FED ROAD DIV	STATE	STATE PROJECT NO.		SHEET
6	TEXAS	STP 2024(924)TP		1
CHECKED BY	STATE DIST	COUNTY	STATE CONTROL NO.	HIGHWAY
CHECKED BY	WNT	BELL	0015-07-087	IH 35

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
FEDERAL HIGHWAY IMPROVEMENT
IH 35

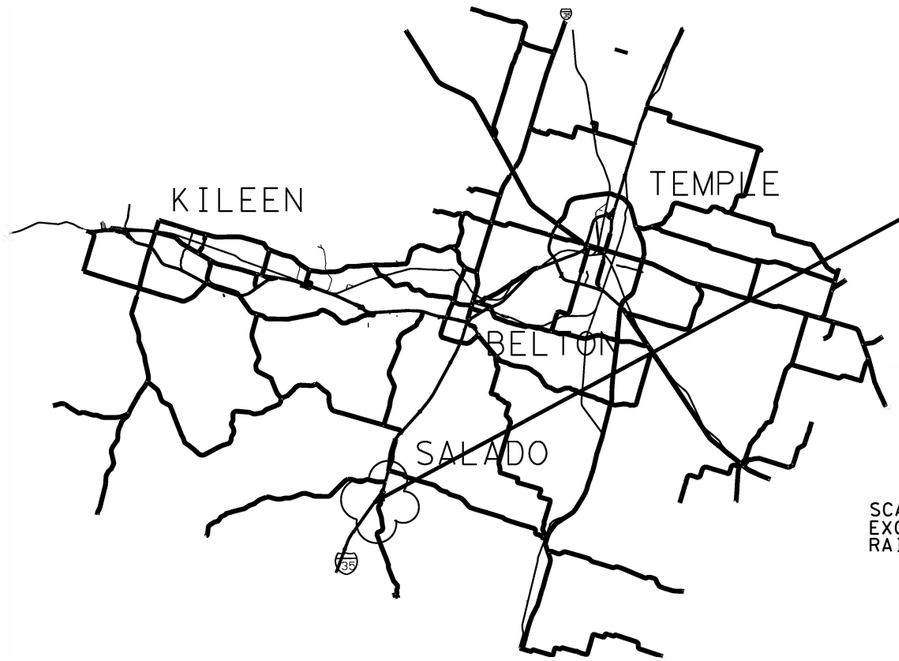
FEDERAL PROJECT NO. STP 2024(924)TP

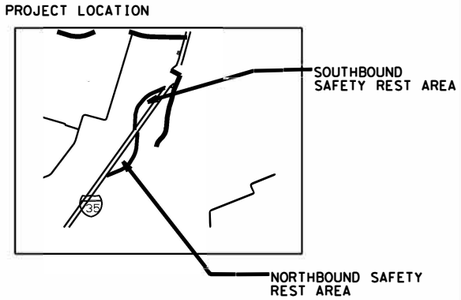
REGISTERED ACCESSIBILITY SPECIALIST
(RAS) INSPECTION REQUIRED
TDLR No. TABS 2023009378

30.9059723, -97.5623586

FOR THE CONSTRUCTION OF SAFETY REST AREA

CONSISTING OF EXPAND NORTHBOUND AND SOUTHBOUND SAFETY REST AREA TRUCK PARKING





SCALE: NOT TO SCALE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, WILL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL - AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 2023)

RECOMMENDED FOR LETTING: 6/3/2024
DocuSigned by:
Michael Yates
ED554D438C874EF...
AREA ENGINEER

RECOMMENDED FOR LETTING: 6/3/2024
DocuSigned by:
Vicki Hahl, P.E.
9AD8C743F95E4E3...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING: 6/4/2024
DocuSigned by:
Stanley Swiatek
B69BD796DD564C9...
DISTRICT ENGINEER

GENERAL

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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Justin E. Obinna — Digitally signed by Justin E. Obinna, Date: 2024.05.29 17:11:23 -05'00' — P.E.

05/29/2024
DATE

IH 35
INDEX OF SHEETS

Texas Department of Transportation

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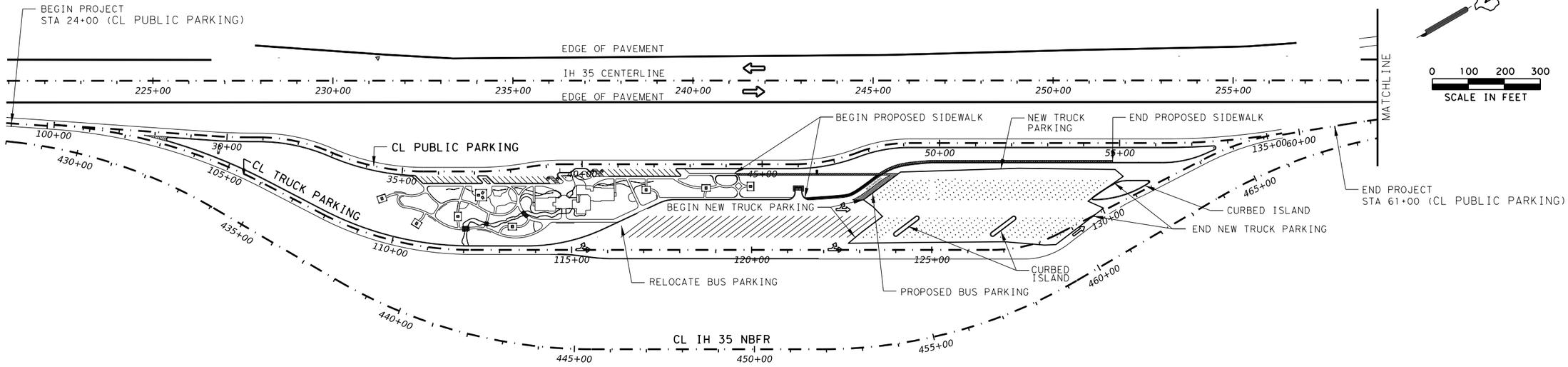
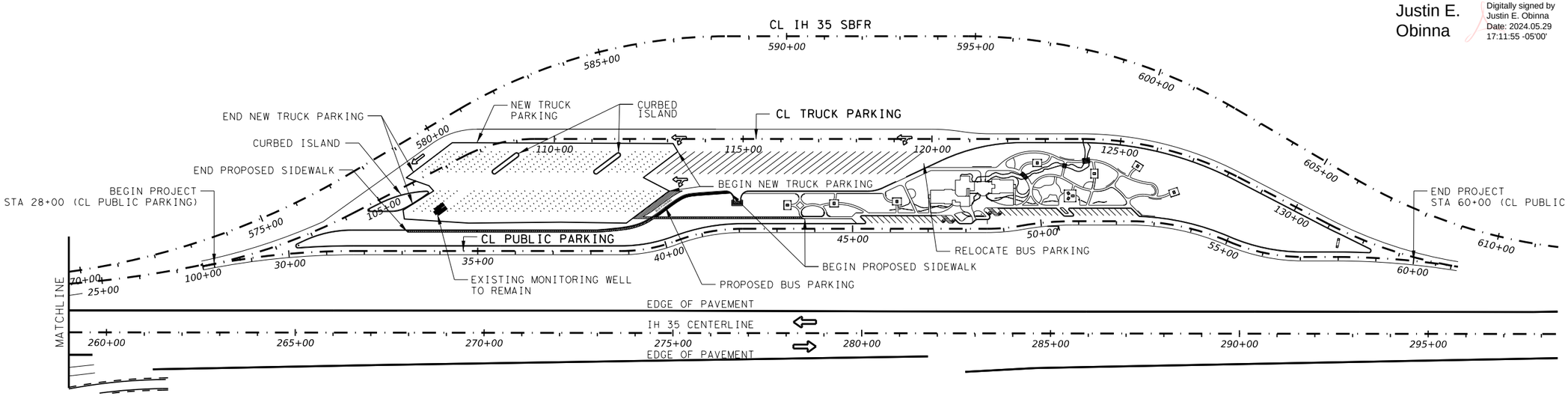
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		2



NORTHBOUND REST AREA



SOUTHBOUND REST AREA

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STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

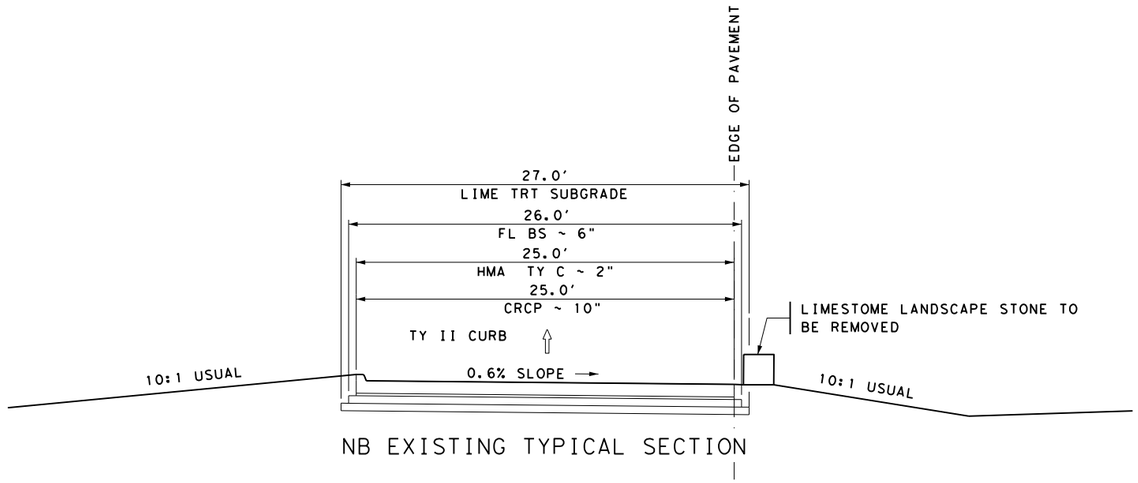
05/29/2024

IH 35
PROJECT LAYOUT
OVERVIEW

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		3

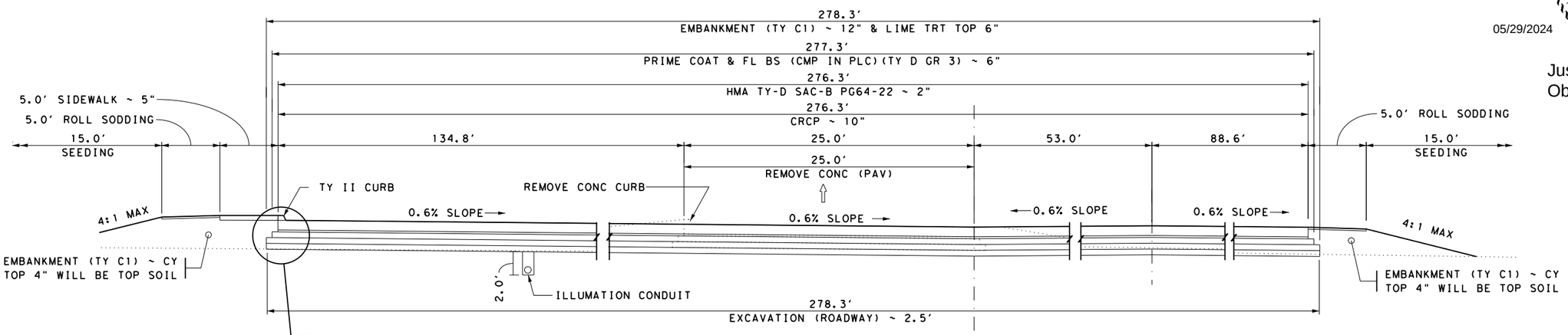
DATE: $DATE$ $TIME$
FILE: $FILE$



NB EXISTING TYPICAL SECTION

NOTE:

SEE PLAN LAYOUT SHEET FOR ADDITIONAL CURB AND GUTTER INFORMATION.



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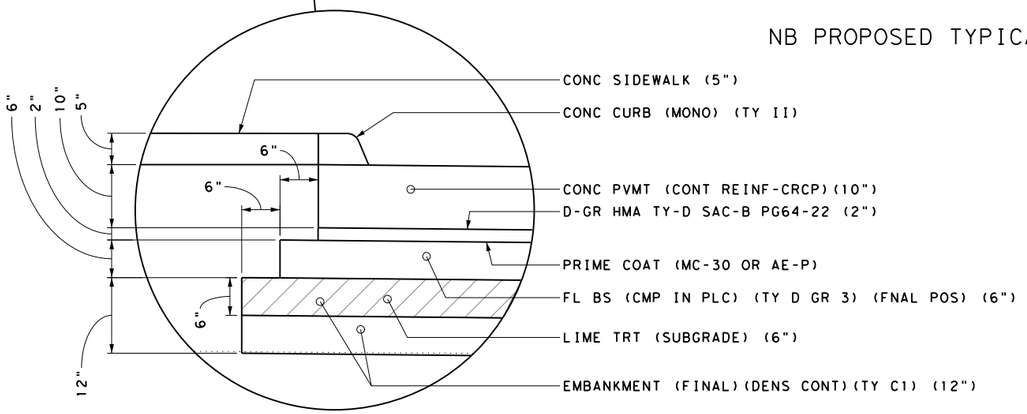

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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Date: 2024.05.29 17:12:51 -05'00'

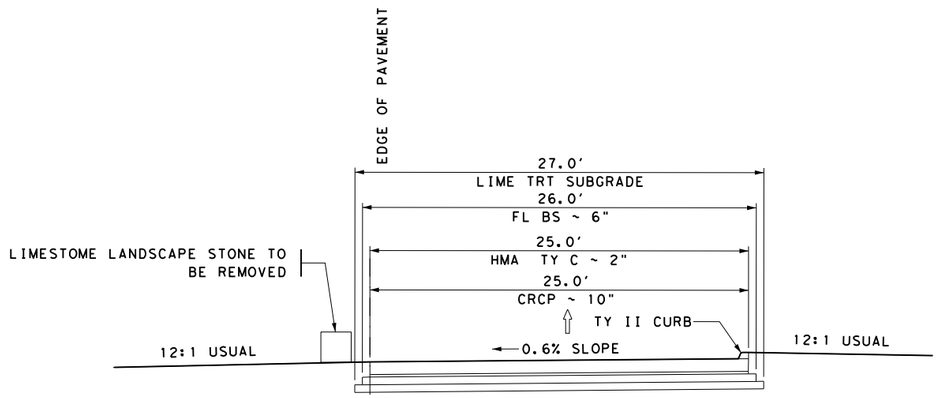
IH 35
TYPICAL SECTIONS

Texas Department of Transportation

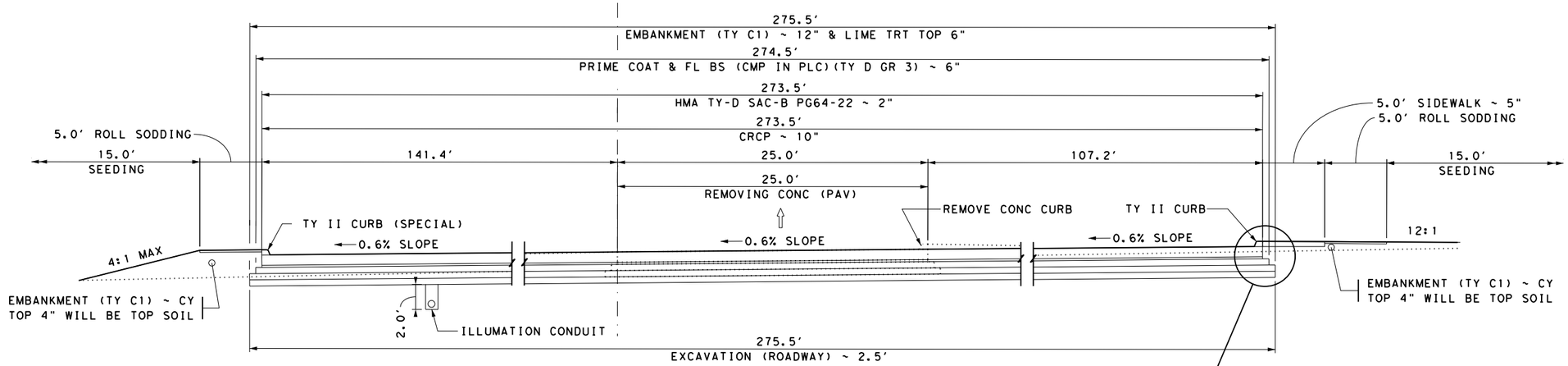
CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		16

NOTE:

SEE PLAN LAYOUT SHEETS AND SOUTHBOUND DETAILS FOR ADDITIONAL CURB AND GUTTER INFORMATION.



