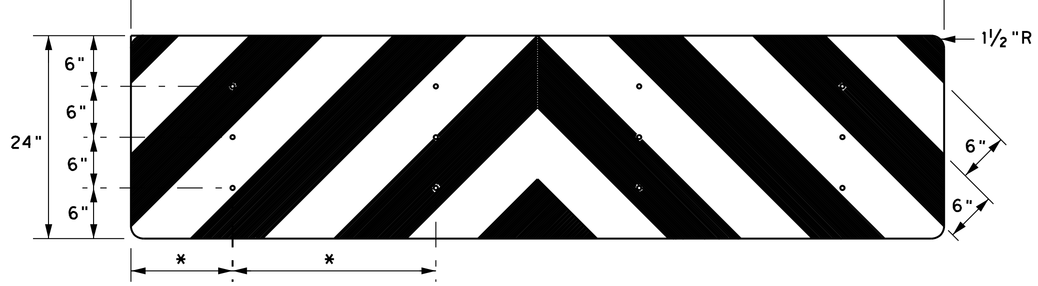
OBJECT MARKERS SMALLER THAN 3 FT^2











NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 8-04 8-95 3-15 4-98 7-20	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		86

20G

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		87

DATE: 11/16/2021 10:28:57 AM
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD\SHT\GENRL\non-bridge-projects.dgn

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0915	12	532	N WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		88

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 848 200E
Crossing Type:** Highway Overpass
RR Company Owning Track at Crossing: Union Pacific Railroad
Operating RR Company at Track: Union Pacific Railroad
RR MP: 206.690
RR Subdivision: Del Rio
City: San Antonio
County: Bexar
CSJ at this Crossing: 0915-12-532
Highway/Roadway name crossing the railroad: Walters St.
# of regularly scheduled trains per day at this crossing: ____
# of switching movements per day at this crossing: ____
% of estimated contract cost of work within railroad ROW: 23%

Scope of Work at this Crossing to Be Performed by State Contractor:
Partial-depth removal and replacement of top 2" of bridge deck between the curbs.

Scope of Work at this Crossing to Be Performed by Railroad Company:
Railraod flagging

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

- [ ] Expected
- [X] Not Expected

Flagging services will be provided by:

- [ ] Railroad Company: TxDOT will pay flagging invoices
- [X] Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

- [X] UPRR - UP.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [ ] BNSF - BNSF.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
- [ ] KCS - KCS.info@railpros.com
  Call Center 877-315-0513, Select #1 for flagging
  - Bottom Line On-Track Safety Services
  bottomline076@aol.com, 903-767-7630
- [ ] OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- [X] Not Required
- [ ] Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

- [ ] Required
- [X] Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	
[ ] Not Required	
[ ] Non - Bridge Projects	$2,000,000 / $6,000,000
[X] Bridge Projects	$5,000,000 / $10,000,000
[ ] Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

- [ ] Not Required
- [X] Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- [ ] Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- [ ] Not Required
- [X] Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Union Pacific Railroad (UPRR)
Railroad Emergency Line at 888-877-7267
Location: DOT 848 200E
RR Milepost 206.690
Subdivision Del Rio

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:		
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0915	12	532	CS		
3/2020	DIST	COUNTY		SHEET NO.		
	SAT	BEXAR		89		

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ 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 Storm Water Pollution Prevention Plan (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 Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required

☐ Nationwide Permit 14 - PCN Required

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _______

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ 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

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

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. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

3. Bird BMPs:
   In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs:
   1. Prior to construction, perform daytime surveys for nests including under the bridges and in culverts to determine if they are active before removal;
   2. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season;
   3. Avoid the establishment of unoccupied, inactive nests, a s practicable;
   4. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair;
   5. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

4. Bat BMPs will be implemented for cave myotis bat and big free-tailed bat.
   To determine the appropriate best management practice to avoid or minimize impacts to bats, review the habitat description for the species of interest on the TPWD Rare, Threatened, and Endangered Species of Texas by County List or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD recommended white-nose syndrome protocols located on the TPWD Wildlife Habitat Assessment Program website under "Project Design and Construction".
   The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings.
   - For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
   - For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
   - If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
   - Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area. See Section 2: Standard

   Recommendations for recommended acceptable methods for excluding bats from structures.
   - If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat friendly design or artificial roosts should be constructed to replace these features, as practicable.
   - Conversion of property containing cave or cliff features to transportation purposes should be avoided where feasible.
   - Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1 through October 31. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warms periods (nighttime temperatures~ 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
   - Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
   - Retain mature, large diameter hardwood forest species and native/ornamental palm trees where feasible.
   - In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

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 immediated area, and contact the Engineer immediately.

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 appropiate 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 follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action No.

1. IF THE BRIDGE RAIL NEEDS TO BE REMOVED THE CONTRACTOR MUST UNBOLT THE RAIL AND NOT USE A CUTTING TORCH OR OTHER MECHANICAL MEANS (I.E. GRINDER) TO REMOVE THE RAIL.
2.
3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

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
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		90

11/12/2021 11:03:05 AM
pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFXO5301

Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *Same as stated on the Title Sheet*

2. PROJECT SITE MAPS:
- *Project Latitude 29°26'06.44" N Project Longitude 98°26'59.62" W*
- *Project Location Map: Shown on Title Sheet*
- *Drainage Patterns: Shown on Drainage Area Maps Sheet 47*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections Sheet 4*
- *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets Sheet 92*
- *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
- *Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets Sheet 49*

3. PROJECT DESCRIPTION: *FOR WORK CONSISTING OF REHABILITATING AND WIDENING BRIDGE AND APPROACHES.*

Non-Joint Bid Utilities are not part of this SW3P.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

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. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

__X__ *Placement of road base*
____ *Exstensive ditch grading*
____ *Upgrading or replacing culverts or bridges*
__X__ *Temporary detour road(s)*
____ *Other:* _____

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: THICK AND UNIFORMLY ESTABLISHED
Percentage of existing vegetative cover: 40%
Existing vegetative cover: (mark one)
__X__ *Thick or uniformly established*
____ *Thin and Patchy*
____ *None or minimal cover*
Description of soils: (Provide classification and description of soils)
Site Acreage: 3.80 *Acreage disturbed: 0.47 AC*
Site runoff coefficient (pre-construction): 0.90 *Site runoff coefficient (post-construction): 0.90*

6. RECEIVING WATERS: *(Mark all that apply)*

__X__ *A classified stream does not pass through project.*
____ *A classified stream passes through project. Name* _____ *Segment Number* _____
Name of receiving waters that will receive discharges from disturbed areas of the project: MENGER CREEK
Site is in a Municipal Separate Storm Sewer System (MS4).
MS4 Operator (name): _____