SB EXISTING TYPICAL SECTION



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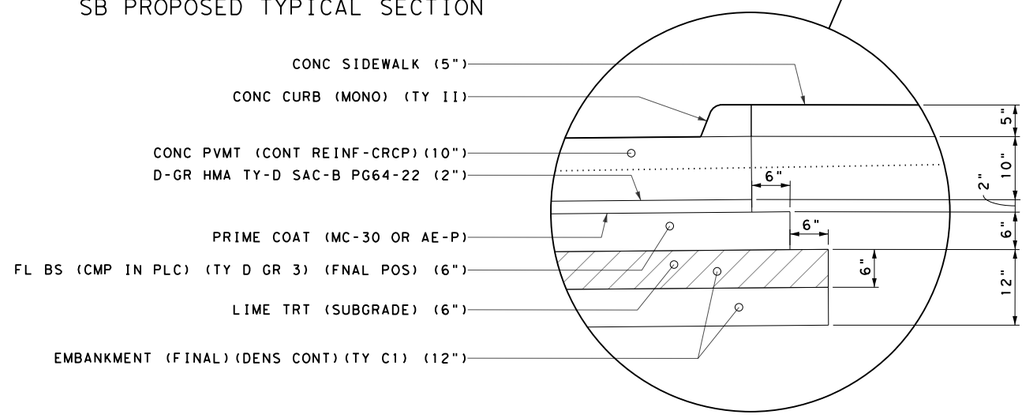

05/29/2024

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

Justin E. Obinna

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Date: 2024.05.29 17:13:23 -05'00'

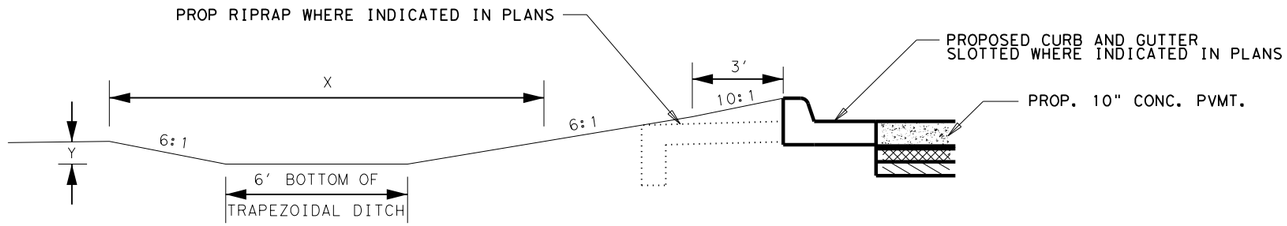
IH 35
TYPICAL SECTIONS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		16A

OUTFALL*	Q (CFS)	Y (FEET)	X (FEET)
D01	18.4	0.6	13.2
D02	36.5	0.85	16.2
D03	54.7	1	18
D04	72.8	1.15	19.8
D05	91.4	1.3	21.6

*SEE PROJECT LAYOUT - SOUTHBOUND FOR OUTFALL LOCATIONS



TYPICAL SECTION SOUTHBOUND DITCH

05/29/2024

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.29 17:14:09 -05'00'

LOCATION	247 6055	260 6016	260 6079	276 6107	310 6027	360 6004	3076 6037
	FL BS (CMP IN PLC)(TY D GR 3)(FNAL POS)	LIME (HYD, COM, OR QK(SLURRY))	LIME TRT (SUBGRADE)(6")	CM TRT(PT MX)(CL N)(TY D)(GR 3)(FN POS)	PRIME COAT(MC-30 OR AE-P)	CONC PVMT (CONT REINF - CRCP) (10")	D-GR HMA TY-D SAC-B PG64-22
	CY	TON	SY	CY	GAL	SY	TON
Northbound	3473	281	20829	386	4166	20829	2292
Southbound	3317	269	19899	369	3980	19899	2189

IH 35
TYPICAL SECTIONS

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		16B

BASIS OF ESTIMATE TABLES

Table 1: Basis of Estimate for Erosion Control Items

Item	Description	Rate	Basis	Quantities
*166	FERTILIZER			
	FERTILIZER (20-10-10) (PERMANENT)	300 LBS / AC	0.47 AC	0.07 TON
	FERTILIZER (20-10-10) (TEMPORARY)	300 LBS / AC	9.00 AC	1.35 TON
168	VEGETATIVE WATERING			
	(3 APPLICATIONS - PERM)	15,366 GAL/AC/APP	0.47 AC	21.7 MG
	(3 APPLICATIONS - TEMP)	15,366 GAL/AC/APP	9.00 AC	414.9 MG

* FOR Contractor'S INFORMATION ONLY

Table 2: Basis of Estimate for Base Work

Item	Description	Rate	Basis	Quantities
247	FLEXIBLE BASE			
	(TY D GR 3 FNAL POS)	138 LB/CF	183,330 CF	6,790 CY *12,650 TON
260	LIME TREATMENT (ROAD-MIXED)			
	LIME (HYD, COM OR QK (SLURRY)) (6")	27 LB / SY (6%)	40,728 SY	550 TON
310	PRIME COAT			
	PRIME COAT (MC-30 OR AE-P)	0.20 GAL / SY	40,728 SY	8,146 GAL

Table 3: Basis of Estimate for Asphalt Pavements

Item	Description	Rate	Basis	Quantities
3076	DENSE-GRADED HOT MIX ASPHALT			
	TY-D PG 64-22	110 LB / SY / IN	40,728 SY	4,481 TON
*ALL HOT MIX ITEMS	TACK COAT	0.1 GAL/SY/LIFT OF HMAC	40,728 SY	4,073 GAL

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 9.47 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The Contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the Engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

There is a high probability that an environmentally sensitive area could be encountered on the Contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - Wacoprebid@txdot.gov, 254-867-2770, 100 S. Loop Dr., Waco, TX
Carmen Chau - Wacoprebid@txdot.gov, 254-867-2794, 100 S. Loop Dr., Waco, TX

Or Via phone or in person to the following individual(s):
Area Engineer's: Michael Yates P.E., 254-939-3778
Assistant Area Engineer's: Brian Douglas P.E., 254-939-3778

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

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

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

GENERAL NOTES

ITEM 5: CONTROL OF THE WORK

Provide the Engineer with a weekly work schedule of planned activities including anticipated quantities of materials to be placed daily (CY of each concrete placement, tons of HMAC to be placed daily, etc.). Schedules will be provided for the following week as part of each week's project meetings or by 5PM on Thursday as approved by the Engineer. Failure to provide notifications are required here may be deemed as insufficient notice per item 5.10.

Submit all fabrication and shop drawings per TxDOT's online shop drawing submittal system and copy the Area Engineer on the email submittal, unless otherwise directed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (254)867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

ITEM 6: CONTROL OF MATERIALS

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.
https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the Contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer. Provide such proof prior to occupying the site.

Personal vehicles of the Contractor's employees will not be parked within the right of way at any time including any section closed to public traffic, unless the vehicle is being utilized for construction procedures. However, the Contractor's employees may park on

the right of way at the sites where the Contractor has his office, equipment and materials storage yard.

The Contractor will submit detailed site-specific plans for work in each “water of the United States” designated on the EPIC sheet. These plans must be approved by the Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks
- Locations of proposed sediment and erosion control devices
- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor’s supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, “Barricades, Signs and Traffic Handling”.

ITEM 8: PROSECUTION AND PROGRESS

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

Meet weekly or at intervals as agreed upon with the Engineer to notify him or her of planned work for the upcoming 3-week period.

For this project, provide a Bar Chart progress schedule.

ITEM 100: PREPARING RIGHT OF WAY

The limits of preparing right of way will be measured as shown on the project layout sheets.

Remove the existing roadway delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Delineator and object marker removals are subsidiary to this Item.

Remove all trees within the right of way within station limits designated for Preparing Right of Way unless designated for preservation or as directed by the Engineer.

Trees to be removed near gas lines shall be cut and ground 1’ below grade.

Preserve trees within temporary construction easements in accordance with Article 100.2., unless otherwise directed.

Prune trees designated for preservation as directed. All work required in preserving and pruning trees will be included in the price bid for Item 100, “Preparing Right Of Way”.

All trees and brush removed each day will be disposed of within the same day of removal unless otherwise approved.

The Contractor is prohibited from removing grass vegetation throughout the entire project limits and then ceasing construction for long periods, typically over three weeks. The Contractor schedule will be developed based on staged vegetation removal, limiting disturbed soil to no more than 25 percent at one time, unless otherwise approved. Should the Contractor not be able to adequately control sediment and erosion for areas disturbed, TxDOT will substantially reduce the size of areas that the Contractor may disturb soil. Should the project be evaluated to have sediment control problems as a result of the Contractor disturbing excessive amounts of soil, the Contractor will be required to immediately re-vegetate (seed and water) those disturbed areas at no cost to TxDOT.

The following five (5) notes apply to All Oak Tree Species:

1. To avoid the spread of Oak Wilt or other disease, all species of oak trees that are damaged or cut (branches, roots and/or stumps) for any reason during this contract, must be treated with a commercial wound dressing within 20 minutes of causing the damage or cut.

2. To prevent the spread of infection from tree to tree when pruning oak trees (all species), the Contractor must disinfect all pruning tools with a solution of 70% isopropyl alcohol after all cutting is complete on each oak tree.

3. Potentially dangerous trees or limbs will be removed as soon as possible.

4. The Engineer can stop all Work operations if the dressing, cut and removal requirements are not followed.

5. Pruning shall be in accordance with ANSI A300 pruning standard.

The Contractor will be responsible for leaving the project site clean and neat in appearance upon completion and before final acceptance by the Engineer.

Wood chips may be left on the right of way no deeper than two (2) inches outside of city limits. Do not trespass on private property while performing work on this contract. Do not cut or damage timber outside the right-of-way lines.

Remove all fallen parts of trees, damaged limbs, and dead limbs. This work will not be paid for directly but will be considered subsidiary to this item.

ITEM 104: REMOVING CONCRETE

In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planning or grinding is considered an acceptable method at these locations. Measurement and payment are in accordance with this item.

Work along the existing sidewalks will be performed using hand tool methods in order to achieve ADA repairs as directed.

ITEM 110: EXCAVATION

In a cut section, when soils to be lime treated are encountered at subgrade depths that have a soluble sulfate level greater than 7000 parts per million (ppm), as determined by Test Method TEX-145-E undercut this material for a minimum depth of one (1.0) foot below the lime treated layer and maximum depth as determined and replace with a material having a plasticity index less than 25, a liquid limit of less than 50 and a soluble sulfate content of less than 3000 ppm. This required undercutting will be paid per contract provisions for unsuitable material".

ITEMS 110 & 132: EXCAVATION & EMBANKMENT

The Contractor may modify side slopes from those shown in the cross section as needed to allow grades to match / tie into fixed features. In no case should slope be modified beyond the maximum grades shown on the typical section and approved by the Engineer. Additionally slope adjustments will not be allowed simply to reduce work quantities.

ITEM 132: EMBANKMENT

The Ty C1 embankment material for this project must meet the following requirements:

Properties	Test Method	Specification Limits
LIQUID LIMITS	TEX-104-E	≤ 55
PLASTICITY INDEX (PI)	TEX-106-E	10 ≤ PI ≤ 30

Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for

embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the Department. The Engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

All embankment material to be placed within one foot vertically or laterally of treated subgrades will require testing for sulfates. A Soluble Sulfate~~,~~ Content~~s~~ of all Embankment Soils will be determined by Test Method TEX-145-E. Test Method TEX-146-E may be used to check for soluble salts in these materials. If results of this testing indicate a salt level in excess of 200 micro-Siemens, Test Method TEX-145-E must be performed on the material to determine if the salt present are sulfates and their concentration. Under no circumstance, will materials possessing a soluble sulfate concentration greater than 7000 ppm be allowed in a layer within one (1) foot vertically or horizontally of a lime treated layer.

Type C1 Embankment will consist of suitable earthen material such as rock, loam, clay or other materials that will form a stable embankment. Shale will not be allowed. Deleterious materials material will be removed.

ITEM 160: TOPSOIL

Salvage the existing topsoil from the cut/fill areas. Topsoil not stored in small windrows will be stockpiled in locations with heights no greater than four (4) feet and dumped loose from Contractor equipment. The Contractor will minimize topsoil compaction and limit equipment being driven over stockpiled topsoil.

Avoid topsoil areas that have invasive plant species. Contain / separate topsoil from areas with identified invasive species into separate windrows / piles. Mark topsoil from invasive species areas accordingly and track and return materials to only their original areas or dispose of such materials accordingly. Invasive species will include Giant Cane,

Additional Topsoil will come from approved sources outside of the ROW. Topsoil must come from a location within six (6) inches of the natural ground surface to ensure it contains nutrients and is not sterile soil. Off ROW topsoil will contain a minimum organic content of three & one-half (3.5%) percent, based on soil test results.

ITEM 162: SODDING FOR EROSION CONTROL

Block sod (Bermuda grass) will be cynodon dactylon Bermuda grass cut to a minimum depth (thickness) of one (1) inch. The sod will have the following characteristics: (1)

uniformity; (2) good color; (3) free of weeds, weed seed, insects, and disease; (4) healthy, virile root system of dense, thickly matted roots throughout the soil of the sod; (5) adequate moisture to prevent drying out by exposure to the air and sun to the extent as to damage sod.

Prior to laying the block sod, blade the area and rake smooth. Refer to the plans and details for areas to receive the sod. Remove one (1) in. of soil along paved edges and curb lines before laying sod and dress the slope to match all exposed edges after placing the sod.

ITEM 164: SEEDING FOR EROSION CONTROL

Temporary seeding mixtures (cool and warm) will also include three (3) lbs of Bermuda grass seed per acre, with all seeds being planted concurrently.

Contractor will mow or disc wheat and or oats in spring prior to vegetation going to seed.

Permanent seed mixes for both urban and rural projects including sand or clay soils in the Waco District will be bid and installed to include a minimum of one & one-half (1.5) pounds per acre Green Sprangletop seed and four (4) pounds per acre Bermudagrass seed, with other seed types also being included and quantities remaining unchanged.

ITEM 168 – VEGETATIVE WATERING:

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in-place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require watering to continue as specified for a period not to exceed 30 days.

ITEM 247: FLEXIBLE BASE

Construct uniform layer thickness of 6 inches, or less with the required density and moisture content. Construction no layers less than 3 inches in thickness.

Minimum PI is equal to three (3) for all grades, or a minimum Bar Linear Shrinkage of 2%.

RAP may not be incorporated into Flexbase Material

ITEM 260: LIME TREATMENT (ROAD-MIXED)

Apply lime by the slurry placement method. Dry placement will not be allowed.

Cure the lime treated material with an application of MS-2 or an approved emulsion at a rate of 0.20 gal/sy. Water Curing will not be allowed.

Proof Roll lime treated subgrade in accordance with Item 216 “Proof Rolling”. Soft spots detected should be re-worked as outlined in Section 260.4.6, “Reworking a Section”.

ITEM 276: CEMENT TREATMENT (PLANT-MIXED)

Strength class required for this material will be Class “N”, 150 psi.

Cure the cement treated material with an application of MS-2 or an approved emulsion, at a rate of 0.2 gal/sy. Water curing will not be allowed.

ITEM 310: PRIME COAT

When cutback asphalt is used, a minimum curing time of seven (7) days will be required before application of Item 3076, “Dense Graded Hot Mix Asphalt”, unless otherwise approved in writing.

ITEM 360: CONCRETE PAVEMENT

Use of multiple piece tie-bars will be required in any areas where adjacent base construction will be completed in a separate phase exposing tie bars to potential damage during base construction. Provide chairs for multiple piece tie-bars, threaded connectors or other adequate devices, used in concrete paving, or tie them to the pavement reinforcing steel.

Insertion of tie bars into plastic concrete will be allowed as part of slip form paving operation via methods approved by the Engineer. Pull testing of a sample of inserted bars post curing period may be required to assure plastic insertion methods are not detrimental to bar development strength.

Do not bend tie-bars

Provide curbs monolithically constructed with the concrete pavement. If continuous monolithic curb has to be temporarily omitted for any reason, provide dowelled curbs in the proposed areas, as detailed in the plans, and apply an approved epoxy resin to the pavement to receive the curb as directed. This work and materials will not be paid for directly but is considered subsidiary to this item.

Provide pavement widening joints, as detailed in the plans, at all locations where concrete pavement is placed adjacent to existing concrete pavement. Installation of these joints is not paid for directly but is considered subsidiary to this item.

Pavement leave-outs are required on this project as necessary to provide for traffic at driveways and side streets as shown in the plans. The cost of providing these leave-outs, including the construction of a suitable crossover connection at each site, will not paid for directly but will be considered subsidiary to this Item.

The Contractor must provide equipment or employ paving methods to meet the allowable work areas as shown in the phased construction plans capable of meeting all specification requirements.

Curb transition is paid for as Type II curb.

The installation of curb openings is not paid for directly but is considered subsidiary to this item.

Place construction sawed and contraction joints in accordance with the pavement detail sheet and as directed. Joint locations, other than as shown on the plans, are subject to approval.

Use "mechanical steel placing equipment" at the discretion of the Engineer.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

If more than 30% of an area in any 1000-Ft section of roadway requires grinding, action will be taken by the Contractor to make that 1000-Ft full width section uniform without changing ride quality, compromising quality of pavement and decreasing skid resistance. Approved blasting method or other method approved by the Engineer will be performed at the Contractor's expense.

ITEM 416: DRILLED SHAFT FOUNDATIONS

Provide a minimum of one core per bent, regardless of placement method.

ITEM 421: HYDRAULIC CEMENT CONCRETE

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.
Provide sulfate resistant concrete for all drilled shafts.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

ITEM 440: REINFORCEMENT FOR CONCRETE

All ties, chairs and other appurtenances used with epoxy coated reinforcing will be epoxy coated or non-metallic.

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strips for MBGF and Sidewalks. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved by the Engineer.

For rip rap slope protection wire mesh will not be allowed. Rebar reinforcing will be required per the Standard Details.

ITEM 500: MOBILIZATION

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

ITEM 502: BARRICADES, SIGNS, AND TRAFFIC HANDLING

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.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

A meeting between the Contractor and Engineer to discuss upcoming changes in construction phasing and traffic switches is required at least fourteen (14) days prior to the phase change. Items to be discussed at this meeting include temporary signing, traffic control, pavement markings, the processes necessary for the phase change and subcontractor scheduling.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the workday, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place Barricade / long term traffic control signs with driven post / sleeve mount options for all projects with more than 9 months of project barricades, i.e. in ground mount for project limits signs / long term signs. Upon sign removal, pull sleeve or drive to below ground line.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

ITEM 504: FIELD OFFICE

Furnish one Asphalt Mix Control Laboratory (Type D) for this project.

ITEM 506: TEMPROARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas before the next rain event or within 24 hours of the discharge.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must

adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow overflow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed, and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day, if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed, and maintained by the Contractor per Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls".

ITEM 508: CONSTRUCTING DETOURS

Testing of materials used in the construction of a temporary detour may be waived when approved by the Engineer.

ITEM 512: PORTABLE TRAFFIC BARRIER

Department-furnished concrete traffic barrier units are at a TxDOT yard near the project location or other locations within fifty (50) miles of the project as directed. Barrier provided by TxDOT will be Low Profile or single slope. The Contractor will furnish equipment necessary to load the units at the stockpile locations.

The current locations for barrier are:

Low Profile Barriers – Temple Yard (IH 35), 31.132202°N, 97.331223°W

Single Slope Barriers – Connell Yard (US 190/IH 35), 31° 2'51.11"N, 97°28'47.32"W

For designated source portable barrier, the Department will provide the connection hardware. Should adequate hardware not be available, the Contractor will acquire the hardware, provide to the Department and be reimbursed via force account.

Upon completion of the project, all barrier deemed still acceptable by the Engineer will remain property of the Department and stockpiled at a TxDOT yard near the project location or other locations within fifty (50) miles of the project as directed. The Contractor will furnish equipment necessary to load and unload the units at the stockpile locations. Stockpiled portable concrete traffic barriers will not be permitted to be stacked more than three (3) barriers high in any direction.

When stockpiling, separate unacceptable barriers from acceptable barriers as directed. This work will not be paid for directly but will be considered subsidiary to the stockpile item.

All hardware will become the property of the Department and will be returned to the TxDOT Maintenance yard within fifty (50) miles of the project as directed. Place hardware in fifty-five (55) gallon barrels or other acceptable storage totes with holes in bottom to allow drainage. All barrels or totes must be on pallets.

ITEM 529: CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER

Attach machine laid curb to pavement with a two-part compound epoxy adhesive. Epoxy will be applied to that area of pavement under the machine laid curb and must be a minimum of six (6) inches in width and 0.2 inches (20 mils) thick. The epoxy will be applied uniformly by an approved method.

Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.

For Curb and Gutter sections, provide grooved joints at 10-foot intervals and ¾ inch expansion joint material at a maximum of 50-foot centers and at all radius points and inlets.

Curb and Gutter transitions will be paid for by the foot at the unit price for the corresponding curb or curb and gutter section.

Saw joints at the same location as on the existing pavement.

ITEM 536: CONCRETE MEDIANS AND DIRECTIONAL ISLANDS

Use Class “B” concrete for concrete medians and directional islands, unless otherwise noted on specific plan sheets.

ITEM 585: RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type A on all intersections and driveways.

Milling will not be allowed as a corrective action for excessive deviations in the surface layer.

ITEM 618: CONDUIT

The locations of conduit as shown are for diagrammatic purposes only and may be varied to meet local conditions, subject to approval.

When backfilling bore pits, ensure that the conduit does not become damaged during installation or due to any settling of the backfill material. Compact select backfill in three equal lifts to the bottom of the conduit or if sand is used, place to a point two (2) inches above the conduit. Backfill density will be equal to the existing soil. Be careful to prevent any material from entering the conduit.

Backfill all open trenches before the end of the workday and do not leave any trench open overnight.

ITEM 620: ELECTRIAL CONDUCTORS

Place the communications and/or coaxial cables in a separate conduit from the 120 or 240-volt electrical conductors.

Any damage to any wire or any cable is cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at the Contractor’s expense.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division.

Provide ten (10) amp time delay fuses.

ITEM 624: GROUND BOXES

Ground box locations shown on the plans are approximate locations. Actual locations are as directed.

ITEM 628: ELECTRICAL SERVICES

Contact the Electric Utility Company to make all necessary arrangements to provide electrical service shown on the plans in accordance with Article 628.5 and the Electrical Details, except that TxDOT will make application to the Electric Utility Company for service (See note below).

NOTE:
Before fabricating the electrical service, contact the Waco District Traffic Signal Service Supervisor (Phone (254) 867-2807), to make application (billing arrangements) for service with the Electric Utility Company.

Furnish and install a lock on all electrical services. The lock is to be a Master-Lock number 2195.

The proposed electrical service location will be approved by TxDOT prior to installation.

ITEM 636: SIGNS

Verify all dimensions at the actual proposed sign location in order to maintain dimensions as shown on the Sign Mounting Details.

Stake the location of the new signs a minimum of 7 days in advance of anticipated installation. The Engineer will review and approve the final installation locations.

ITEM 644: SMALL ROADSIDE SIGN ASSEMBLIES

Bolt Clamp type will be used on Texas Triangular Slip Base System.

As practical with new construction, leave the existing sign assemblies in place until the proposed foundation, post and sign are in installed, and then remove the old sign assemblies.

Do not leave any sign foundation holes open overnight. Ensure all holes drilled are at least the minimum required depth with no loose material remaining in the hole.

Stake proposed sign locations and receive approval before installation of sign foundations.

Expanded foam foundations are not permitted.

Cut the bottom of all posts square.

For sign types which design details are not shown on these plans, fabricate according to the “STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS”.

Removed material that is deemed salvageable (signs and posts) will be the property of TxDOT. Deliver salvageable material to the TxDOT Maintenance Office. Remove unsalvageable material.

ITEM 666: RETROREFLECTORIZED PAVEMENT MARKINGS

The Contractor will layout the proposed striping in accordance with TxDOT Traffic Control Plan Standards and latest version Texas Manual on Uniform Traffic Control Devices (TMUTCD) and project striping layout sheets. The Engineer will verify proposed striping layout prior to the beginning of striping operations.

ITEM 668: PREFABRICATED PAVEMENT MARKINGS

Use Type C prefabricated pavement markings.

ITEM 672: RAISED PAVEMENT MARKERS

Existing raised pavement markers to be replaced will be removed at the same time that the new markers are placed (i.e., remove and replace in one operation). Existing raised pavement markers replaced by new markers will be removed in accordance with Item 677, “Eliminating Existing Pavement Markings and Markers”. Immediately fill the damaged area in the pavement due to the removal of existing markers with an approved bituminous material. This removal and backfill work will not be paid for directly, but will be subsidiary to Item 672, "Raised Pavement Markers".

ITEM 677: ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Water blasting method will be used on all pavement surfaces for removal of temporary or permanent pavement markings.

ITEM 3076: DENSE-GRADED HOT-MIX ASPHALT

Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class__B___.

Maximum stripping of 0% is required.

Dense-Graded Hot-Mix Asphalt used as concrete pavement underlayment is deemed as "Exempt Production".

RAP from Contractor owned sources may be used if the RAP is fractionated.

ITEM 3096: ASPHLATS, OILS, AND EMULSIONS

Latex additives or modifiers will not be allowed on this project.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require "full matrix" type portable changeable message signs.

Ensure that the Contractor's Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish 8 portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

Supply portable changeable message sign(s) in accordance with the Traffic Control Plan standard sheets and Article 6f.55 of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways Part VI.

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Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0015-07-087 **DISTRICT** Waco **COUNTY** Bell
HIGHWAY IH 35

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0015-07-087**			
			PROJECT ID		**A00203777**			
			COUNTY		**Bell**			
			HIGHWAY		**IH 35**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	100-6001	PREPARING ROW		AC	8.410		8.410	
	104-6001	REMOVING CONC (PAV)		SY	8,435.000		8,435.000	
	104-6015	REMOVING CONC (SIDEWALKS)		SY	400.000		400.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)		LF	2,738.000		2,738.000	
	110-6001	EXCAVATION (ROADWAY)		CY	46,365.000		46,365.000	
	132-6025	EMBANKMENT (FINAL) (DENS CONT) (TY C1)		CY	35,964.000		35,964.000	
	160-6005	FURNISHING AND PLACING TOPSOIL		CY	185.000		185.000	
	162-6008	ROLL SODDING		SY	2,296.000		2,296.000	
	164-6010	BROADCAST SEED (TEMP) (WARM)		AC	1.000		1.000	
	164-6012	BROADCAST SEED (TEMP) (COOL)		AC	8.000		8.000	
	168-6001	VEGETATIVE WATERING		MG	436.560		436.560	
	247-6055	FL BS (CMP IN PLC)(TY D GR 3)(FNAL POS)		CY	6,790.000		6,790.000	
	260-6016	LIME (HYD, COM, OR QK(SLURRY))		TON	550.000		550.000	
	260-6079	LIME TRT (SUBGRADE)(6")		SY	40,728.000		40,728.000	
	276-6107	CM TRT(PT MX)(CL N)(TY D)(GR 3)(FN POS)		CY	755.000		755.000	
	310-6027	PRIME COAT(MC-30 OR AE-P)		GAL	8,146.000		8,146.000	
	360-6004	CONC PVMT (CONT REINF - CRCP) (10")		SY	40,728.000		40,728.000	
	432-6006	RIPRAP (CONC)(CL B)		CY	10.000		10.000	
	438-6005	CLEANING AND SEALING JOINTS		LF	28.000		28.000	
	446-6029	CLEAN AND PAINT EXIST STR (REF NO.1)		LS	1.000		1.000	
	459-6007	GABION MATTRESSES (GALV)(12 IN)		SY	802.000		802.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	10.000		10.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)		LF	256.000		256.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	256.000		256.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	673.000		673.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY	673.000		673.000	
	506-6034	CONSTRUCTION PERIMETER FENCE		LF	2,000.000		2,000.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	8,297.000		8,297.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	8,297.000		8,297.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	2,170.000		2,170.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	2,170.000		2,170.000	
	508-6001	CONSTRUCTING DETOURS		SY	1,465.000		1,465.000	
	512-6013	PORT CTB (DES SOURCE)(SGL SLP)(TY 1)		LF	432.000		432.000	
	512-6021	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)		LF	600.000		600.000	
	512-6022	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)		LF	40.000		40.000	
	512-6045	PORT CTB (STKPL)(LOW PROF)(TY 1)		LF	600.000		600.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0015-07-087 **DISTRICT** Waco **COUNTY** Bell
HIGHWAY IH 35

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0015-07-087**			
		PROJECT ID		**A00203777**			
		COUNTY		**Bell**			
		HIGHWAY		**IH 35**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	512-6046	PORT CTB (STKPL)(LOW PROF)(TY 2)	LF	40.000		40.000	
	529-6005	CONC CURB (MONO) (TY II)	LF	3,524.000		3,524.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	342.000		342.000	
	529-6021	CONC CURB & GUTTER (SLOTTED)	LF	115.000		115.000	
	529-6037	CONC CURB & GUTTER TY II (MOD)	LF	3,630.000		3,630.000	
	531-6002	CONC SIDEWALKS (5")	SY	1,388.000		1,388.000	
	531-6005	CURB RAMPS (TY 2)	EA	2.000		2.000	
	531-6013	CURB RAMPS (TY 10)	EA	4.000		4.000	
	536-6003	CONC DIRECTIONAL ISLAND	LF	1,406.000		1,406.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	2.000		2.000	
	550-6036	CHAIN LINK FENCE (INSTALL)	SF	1,685.000		1,685.000	
	552-6009	GATE (SPECIAL)	EA	2.000		2.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	12.000		12.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	2.000		2.000	
	644-6050	IN SM RD SN SUP&AM TYS80(2)SA(P)	EA	2.000		2.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	8.000		8.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	22.000		22.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	495.000		495.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	495.000		495.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	13,688.000		13,688.000	
	666-6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	234.000		234.000	
	666-6225	PAVEMENT SEALER 6"	LF	1,500.000		1,500.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	13,688.000		13,688.000	
	666-6356	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	LF	3,000.000		3,000.000	
	666-6357	REFL PAV MRK TY II(RED)(SYMBOL)(100MIL)	EA	96.000		96.000	
	666-6363	REFL PAV MRK TY I (W)12"(SLD)(100MIL)1X	LF	234.000		234.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	6.000		6.000	
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	12.000		12.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	6.000		6.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	12.000		12.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	10,974.000		10,974.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	4.000		4.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	6.000		6.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	10,878.000		10,878.000	
	678-6021	PAV SURF PREP FOR MRK (SYMBOL)	EA	96.000		96.000	
	772-6003	POST AND CABLE FENCE (NEW INSTALLATION)	LF	1,000.000		1,000.000	
	3076-6037	D-GR HMA TY-D SAC-B PG64-22	TON	4,481.000		4,481.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0015-07-087 **DISTRICT** Waco **COUNTY** Bell
HIGHWAY IH 35

			CONTROL SECTION JOB		**0015-07-087**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00203777**		
			COUNTY		**Bell**		
			HIGHWAY		**IH 35**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	8.000		8.000	
	7204-6001	MEP AND WASTEWATER SYSTEM UPGRADE	EA	1.000		1.000	
	01	STATE FORCE ACCOUNT WORK (NON-PARTICIPATING)	LS	1.000		1.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	104* 6022	506 6020	506 6024	506 6034	508 6001	512 6021	512 6022	512 6045	512 6046	529* 6008	662 6008	662 6037	677 6001	6001 6002
	REMOVING CONC (CURB AND GUTTER)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	CONSTRUCTION PERIMETER FENCE	CONSTRUCTING DETOURS	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)	PORT CTB (STKPL)(LOW PROF)(TY 1)	PORT CTB (STKPL)(LOW PROF)(TY 2)	CONC CURB & GUTTER (TY II)	WK ZN PAV MRK NON-REMOV (W)6" (SLD)	WK ZN PAV MRK NON-REMOV (Y)6" (SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN
	LF	SY	SY	LF	SY	LF	LF	LF	LF	LF	LF	LF	LF	EA
Northbound	152	503	503	1000	745	340	20	340	20	152	275	275	588	4
Southbound	190	170	170	1000	720	260	20	260	20	190	220	220	392	4
PROJECT TOTALS	**342**	**673**	**673**	**2000**	**1465**	**600**	**40**	**600**	**40**	**342**	**495**	**495**	**980**	**8**

*TEMPORARILY REMOVE CURB AND GUTTER AT DETOURS AS INDICATED ON TCP. REPLACE UPON COMPLETION OF CONSTRUCTION.