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

__T/P__ SEEDING
____ MULCHING (Hay or Straw)
____ BUFFER ZONES
____ PLANTING
____ COMPOST/MULCH FILTER BERM
____ SODDING
____ PRESERVATION OF NATURAL RESOURCES
____ FLEXIBLE CHANNEL LINER
____ RIGID CHANNEL LINER
__P__ SOIL RETENTION BLANKET
____ COMPOST MANUFACTURED TOPSOIL
____ OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

____ SILT FENCES
____ HAY BALES
____ ROCK FILTER DAMS
____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
____ DIVERSION DIKE AND SWALE COMBINATIONS
____ PIPE SLOPE DRAINS
____ PAVED FLUMES
__T__ ROCK BEDDING AT CONSTRUCTION EXIT
____ TIMBER MATTING AT CONSTRUCTION EXIT
____ CHANNEL LINERS
____ SEDIMENT TRAPS
____ SEDIMENT BASINS
____ STORM INLET SEDIMENT TRAP
____ STONE OUTLET STRUCTURES
____ CURBS AND GUTTERS
____ STORM SEWERS
____ VELOCITY CONTROL DEVICES
__T__ OTHER: *EROSION CONTROL LOGS*

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

__X__ *Existing or new vegetation provides natural filtration.*
____ *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
____ *Project includes permanent sedimentation controls (other than grass).*
__X__ *Velocities do not require dissipation devices.*
____ *Velocity-dissipation devices included in the design.*
____ *Other :* _____
_____

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other:* _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

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 before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. 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 drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

Design Consultant Logo here - delete block if not applicable

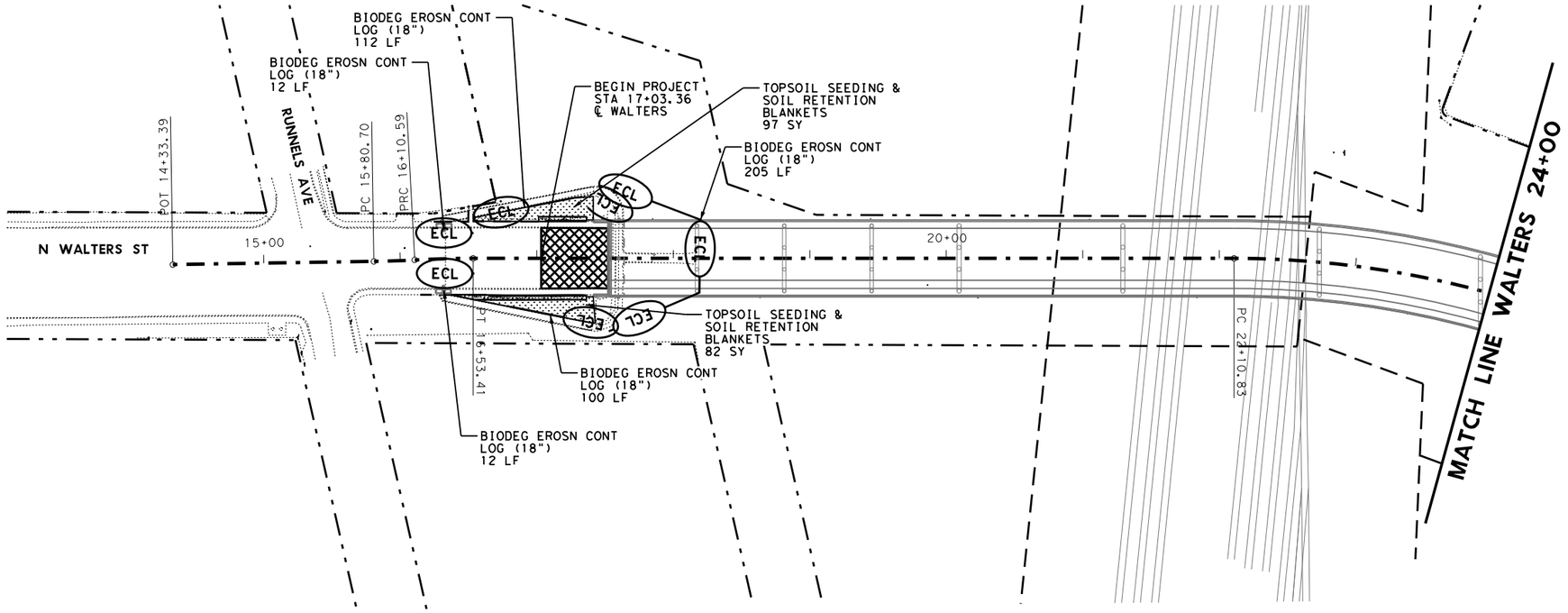
STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/202
, P.E.
Signature of Registrant & Date