SUMMARY OF REMOVAL ITEMS

LOCATION	100 6001	104 6001	104 6015	104 6022	644 6076
	PREPARING ROW	REMOVING CONC (PAV)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB AND GUTTER)	REMOVE SM RD SN SUP&AM
	AC	SY	SY	LF	EA
Northbound	4.3	4079	233	1259	11
Southbound	4.11	4356	167	1137	11
PROJECT TOTALS	**8.41**	**8435**	**400**	**2396**	**22**

SUMMARY OF DRAINAGE ITEMS

LOCATION	459 6007
	GABION MATTRESSES (GALV)(12 IN)
	SY
Northbound	330
Southbound	471
PROJECT TOTALS	**802**

SUMMARY OF ILLUMINATION ITEMS

LOCATION	7204** 6001
	MEP AND WASTEWATER SYSTEM UPGRADE
	EA
	1
PROJECT TOTALS	**1**

**SEE ILLUMINATION SHEETS FOR SUBSIDIARY COMPONENT ITEMS AND QUANTITIES THAT COMPRISE THE ILLUMINATION SYSTEM TO BE INSTALLED.

SUMMARY OF ROADWAY ITEMS

LOCATION	110 6001	132 6025	247 6055	260 6016	260 6079	276 6107	310 6027	360 6004	432 6006	438 6005	446 6029	512 6013	529 6005	529 6021	529 6037
	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)	FL BS (CMP IN PLC)(TY D GR 3)(FNAL POS)	LIME (HYD, COM, OR QK(SLURRY))	LIME TRT (SUBGRADE)(6")	CM TRT(PT MX)(CLN)(TY D)(GR 3)(FN POS)	PRIME COAT(MC-30 OR AE-P)	CONC PVMT (CONT REINF - CRCP)(10")	RIPRAP (CONC)(CLB)	CLEANING AND SEALING JOINTS	CLEAN AND PAINT EXIST STR (REF NO.1)	PORT CTB (DES SOURCE)(SGL SLP)(TY 1)	CONC CURB (MONO) (TY II)	CONC CURB & GUTTER (SLOTTED)	CONC CURB & GUTTER TY II (MOD)
	CY	CY	CY	TON	SY	CY	GAL	SY	CY	LF	LS	LF	LF	LF	LF
Northbound	22822	17982	3473	281	20829	386	4166	20829				360	1156		1810
Southbound	23543	17982	3317	269	19899	369	3980	19899	10	28	1	72	2368	115	1820
PROJECT TOTALS	**46365**	**35964**	**6790**	**550**	**40728**	**755**	**8146**	**40728**	**10**	**28**	**1**	**432**	**3524**	**115**	**3630**

LOCATION	531 6002	531 6005	531 6013	536 6003	545 6007	550 6036	552 6009	772 6003	3076 6037
	CONC SIDEWALKS (5")	CURB RAMPS (TY 2)	CURB RAMPS (TY 10)	CONC DIRECTIONAL ISLAND	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	CHAIN LINK FENCE (INSTALL)	GATE (SPECIAL)	POST AND CABLE FENCE (NEW INSTALLATION)	D-GR HMA TY-D SAC-B PG64-22
	SY	EA	EA	LF	EA	SF	EA	LF	TON
Northbound	705	1	2	701	2	1620	1	500	2292
Southbound	683	1	2	705		65	1	500	2189
PROJECT TOTALS	**1388**	**2**	**4**	**1406**	**2**	**1685**	**2**	**1000**	**4481**

IH 35
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		39

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6170	666 6180	666 6225	666 6303	666 6356	666 6357	666 6363	668 6077	668 6078	668 6085	668 6092	677 6001	677 6008	677 6012	678 6001	678 6021
	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 12" (SLD)	PAVEMENT SEALER 6"	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	REFL PAV MRK TY II(RED)(SYMBOL)(100MIL)	REFL PAV MRK TY I (W)12"(SLD)(100MIL)1X	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (DBL ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (SYMBOL)
	LF	LF	LF	LF	LF	EA	LF	EA	EA	EA	EA	LF	EA	EA	LF	EA
Northbound	6795		750	6795	1500	48		3	6	3	6	4997	2	3	5390	48
Southbound	6893	234	750	6893	1500	48	234	3	6	3	6	4997	2	3	5488	48
PROJECT TOTALS	**13688**	**234**	**1500**	**13688**	**3000**	**96**	**234**	**6**	**12**	**6**	**12**	**9994**	**4**	**6**	**10878**	**96**

SUMMARY OF SIGNING ITEMS

LOCATION	644 6004	644 6030	644 6050	644 6060
	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(T)	IN SM RD SN SUP&AM TYS80(2)SA(P)	IN SM RD SN SUP&AM TYTWT(1)WS(P)
	EA	EA	EA	EA
Northbound	6	1	1	4
Southbound	6	1	1	4
PROJECT TOTALS	**12**	**2**	**2**	**8**

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	160 6005	162 6008	164 6010	164 6012	168 6001	506 6003	506 6011	506 6038	506 6039	506 6041	506 6043
	FURNISHING AND PLACING TOPSOIL	ROLL SODDING	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 3)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	CY	SY	AC	AC	MG	LF	LF	LF	LF	LF	LF
Northbound	90	1162	0.5	4	418.28	128	128	4080	4080	2170	2170
Southbound	95	1134	0.5	4	18.28	128	128	4217	4217		
PROJECT TOTALS	**185**	**2296**	**1**	**8**	**436.56**	**256**	**256**	**8297**	**8297**	**2170**	**2170**

IH 35
QUANTITY SUMMARY

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		39A

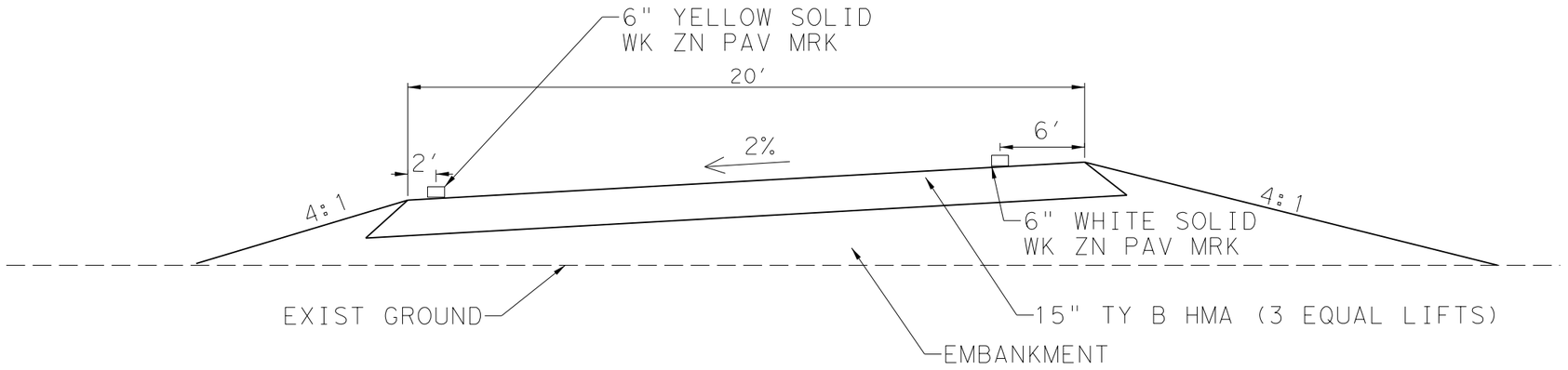
SEQUENCE OF WORK:

PHASE 1: NORTHBOUND

1. UTILIZING STANDARD TCP(2-1)-18, INSTALLBARRICADES AND EROSION CONTROL DEVICES AS DIRECTED, REMOVE CURB, REMOVE PAVEMENT MARKINGS AS SHOWN IN TCP LAYOUT AND CONSTRUCT DETOUR. USE SPACE OF 15′ BETWEEN CHANNELIZING DEVICES.
2. INSTALL LOW PROFILE BARRIER, AND WARNING AND DETOUR SIGNS IN ACCORDANCE WITH TCP STANDARDS AND TRAFFIC CONTROL PLANS.
3. CONSTRUCT THE PARKING EXPANSION. INSTALL UNDERGROUND CONDUIT PER ILLUMINATION PLANS. INSTALL UNDERGROUND CONDUIT OUTSIDE LIMITS OF PARKING EXPANSION PER TYPCAL ILLUMINATION TRENCHING DETAIL, PROVIDED IN ILLUMINATION PLANS. FULL ILLUMINATION PLAN AND PROPOSED SIGNS MAY BE INSTALLED DURING THIS STEP.
4. REMOVE WORKZONE CHANNELIZING DEVICES AND WARNING AND DETOUR SIGNS. REPLACE PAVEMENT MARKINGS AND CURB REMOVED IN STEP 1, MATCHING PRE-CONSTRUCTION CONFIGURATIONS. RE-OPEN THE NEW SECTION.
5. REMOVE THE TEMPORARY DETOUR. COMPLETE ILLUMINATION AND SIGN INSTALLATION, IF NECESSARY. REPAIR EXISTING SIDEWALK WHERE INDICATED IN PLANS.
6. REMOVE EROSION CONTROL DEVICES AS DIRECTED.
7. PERFORM FINAL CLEANUP AND REMOVE PROJECT LIMIT AND WORK ZONE SIGNING AS DIRECTED BY THE ENGINEER.

PHASE 2: SOUTHBOUND

1. UTILIZING STANDARD TCP(2-1)-18, INSTALLBARRICADES AND EROSION CONTROL DEVICES AS DIRECTED, REMOVE CURB, REMOVE PAVEMENT MARKINGS AS SHOWN IN TCP LAYOUT AND CONSTRUCT DETOUR. USE SPACE OF 15′ BETWEEN CHANNELIZING DEVICES.
2. INSTALL LOW PROFILE BARRIER, AND WARNING AND DETOUR SIGNS IN ACCORDANCE WITH TCP STANDARDS AND TRAFFIC CONTROL PLANS.
3. CONSTRUCT THE PARKING EXPANSION. INSTALL UNDERGROUND CONDUIT PER ILLUMINATION PLANS. INSTALL UNDERGROUND CONDUIT OUTSIDE LIMITS OF PARKING EXPANSION PER TYPCAL ILLUMINATION TRENCHING DETAIL, PROVIDED IN ILLUMINATION PLANS. FULL ILLUMINATION PLAN AND PROPOSED SIGNS MAY BE INSTALLED DURING THIS STEP.
4. REMOVE WORKZONE CHANNELIZING DEVICES AND WARNING AND DETOUR SIGNS. REPLACE PAVEMENT MARKINGS AND CURB REMOVED IN STEP 1, MATCHING PRE-CONSTRUCTION CONFIGURATIONS. RE-OPEN THE NEW SECTION.
5. REMOVE THE TEMPORARY DETOUR. COMPLETE ILLUMINATION AND SIGN INSTALLATION, IF NECESSARY. REPAIR EXISTING SIDEWALK WHERE INDICATED IN PLANS.
6. REMOVE EROSION CONTROL DEVICES AS DIRECTED.
7. PERFORM FINAL CLEANUP AND REMOVE PROJECT LIMIT AND WORK ZONE SIGNING AS DIRECTED BY THE ENGINEER.



DETOUR PAVEMENT (SECTION B-B)

Justin E. Obinna

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Date: 2024.05.15 11:45:06 -05'00'

05/15/2024

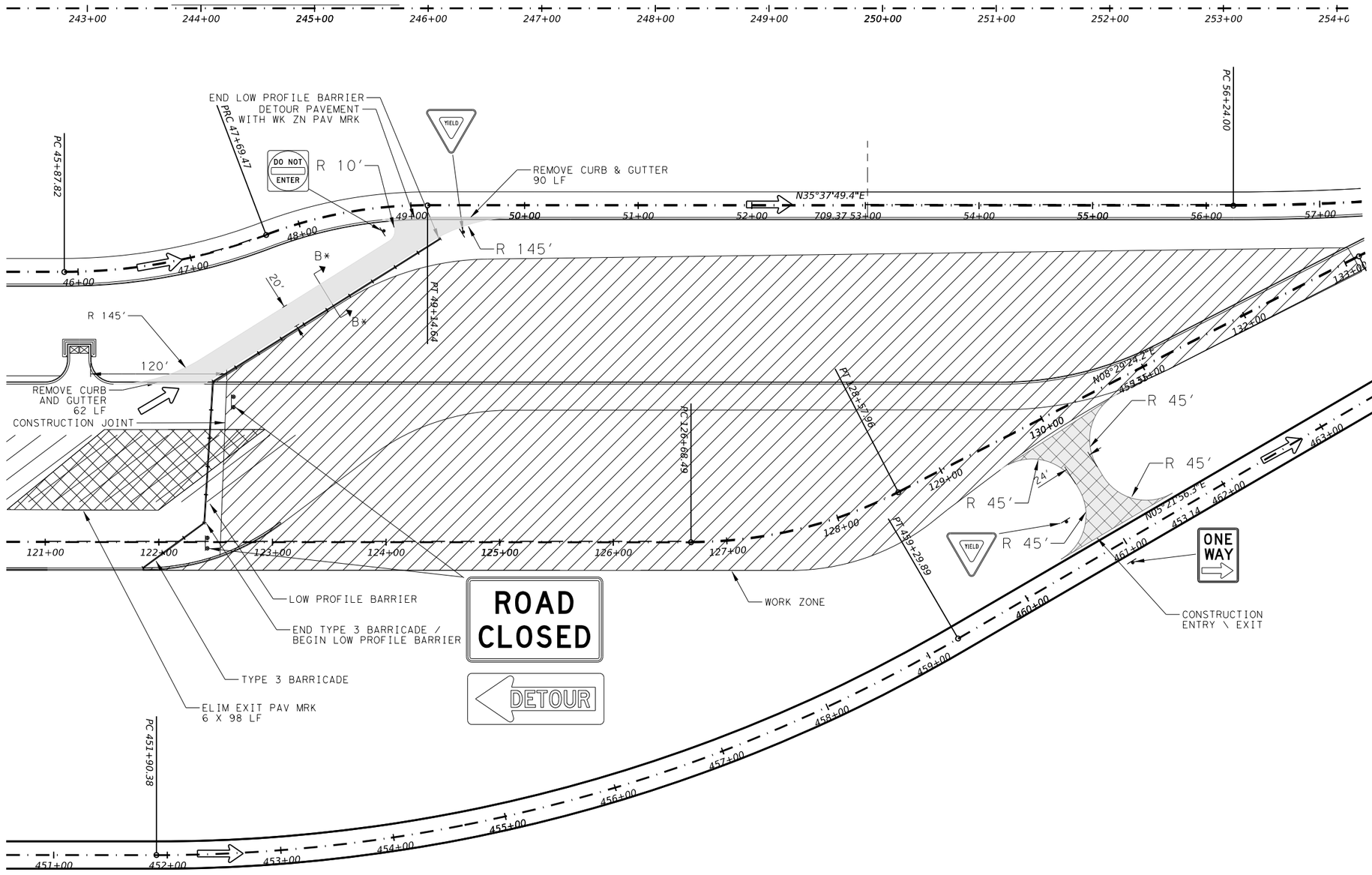
STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