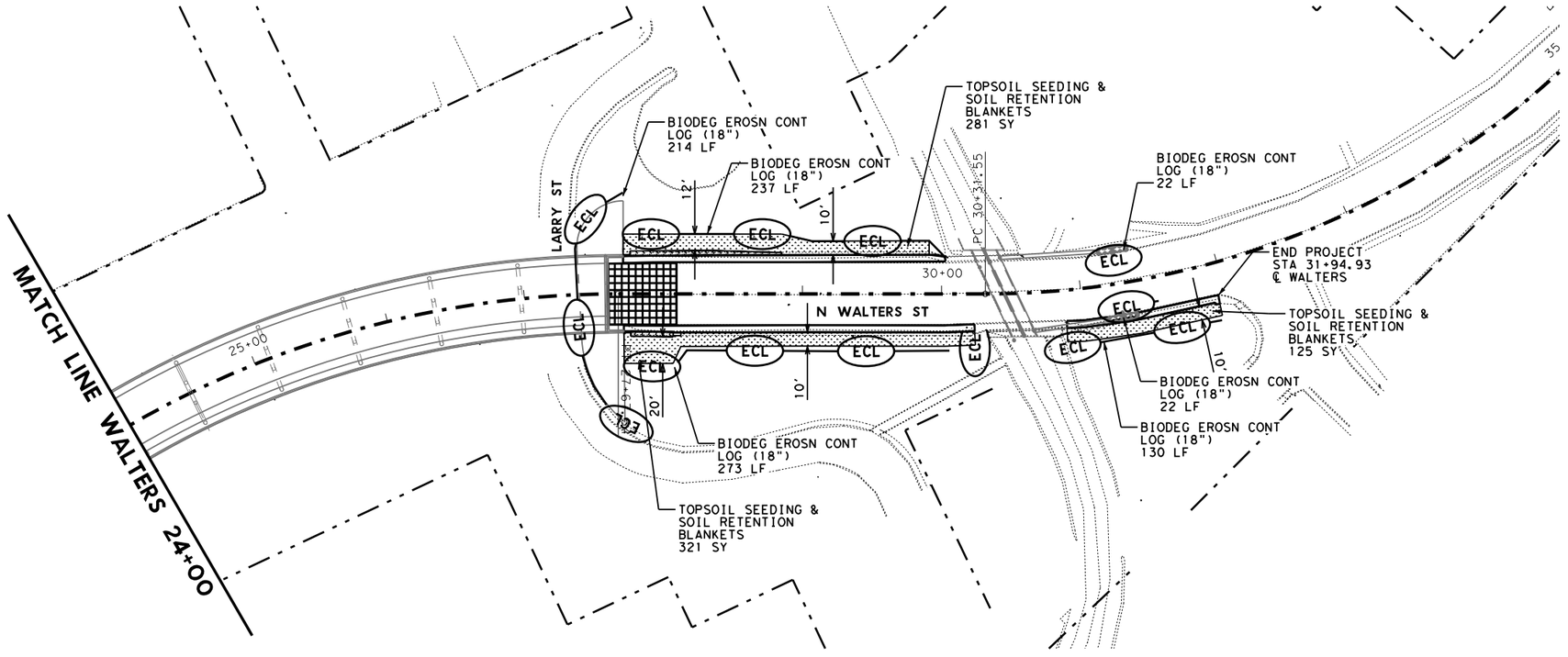
REVISION DATE: 10/12

 Texas Department of Transportation

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		
STATE	DISTRICT	COUNTY	WALTERS ST
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	SHEET NO.
0915	12	532	91





SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION
906		SY	FURNISHING AND PLACING TOPSOIL (4")
906		SY	BROADCAST SEED (PERM)(URBAN)(CLAY)
453		SY	BROADCAST SEED (TEMP)(WARM)
453		SY	BROADCAST SEED (TEMP)(COOL)
37		MG	VEGETATIVE WATERING
906		SY	SOIL RETENTION BLANKETS (CL 1)(TY C)
80		SY	CONSTRUCTION EXITS (INSTALL)(TY 1)
80		SY	CONSTRUCTION EXITS (REMOVE)
1,339		LF	BIODEG EROSN CONT LOGS (INSTL)(18")
1,339		LF	BIODEG EROSN CONT LOGS (REMOVE)

0 50 100

LEGEND

ECL - EROSION CONTROL LOGS

NOTE:

1. LOCATION OF CONSTRUCTION EXITS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER
2. THE CONTRACTOR SHALL PROVIDE SUFFICIENT SW3P CONTROLS TO PREVENT THE RUNOFF FROM THE HYDRO-DEMOLITION OPERATIONS FROM CONTAMINATING OR ERODING SOIL ADJACENT TO OR BENEATH THE BRIDGE

STATE OF TEXAS
DANIEL J. CRYAN
127112
LICENSED PROFESSIONAL ENGINEER
11/12/2021

NO.	DATE	REVISION	BY

K·FRIESE + ASSOCIATES
PUBLIC PROJECT ENGINEERING
1120 S. Capital of Texas Highway
CityView 2, Suite 100
Austin, Texas 78746
P – 512.338.1704 F – 512.338.1784
TBPE Firm Number 6535
www.kfriese.com

JACOBS®
JACOBS ENGINEERING GROUP INC. FIRM #2966

N WALTERS ST

SW3P LAYOUT

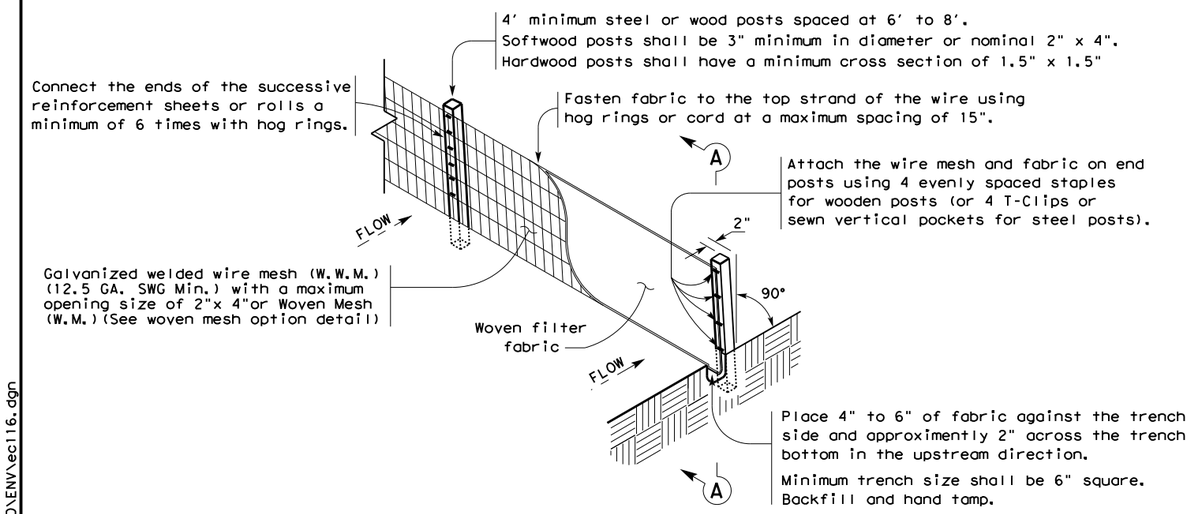
BEGIN PROJECT TO END PROJECT

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	92
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		WALTERS ST	

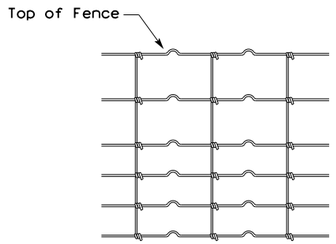
...\SHT\ENV\0534_SW3P01.dgn
11/12/2021 11:03:33 AM

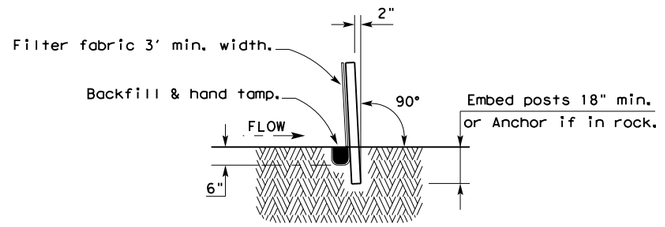
DATE/2021
D:\&BUSLASO-APP0666CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301\700 CADD-Subs\STND\ENV\ec116.dgn