IH 35
TCP NARRATIVE & TYPICAL SECTION

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		40

LOCATION	104 6022	506 6020	506 6024	506 6034	508 6001	512 6021	512 6022	512 6045	512 6046	529 6008	662 6008	662 6037	677 6001	6001 6002
	REMOVING CONC (CURB AND GUTTER)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	CONSTRUCTION PERIMETER FENCE	CONSTRUCTING DETOURS	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)	PORT CTB (STKPL)(LOW PROF)(TY 1)	PORT CTB (STKPL)(LOW PROF)(TY 2)	CONC CURB & GUTTER (TY II)	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN
	LF	SY	SY	LF	SY	LF	LF	LF	LF	LF	LF	LF	LF	EA
Northbound	152	503	503	1000	745	340	20	340	20	152	275	275	588	4



LEGEND

- WORK AREA
- BARRICADE \ LOW PROFILE BARRIER
- DIRECTION OF TRAVEL
- TEMPORARY SIGN
- DETOUR PAVEMENT
- ELIM EXIT PAV MRK
- CONSTRUCTION EXIT

* SEE TEMPORARY PAVEMENT DETAIL

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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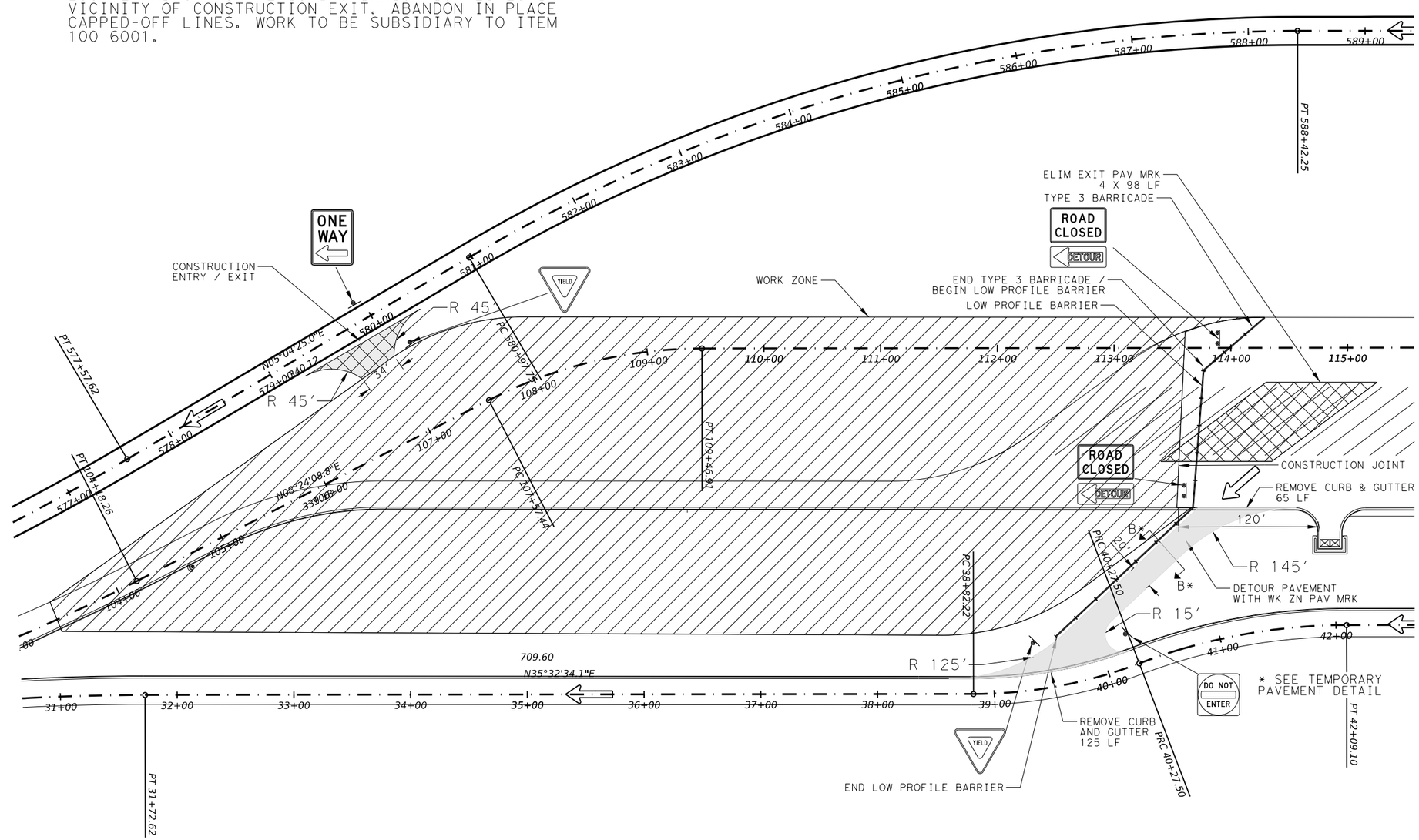
IH 35 TCP NORTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		41

NOTE:

LOCATE AND CAP OFF EXISTING IRRIGATION LINES IN VICINITY OF CONSTRUCTION EXIT. ABANDON IN PLACE CAPPED-OFF LINES. WORK TO BE SUBSIDIARY TO ITEM 100 6001.



LEGEND

- WORK AREA
- BARRICADE \ LOW PROFILE BARRIER
- DIRECTION OF TRAVEL
- TEMPORARY SIGN
- DETOUR PAVEMENT
- ELIM EXIT PAV MRK
- CONSTRUCTION EXIT

LOCATION	104 6022	506 6020	506 6024	506 6034	508 6001	512 6021	512 6022	512 6045	512 6046	529 6008	662 6008	662 6037	677 6001	6001 6002
	REMOVING CONC (CURB AND GUTTER)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	CONSTRUCTION PERIMETER FENCE	CONSTRUCTING DETOURS	PORT CTB (DES SOURCE)(LOW PROF)(TY 1)	PORT CTB (DES SOURCE)(LOW PROF)(TY 2)	PORT CTB (STKPL)(LOW PROF)(TY 1)	PORT CTB (STKPL)(LOW PROF)(TY 2)	CONC CURB & GUTTER (TY II)	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN
	LF	SY	SY	LF	SY	LF	LF	LF	LF	LF	LF	LF	LF	EA
Southbound	190	170	170	1000	720	260	20	260	20	190	220	220	392	4

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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IH 35 TCP SOUTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		42

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

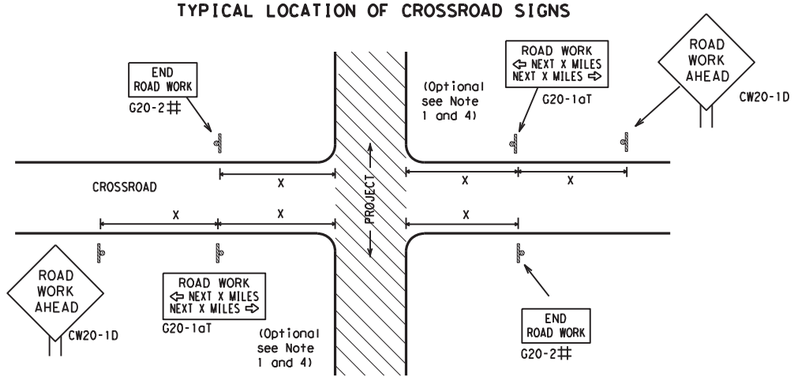
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0015	07	087	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	WAC	BELL		52

DATE:
FILE:

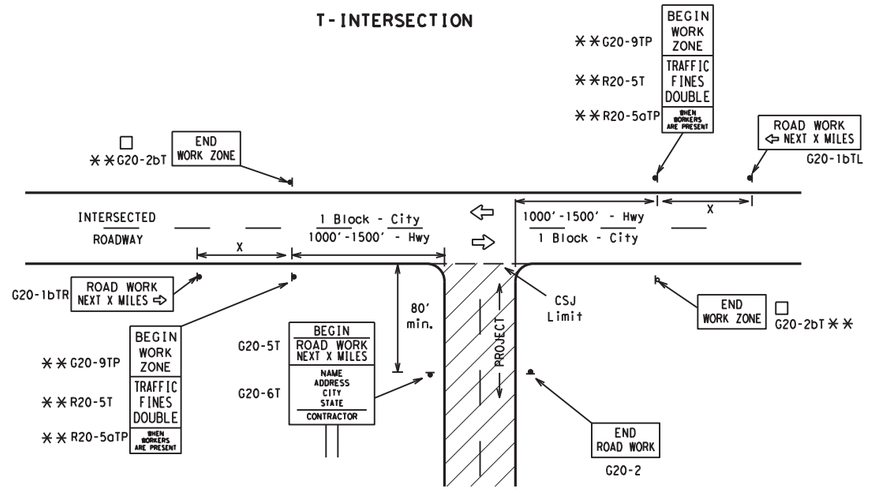
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

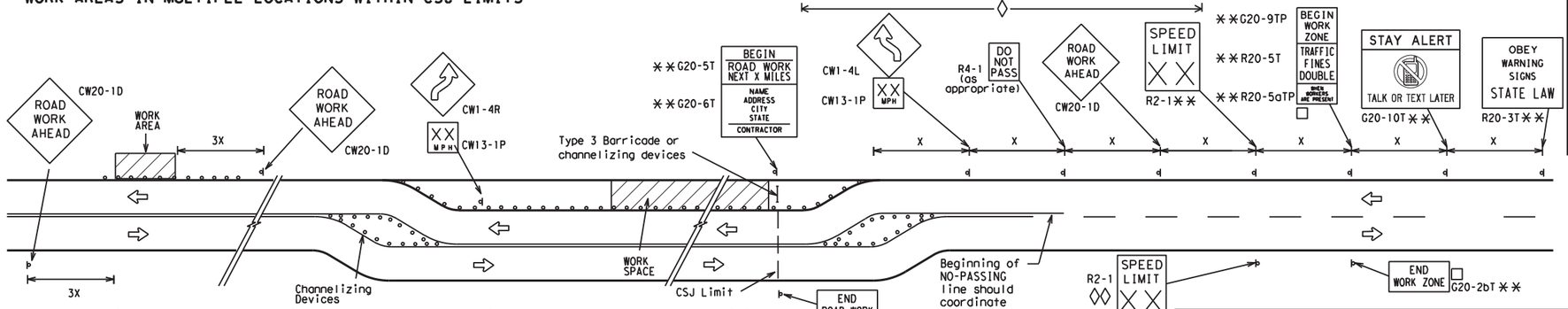
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

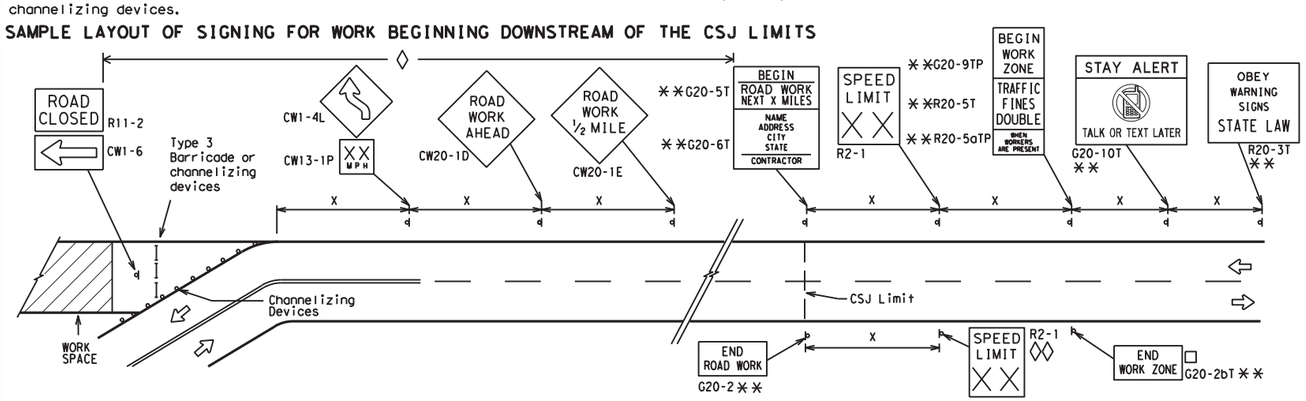
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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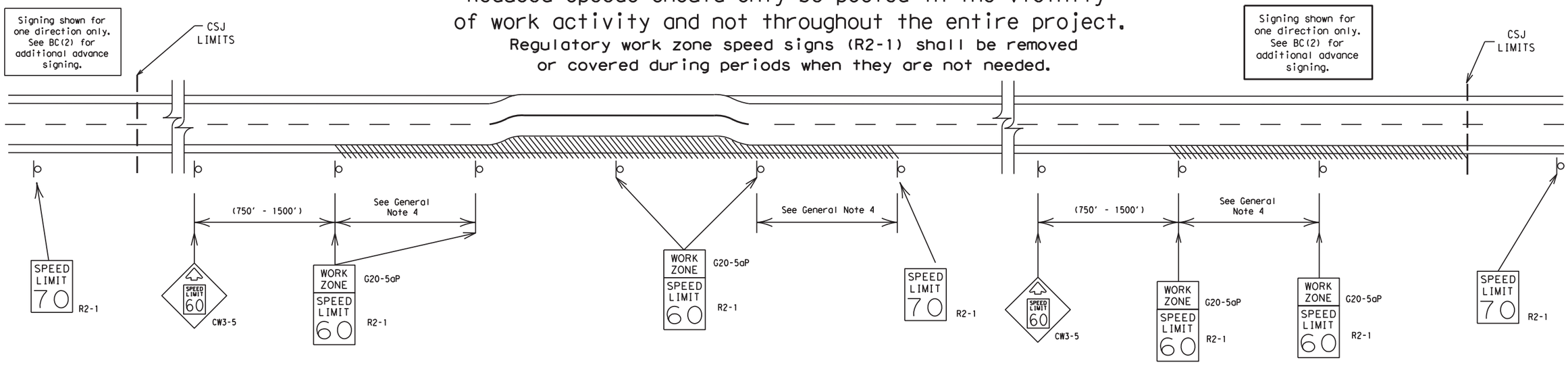
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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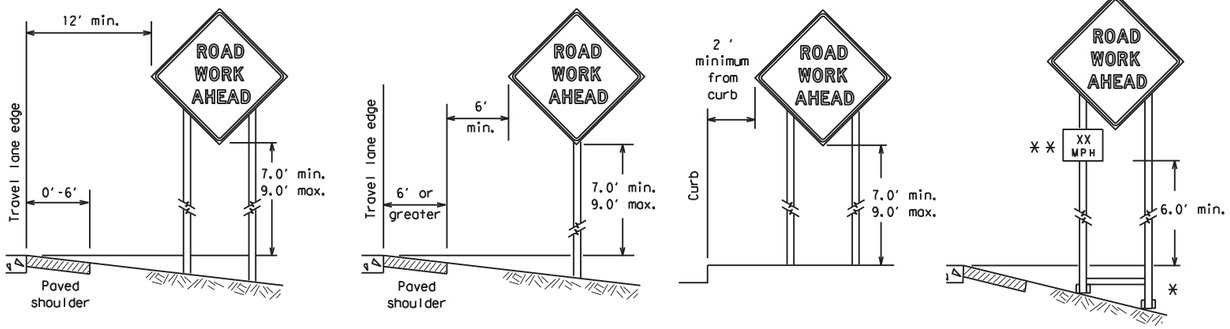
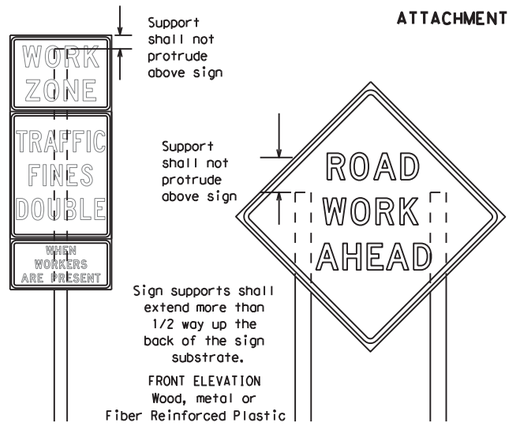
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