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

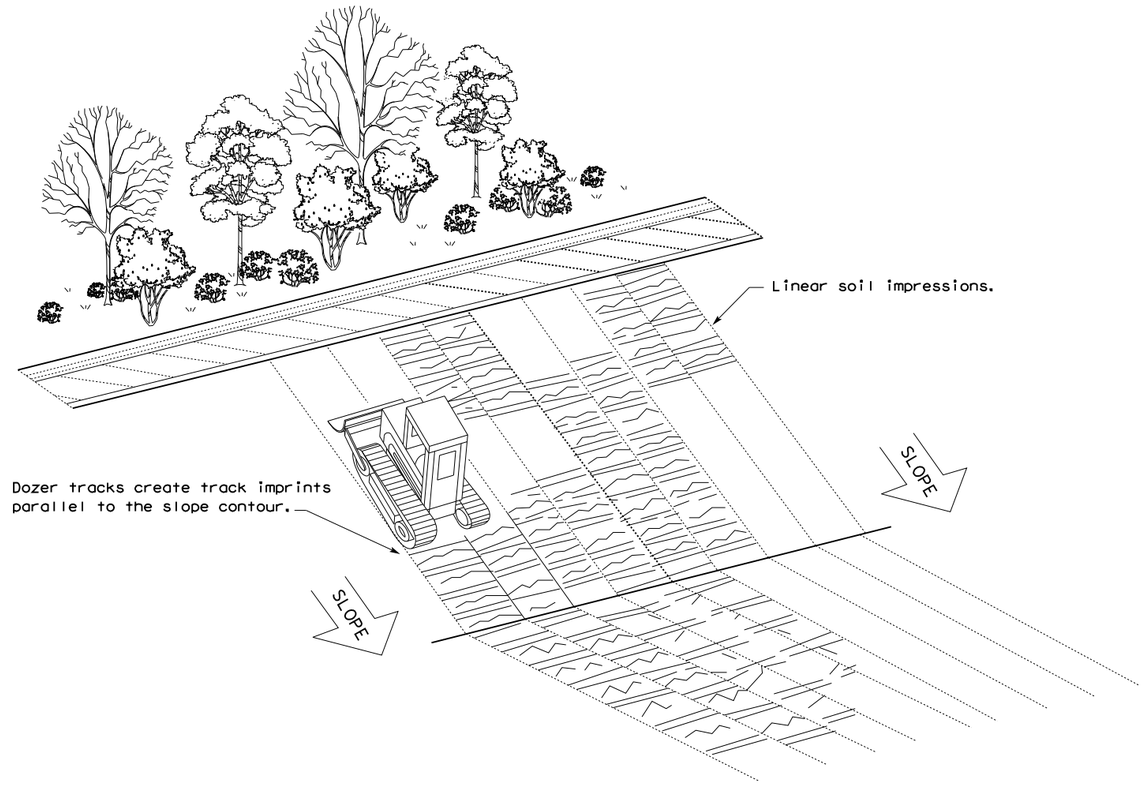
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

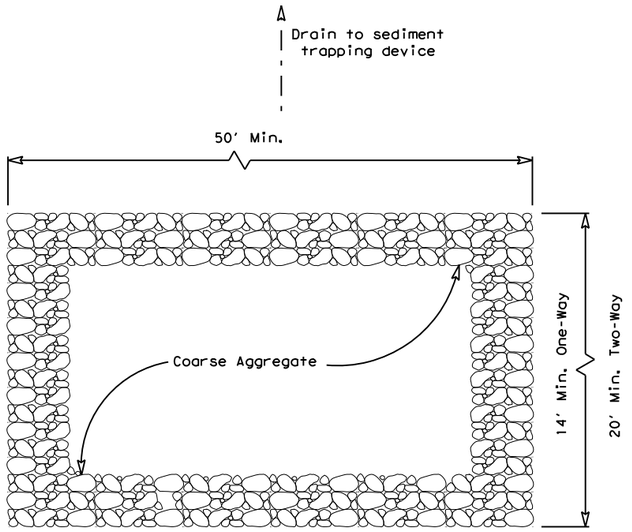
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

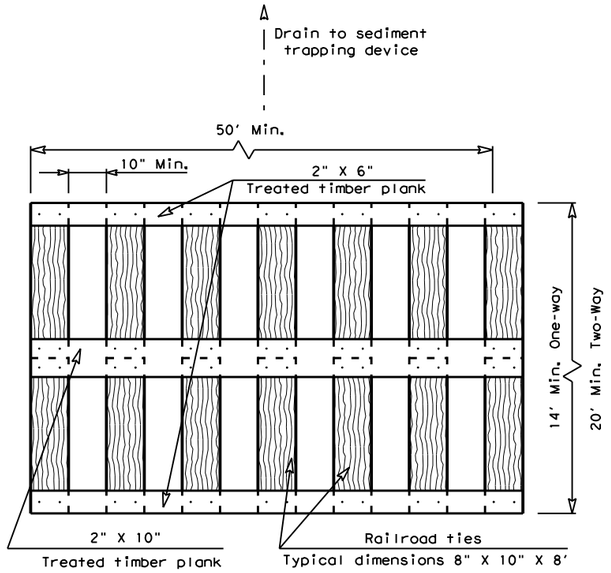
EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		93

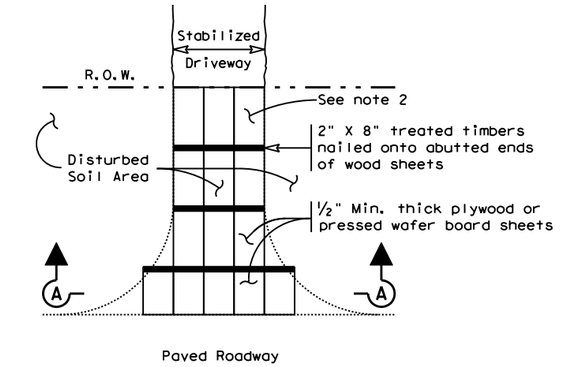
DATE: 11/12/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\ENV\ec316.dgn



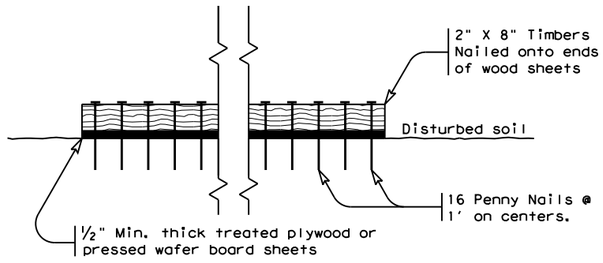
PLAN VIEW



PLAN VIEW



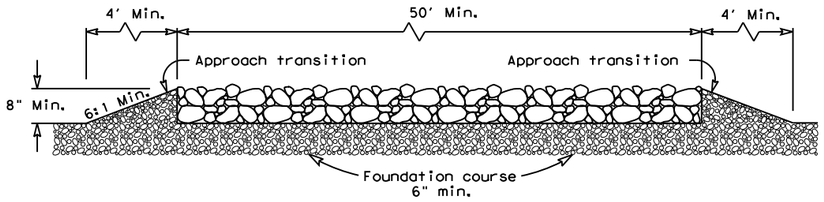
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

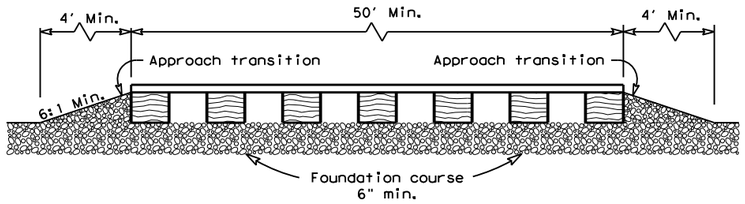
SHORT TERM



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

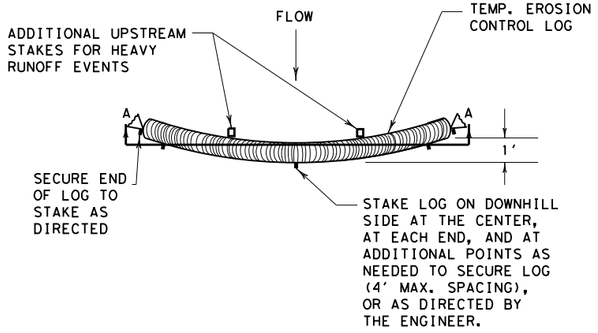
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

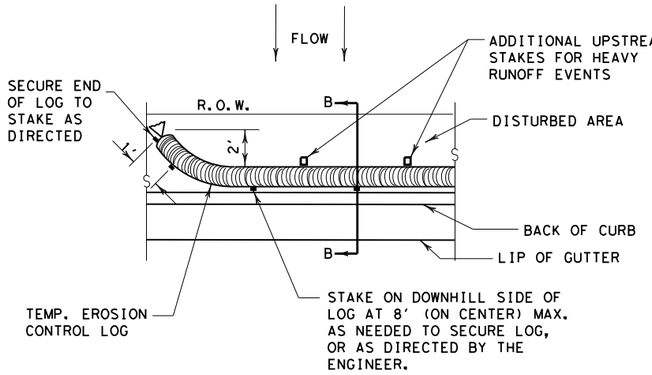
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		94

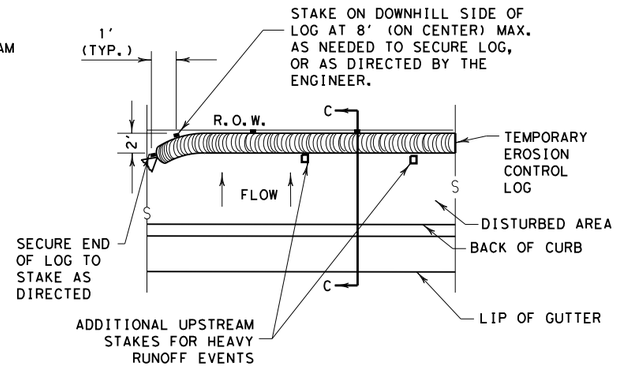
DATE: 11/12/2021
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\ENV\ec916.dgn



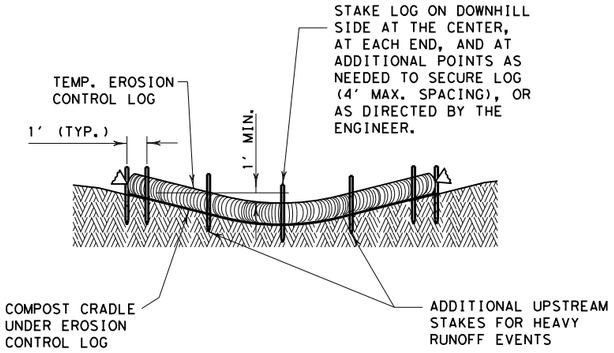
PLAN VIEW



PLAN VIEW



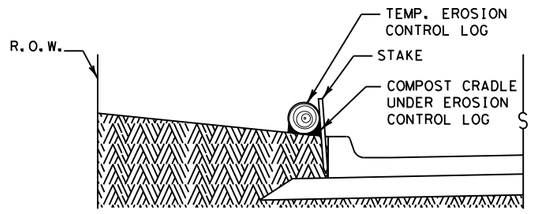
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

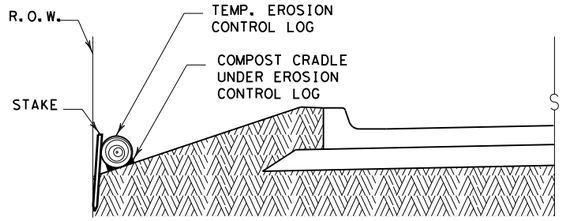
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

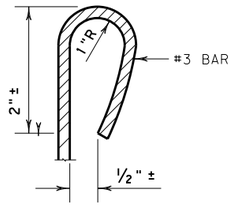
CL-BOC



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.

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.

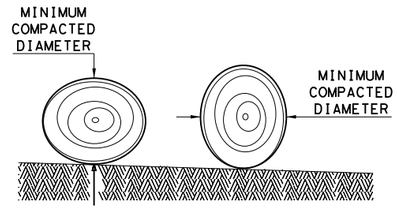
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

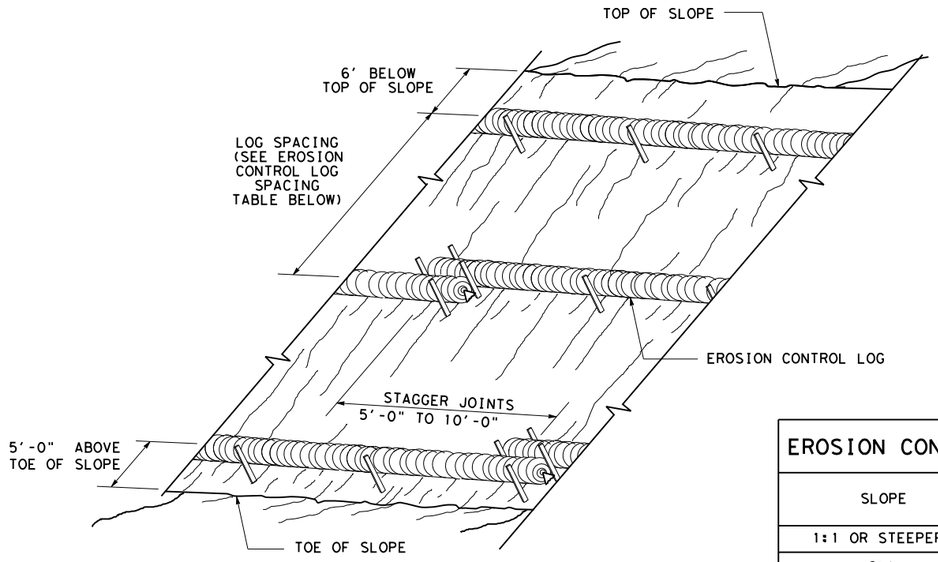
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

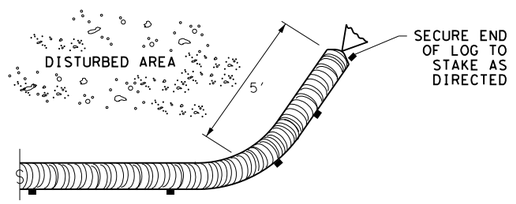
FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0915	12	532		WALTERS ST		
	DIST	COUNTY			SHEET NO.		
	SAT	BEXAR			95		