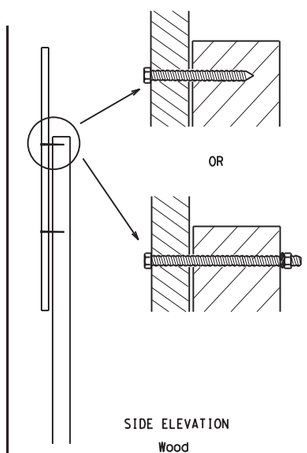


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





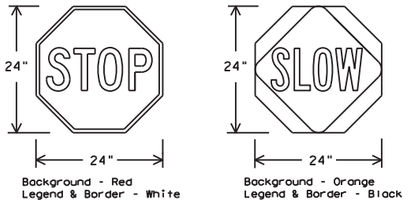
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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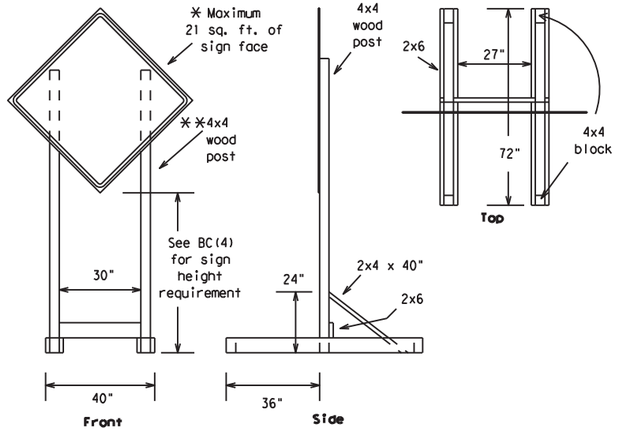
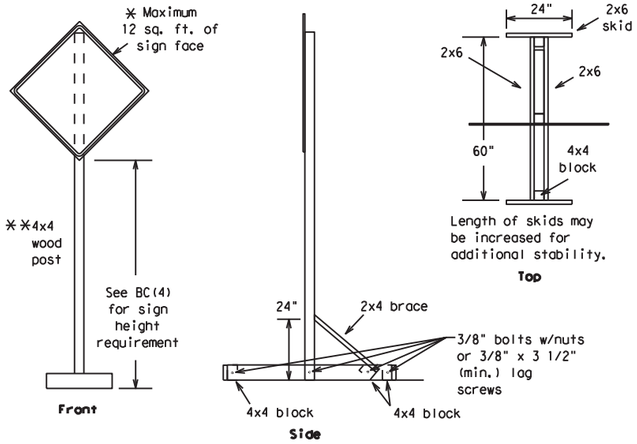
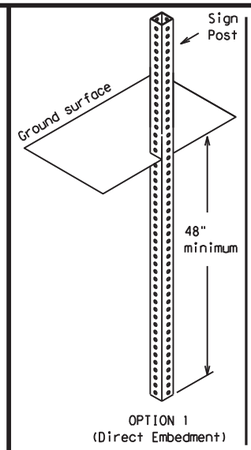
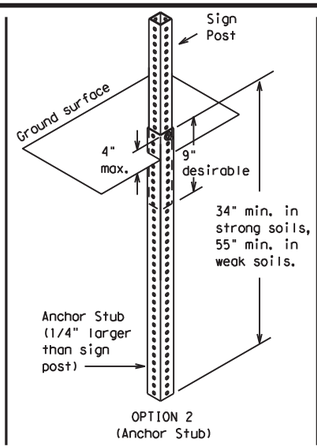


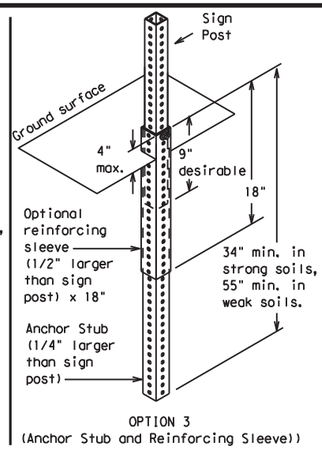


SKID MOUNTED WOOD SIGN SUPPORTS

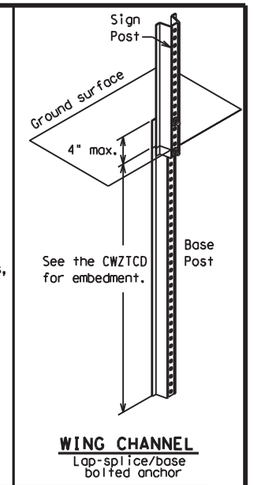
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS





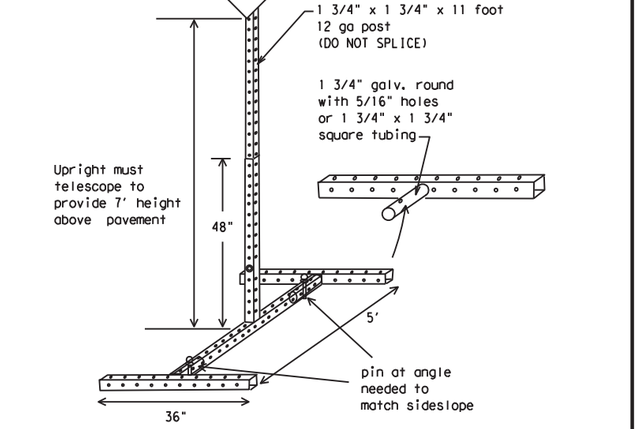


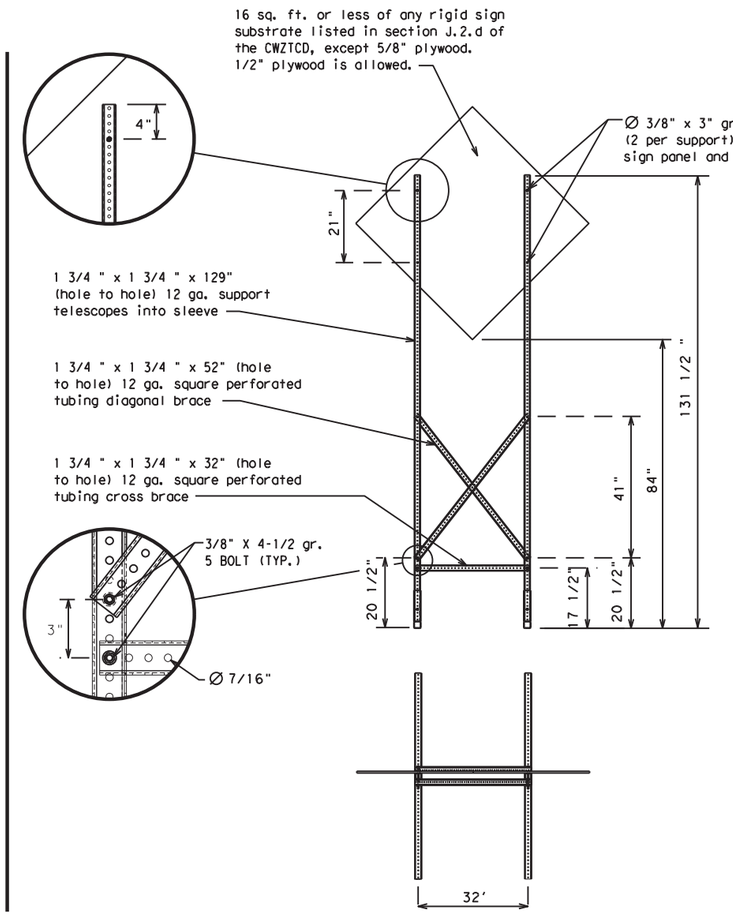
PERFORATED SQUARE METAL TUBING

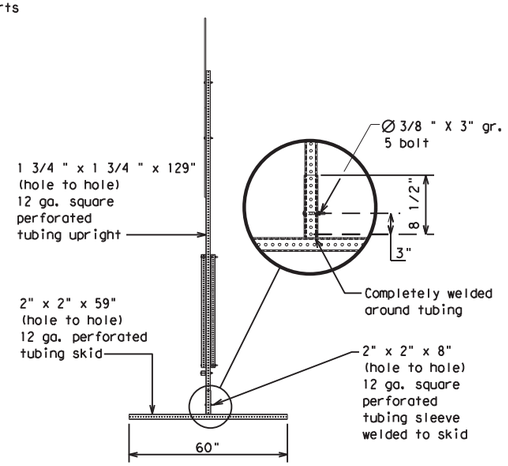


GROUND MOUNTED SIGN SUPPORTS

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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

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)

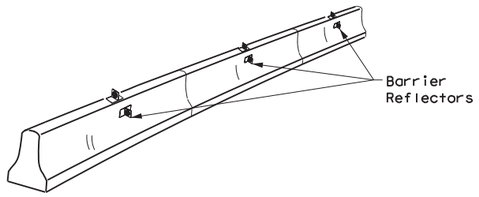
BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0015	07	087	IH 35
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		WAC	BELL		57

100

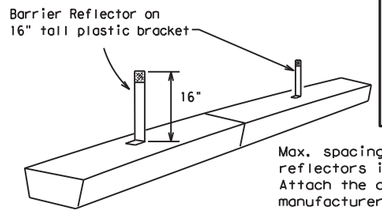
DATE:
FILE:

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.



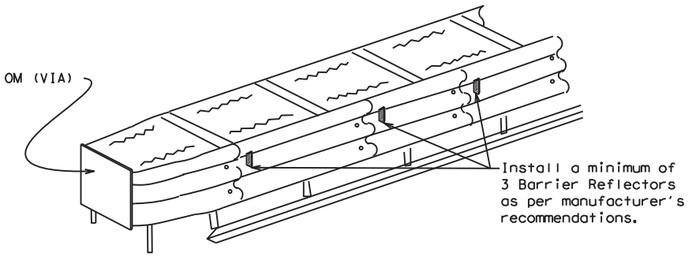
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

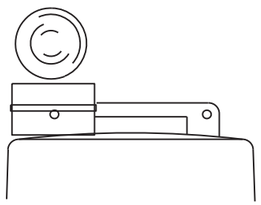
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

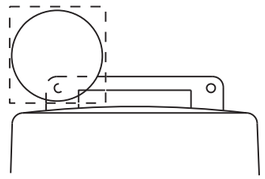
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

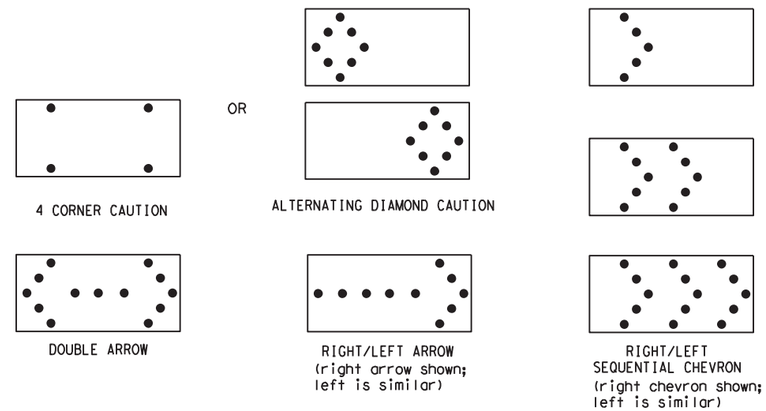
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WAC	BELL		58

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:

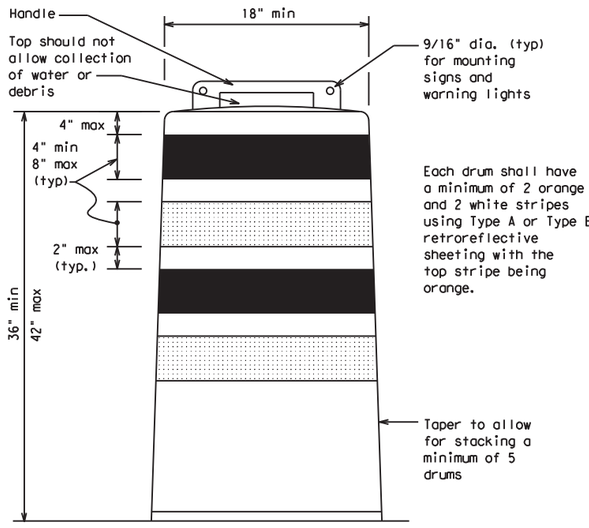
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

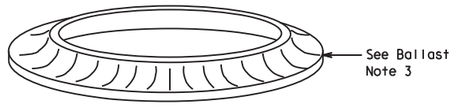
RETROREFLECTIVE SHEETING

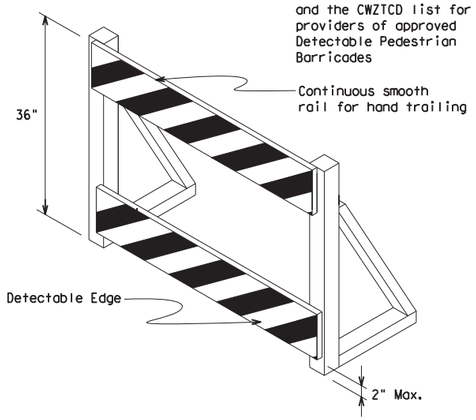
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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



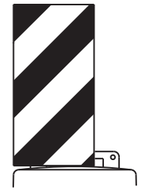




DETECTABLE PEDESTRIAN BARRICADES

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

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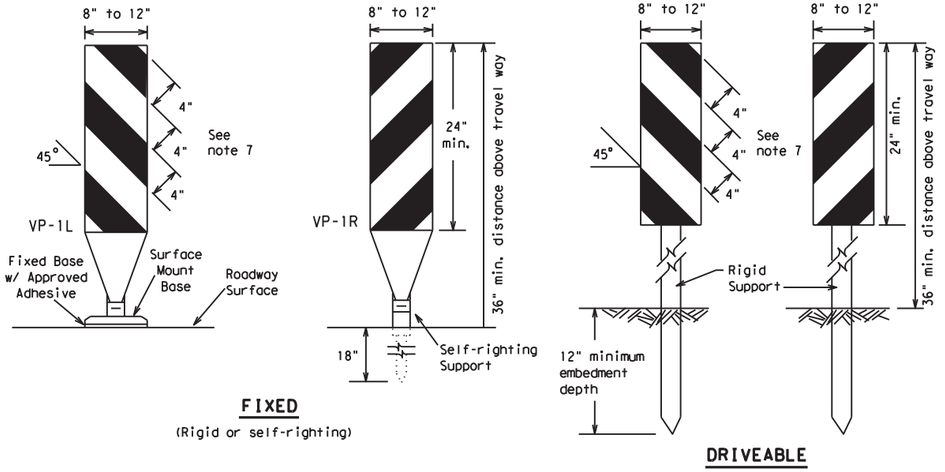
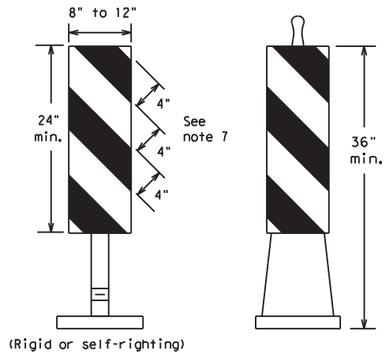


FIXED
(Rigid or self-righting)

DRIVEABLE

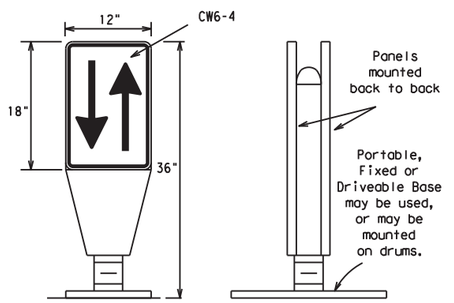


(Rigid or self-righting)

PORTABLE

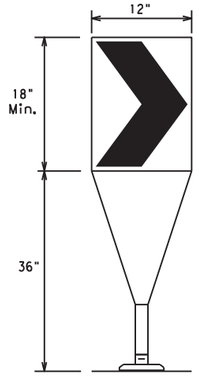
VERTICAL PANELS (VPs)

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.