DATE: 11/12/2021
FILE: pw:\\USLAS0-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\ENV\ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

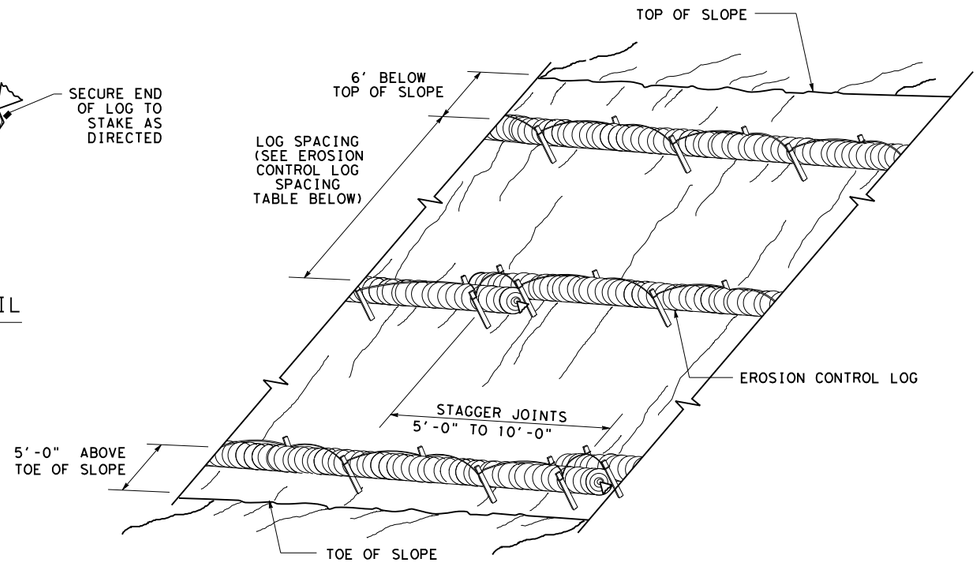
CL-SST



END SECTION RAP DETAIL

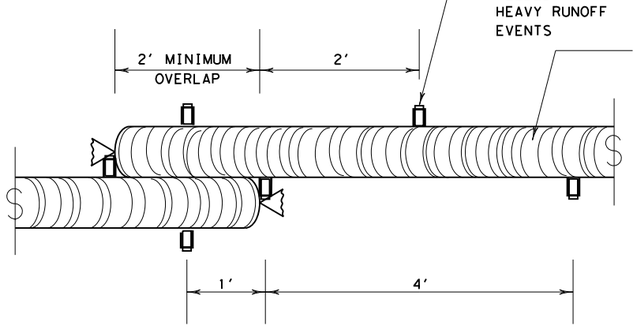
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

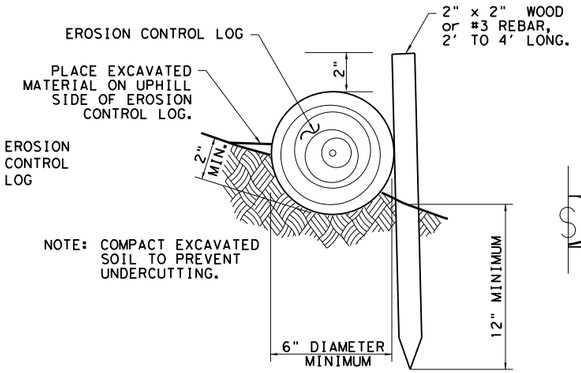
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

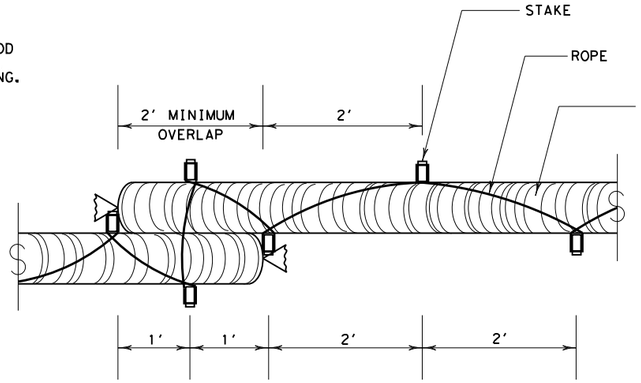


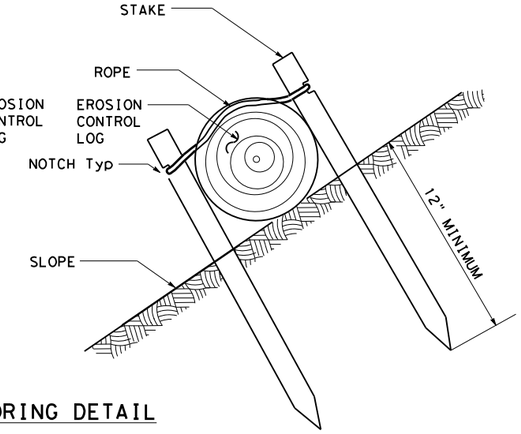


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

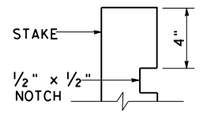
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



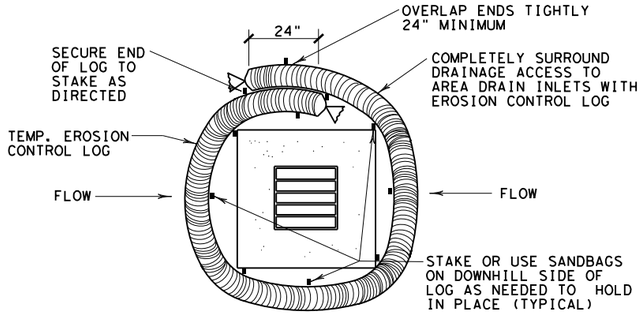
STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

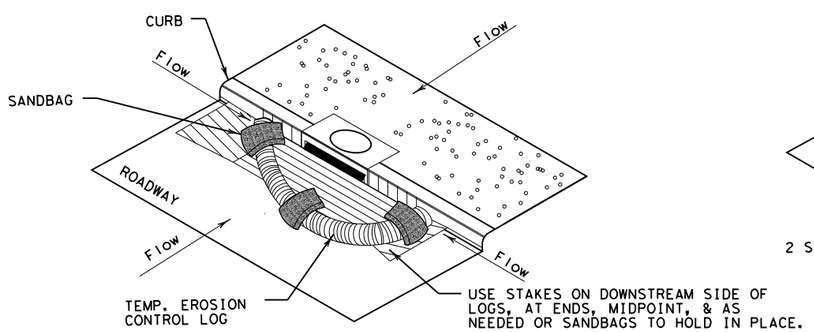
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	532	WALTERS ST
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		96

DATE: 11/12/2021
FILE: pw:\\USLASO-APP066CS.jacobs.com:Jacobs_US_B_I_SS4\Documents\WFX05301_Walters_Street_Bridge\WFX05301\700 CADD-Subs\STND\ENV\ec916.dgn



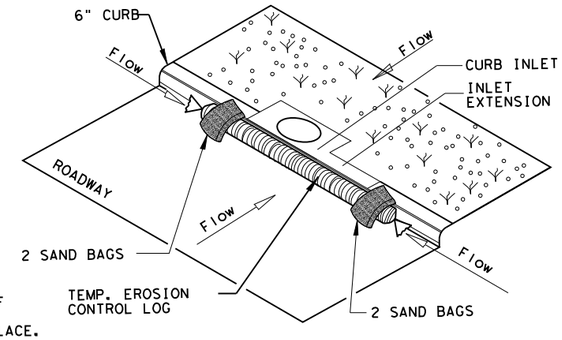
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

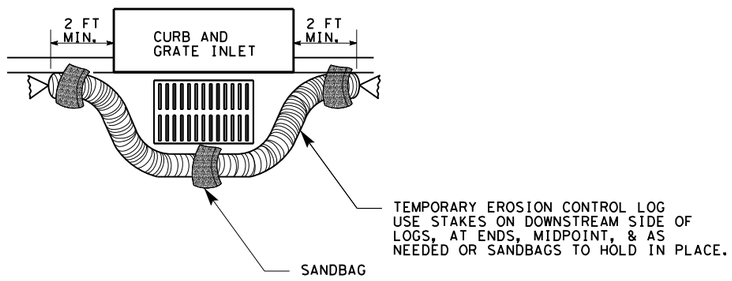
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

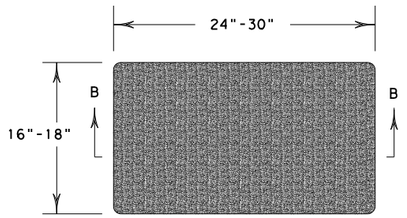
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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		
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0915	12	532		WALTERS ST	
	DIST	COUNTY			SHEET NO.	
	SAT	BEXAR			97	

LEGEND

OVERHEAD ELECTRIC	OE1	CPS ENERGY
OVERHEAD ELECTRIC/CTV	OE1/CTV1	CPS ENERGY/CHARTER
ELECTRIC	E1	CPS ENERGY
ELECTRIC	E1(D)	CPS ENERGY
TELEPHONE	T1	ATT
TELEPHONE	T1(D)	ATT
FIBER OPTIC	FOC1	ATT
FIBER OPTIC	FOC1(D)	ATT
FIBER OPTIC	FOC2	ZAYO
FIBER OPTIC	FOC2(D)	ZAYO
FIBER OPTIC	FOC3	WINDSTREAM
FIBER OPTIC	FOC3(D)	WINDSTREAM
FIBER OPTIC	FOC4	CENTURYLINK
FIBER OPTIC	FOC4(D)	CENTURYLINK
FIBER OPTIC	FOC5	VERIZON BUSINESS
FIBER OPTIC	FOC5(D)	VERIZON BUSINESS
GAS	G1	CPS ENERGY
GAS	G1(D)	CPS ENERGY
CTV	CTV1	CHARTER
CTV	CTV1(D)	CHARTER
STORM SEWER	SD1	SAWS
STORM SEWER	SD1(D)	SAWS
WATER	W1	SAWS
WATER	W1(D)	SAWS
WASTE WATER	WW1	SAWS
WASTE WATER	WW1(C)	SAWS
WASTE WATER	WW1(D)	SAWS
TDUCT	T-DUCT1	ATT
TDUCT	T-DUCT1(D)	ATT
TDUCT	T-DUCT2	ATT AND CAPROCK (DUCT LEASED BY VERIZON BUSINESS)
TDUCT	T-DUCT2(D)	ATT AND CAPROCK (DUCT LEASED BY VERIZON BUSINESS)

- TT TRANSMISSION TOWER
- ELECTRICAL TRANSFORMER BOX
- E ELECTRICAL POWER BOX
- E ELECTRIC MANHOLE
- TRAFFIC SIGNAL POWER BOX
- POWER POLE
- LIGHT POLE
- T TELEPHONE MANHOLE
- T TELEPHONE VAULT
- TELEPHONE PEDESTAL
- HH TELEPHONE HAND HOLE
- FIBER OPTIC VAULT
- F FIBER OPTIC MANHOLE
- FH FIBER OPTIC HANDHOLE
- HYDRANT
- W WATER MANHOLE
- WATER VALVE
- WM WATER METER
- WV WATER VAULT
- WW WASTE WATER MANHOLE
- CO CLEAN OUT
- V WASTE WATER VAULT
- STORM SEWER DRAIN
- GV GAS VENT
- GM GAS METER
- GAS TRANSFORMER
- OUT OF SCOPE
- END OF LINE

QUALITY LEVEL "D": INFORMATION DERIVED FROM EXISTING RECORDS AND/OR ORAL RECOLLECTIONS,

QUALITY LEVEL "C": INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION TO QUALITY LEVEL D INFORMATION.

QUALITY LEVEL "B": INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES (AKA DESIGNATING).

QUALITY LEVEL "A": PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES, USUALLY AT A SPECIFIC POINT (AKA LOCATING).

QUALITY LEVEL LEGEND

WW1	QUALITY LEVEL "B"
WW1(D)	QUALITY LEVEL "D"
WW1(C)	QUALITY LEVEL "C"

TYPICAL FOR ALL UTILITIES

GENERAL NOTES:

1. UTILITIES ARE DEPICTED ON THESE PLANS IN ACCORDANCE WITH THEIR ACHIEVED QUALITY LEVELS AS DEFINED IN THE AMERICAN SOCIETY OF CIVIL ENGINEER'S DOCUMENT ASCE 38-02, "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

2. THE HORIZONTAL ALIGNMENT OF QUALITY LEVEL B LINES SHOWN WERE ARRIVED AT USING GEOPHYSICAL EQUIPMENT. THE ACCURACY OF THE HORIZONTAL LOCATION CAN BE INFLUENCED BY MOISTURE CONTENT, PROXIMITY OF OTHER UNDERGROUND UTILITIES OR STRUCTURES, DEPTH OF THE UTILITY AND LOCATION OF TRACE WIRE/TAPE IN RELATIONSHIP TO THE TOP OF THE PIPE.

3. GEOPHYSICAL SEARCH AND RECORDS RESEARCH DO NOT GUARANTY ALL UTILITIES WILL BE FOUND.

4. UTILITY INFORMATION LABELED AS LEVELS "C" OR "D" ARE DERIVED FROM FURNISHED RECORDS. SUCH INFORMATION MAY NOT BE ACCURATE OR RELIABLE. LTRA DISCLAIMS RESPONSIBILITY FOR THE ACCURACY OR RELIABILITY OF UTILITY INFORMATION DEPICTED ACCORDING TO RECORDS.