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)



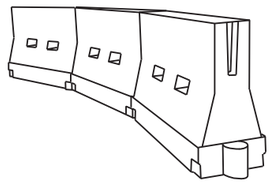
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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 ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices 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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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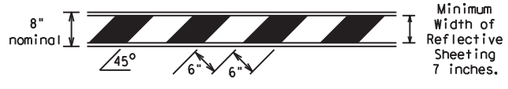
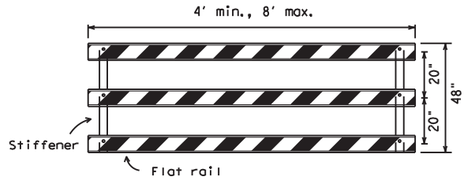
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



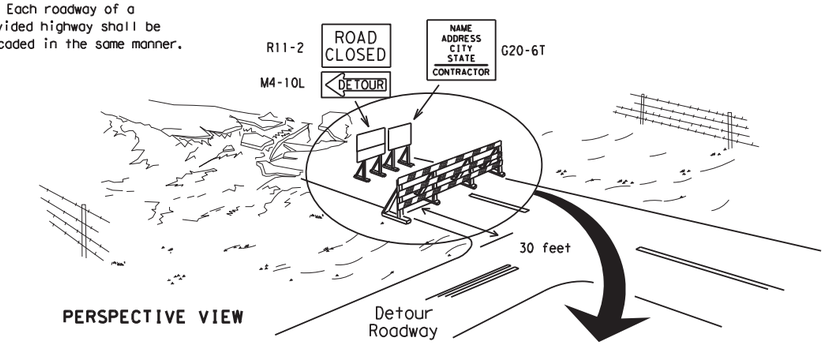
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

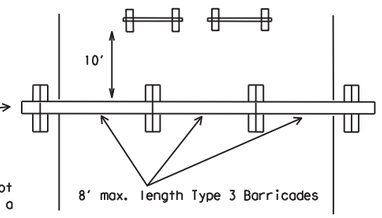
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

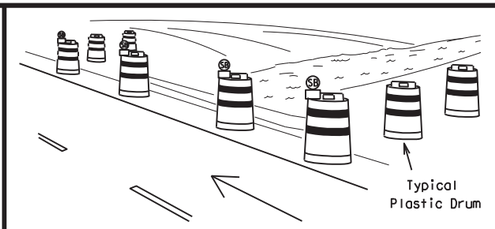
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

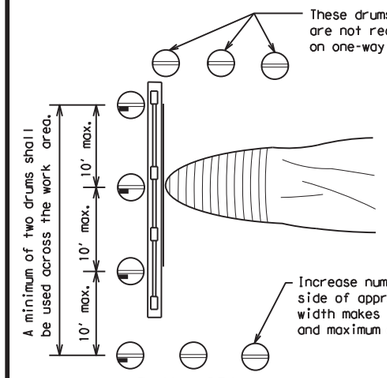
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

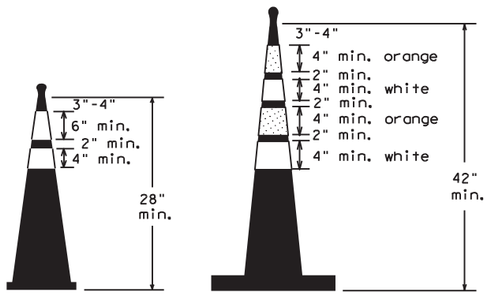
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



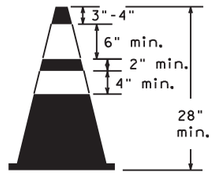
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

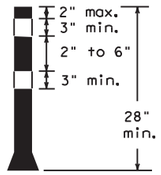
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

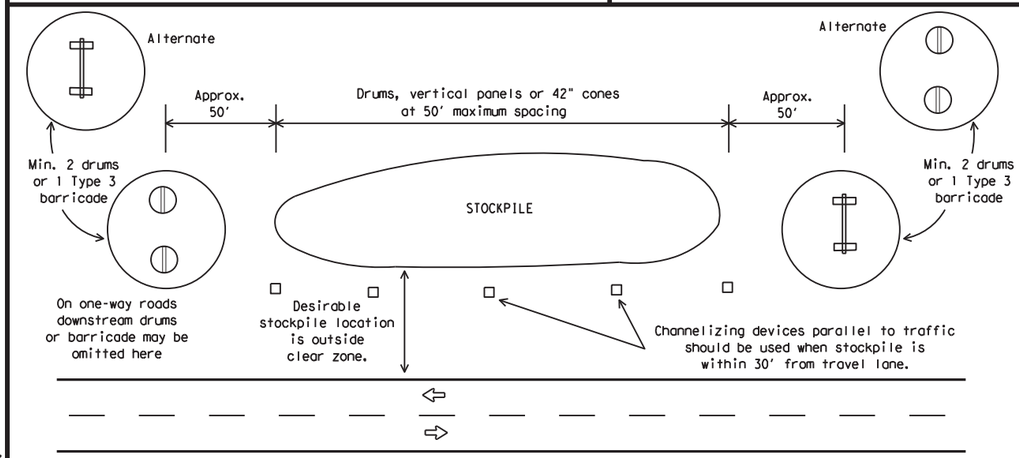


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

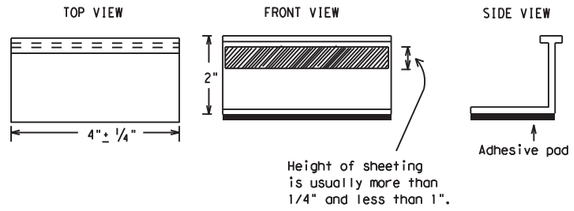
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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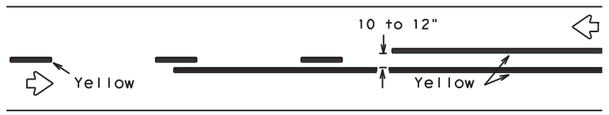
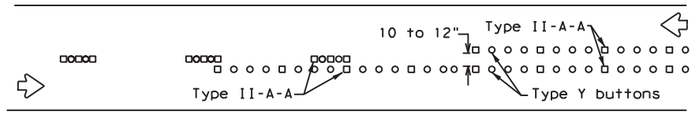
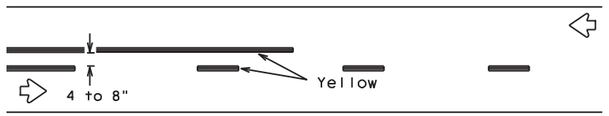
PAVEMENT MARKING PATTERNS



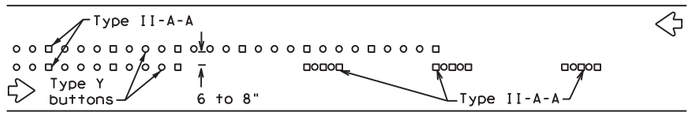
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



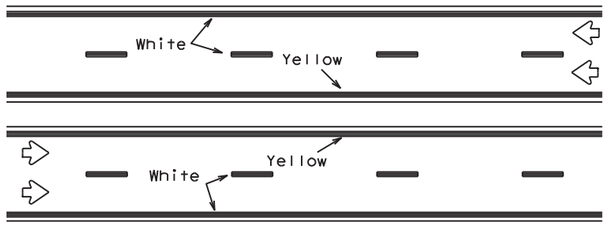
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



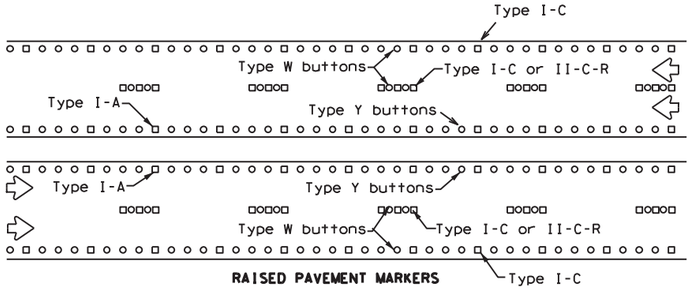
RAISED PAVEMENT MARKERS - PATTERN B

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



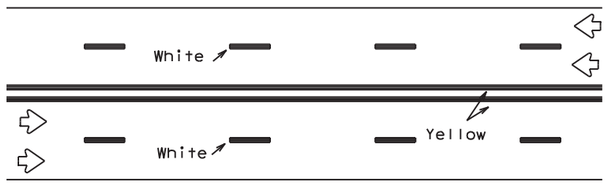
REFLECTORIZED PAVEMENT MARKINGS



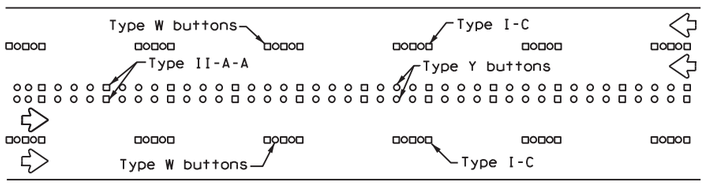
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



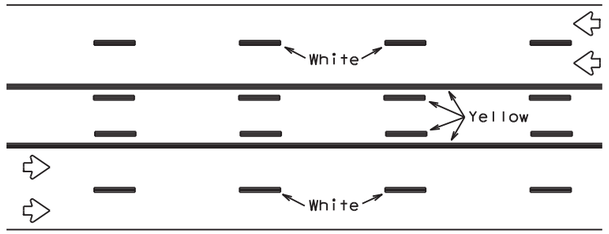
REFLECTORIZED PAVEMENT MARKINGS



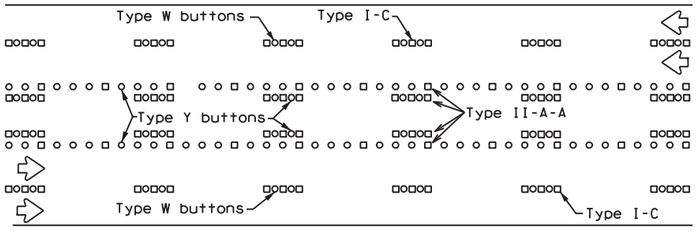
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

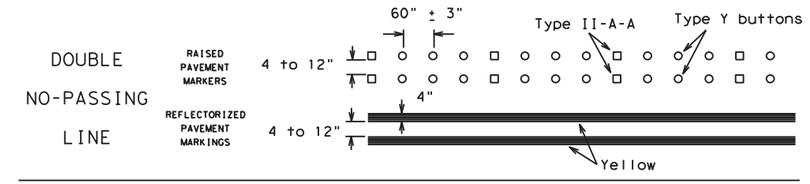
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

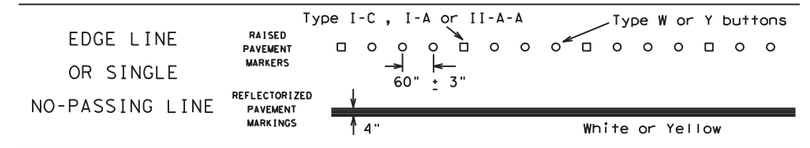
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

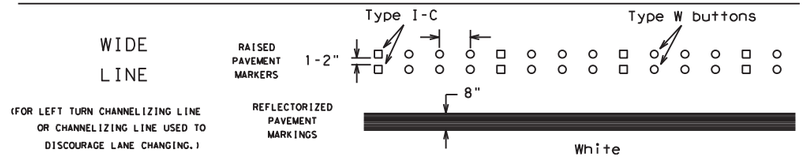


EDGE LINE OR SINGLE NO-PASSING LINE



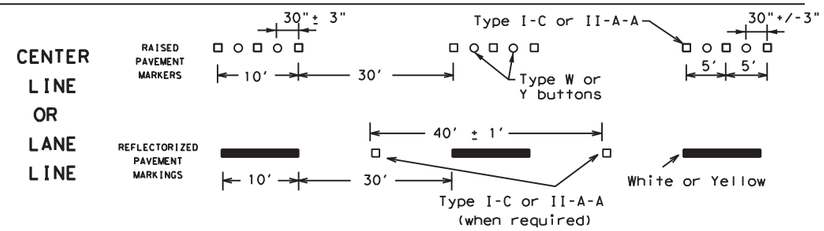
WIDE LINE

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

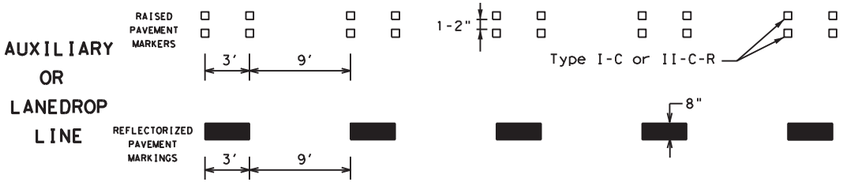


BROKEN LINES

CENTER LINE OR LANE LINE

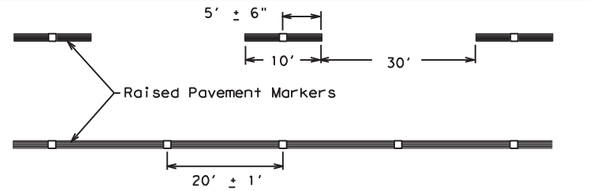


AUXILIARY OR LANEDROP LINE



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."

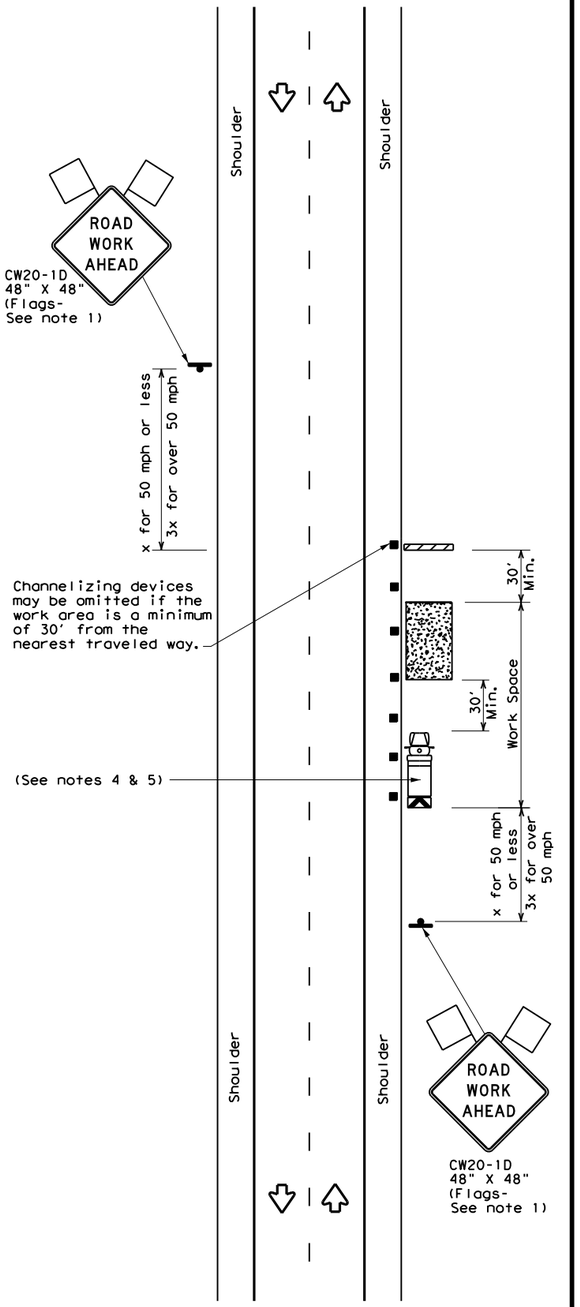
Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