5. STORM SEWER AND ASSOCIATED APPURTENANCES ARE NOT SHOWN ON THESE PLANS. WASTEWATER FLOWLINE INFORMATION IS BASED ON FIELD MEASURED DEPTHS AND SHALL BE DEEMED APPROXIMATE.

6. THE ROADWAY AND ROW FILES WERE PROVIDED BY OTHERS AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

7. RELIANCE UPON THESE DATA FOR RISK MANAGEMENT PURPOSES DURING BIDDING DOES NOT RELIEVE THE EXCAVATOR OR UTILITY OWNER FROM FOLLOWING ALL APPLICABLE UTILITY DAMAGE PREVENTION LAWS AND REGULATIONS. THIS INCLUDES BUT IS NOT LIMITED TO GIVING NOTIFICATION TO UTILITY OWNER'S "ONE-CALL" CENTERS BEFORE EXCAVATION.

8. FIELD WORK BEGAN ON 01-01-18 AND WAS COMPLETED 4-30-18, LTRA EXPRESSLY DISCLAIMS RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS OR ADJUSTMENTS TO EXISTING UTILITIES AFTER 04-30-18 ALONG THE MAIN CORRIDOR.

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

NO.	DATE	REVISION	BY

LTRA Lina T. Raney & Associates, Inc. 3200 Bee Line Road, Farmers Branch, Texas 75234 • 214-979-1144 • FIRM REGISTRATION NO. F-192 • TBPLS REGISTRATION NO. 10140700

JACOBS ENGINEERING GROUP INC. FIRM #2966

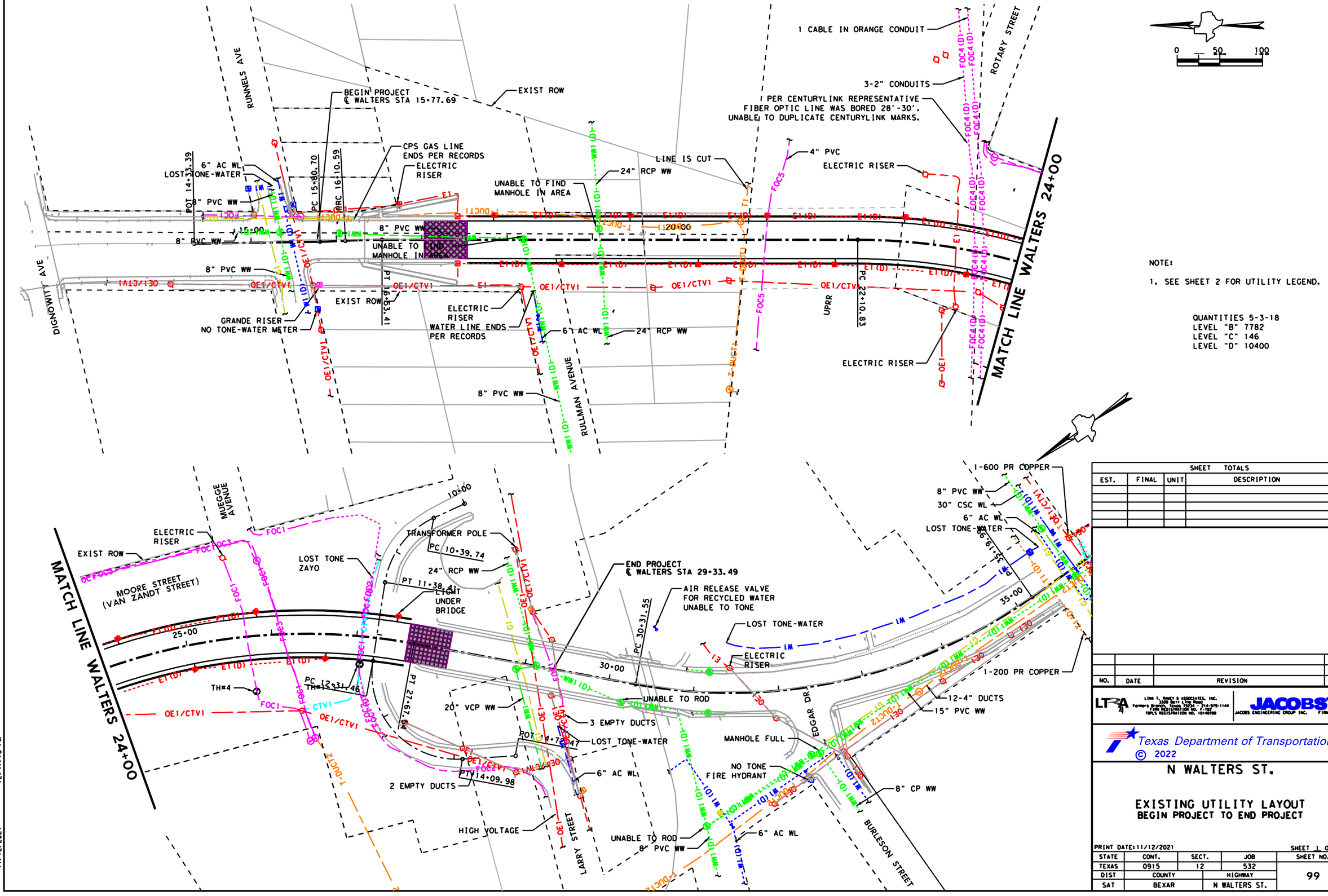
N WALTERS ST.

EXISTING UTILITY LEGEND

PRINT DATE: 11/12/2021 SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	98
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST.	

...\DGN\SHEETS\UTIL-LGND-01.dgn
11/12/2021 12:47:08 PM



NOTE:

1. SEE SHEET 2 FOR UTILITY LEGEND.

QUANTITIES 5-3-18
LEVEL "B" 7782
LEVEL "C" 146
LEVEL "D" 10400

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

NO.	DATE	REVISION	BY

LTRA — Lina T. Ramey & Associates, Inc. 3320 Belt Line Road, Farmers Branch, Texas 75234 • 214-979-1144 TBPE REGISTRATION NO. F-782 TBPLS REGISTRATION NO. 10148700

JACOBS — JACOBS ENGINEERING GROUP INC. FIRM #2966

Texas Department of Transportation®
© 2022

N WALTERS ST.

EXISTING UTILITY LAYOUT
BEGIN PROJECT TO END PROJECT

PRINT DATE: 11/12/2021 — SHEET 1 OF 1

STATE	CONT.	SECT.	JOB	SHEET NO.
TEXAS	0915	12	532	99
DIST	COUNTY		HIGHWAY	
SAT	BEXAR		N WALTERS ST.	

...\DGN\SHEETS\UTIL-LAY-01.dgn
11/12/2021 12:47:18 PM