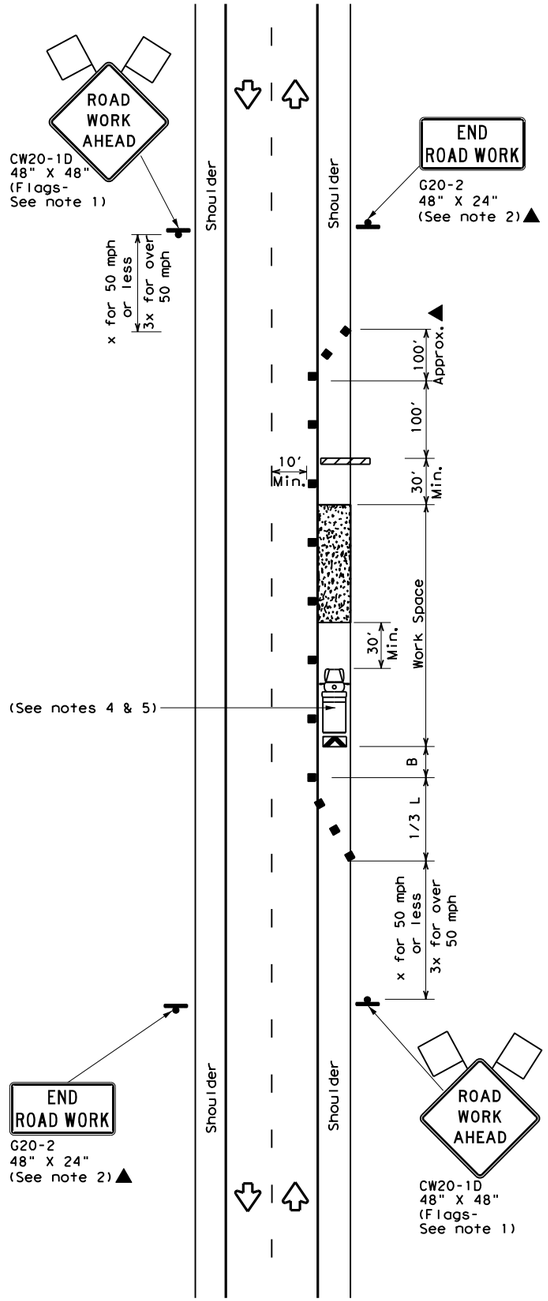
BC(12)-21

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	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		63



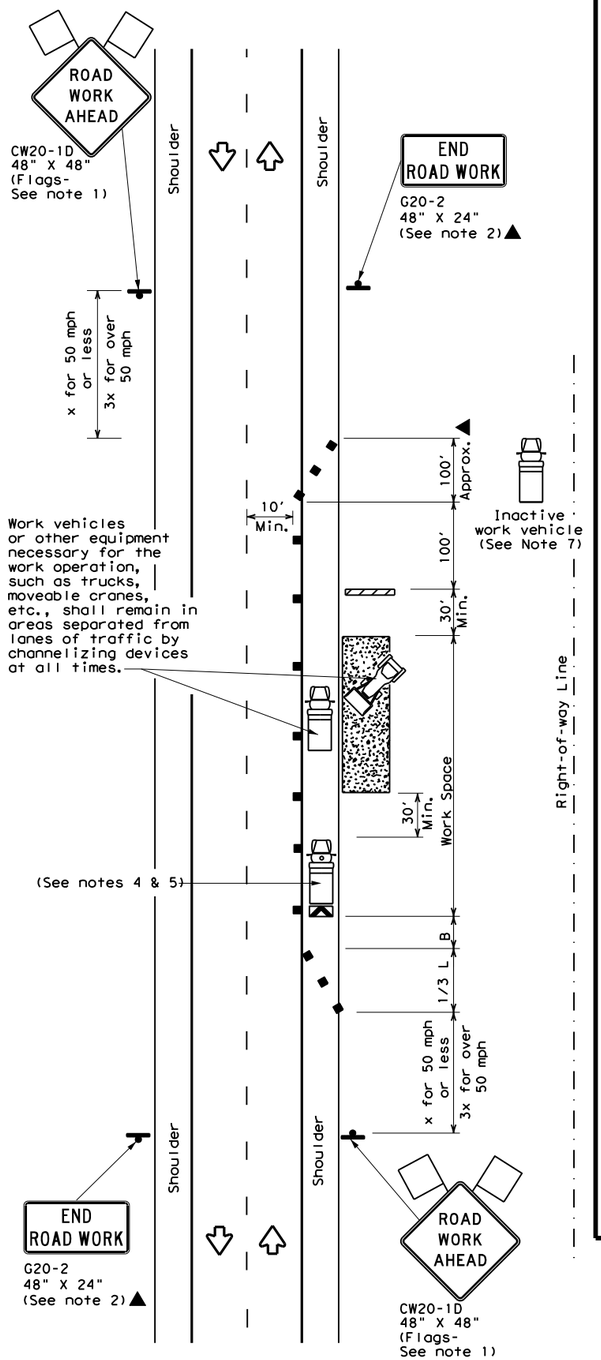
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

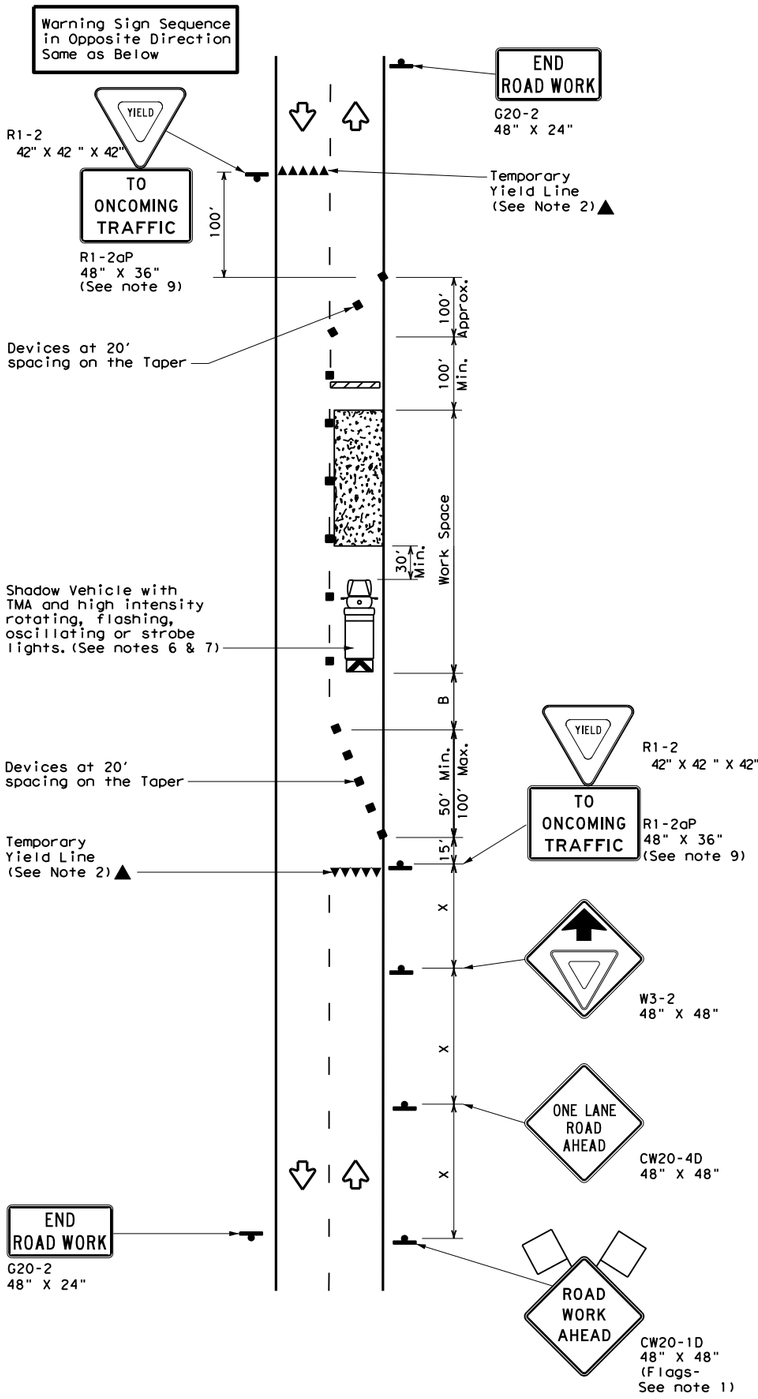
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

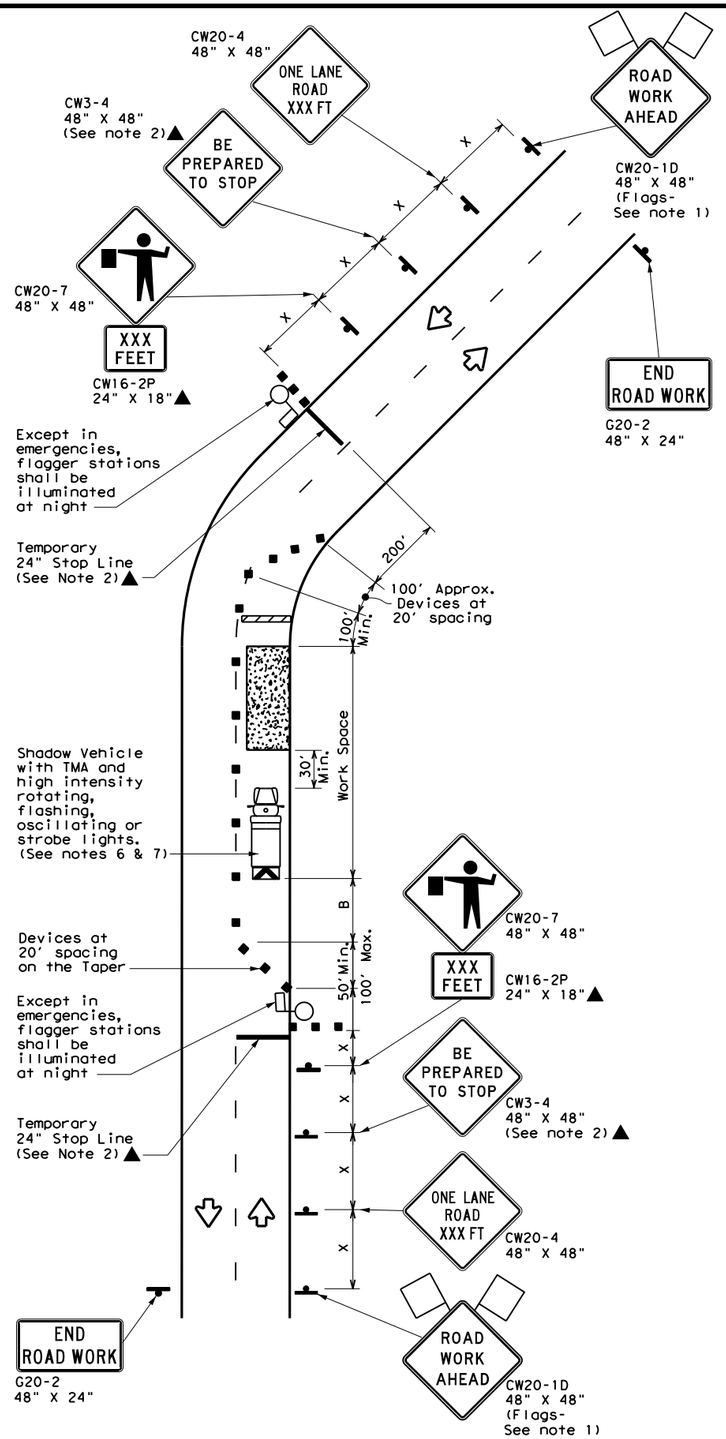
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WAC	BELL		64
1-97 2-18				

161

DATE: $DATE$ $TIME$
FILE: $FILE$



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



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

LEGEND

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

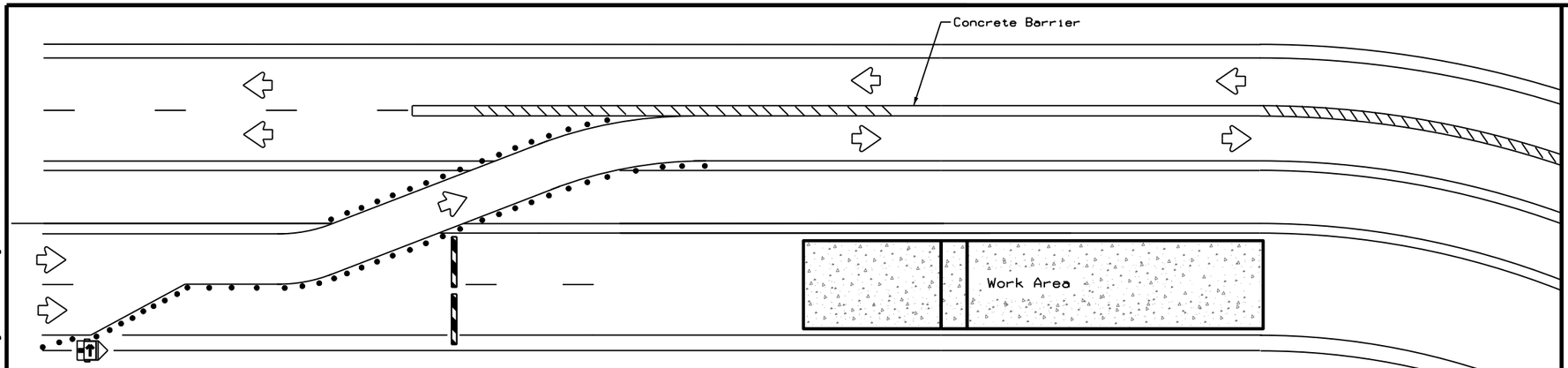
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		64A

DATE: $DATE$ $TIME$
FILE: $FILE$



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.

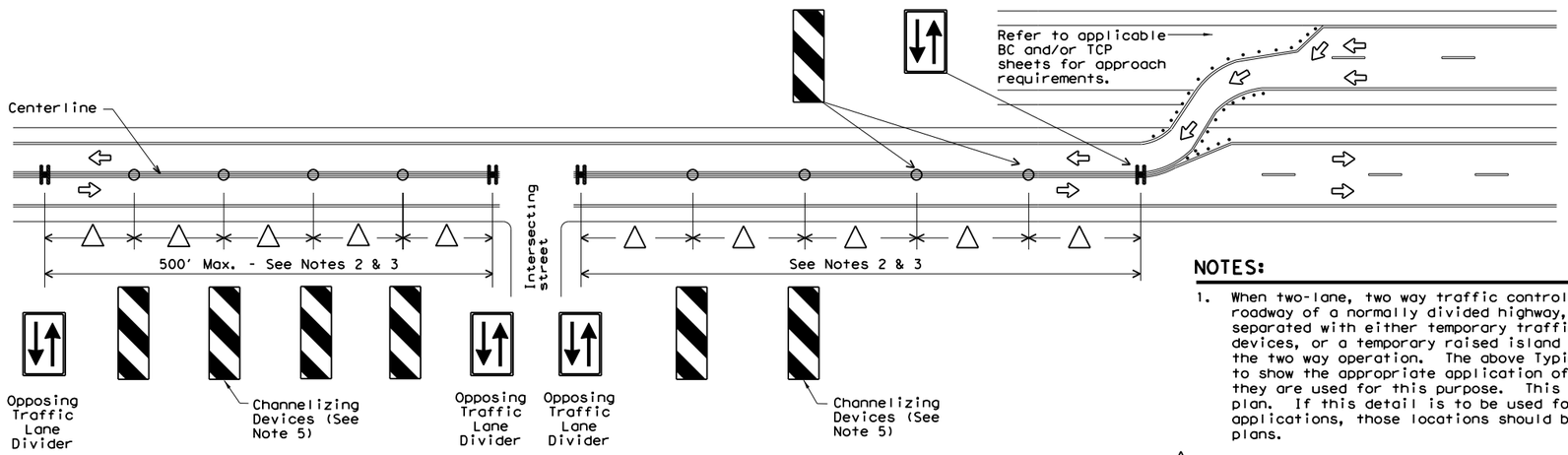
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	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



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

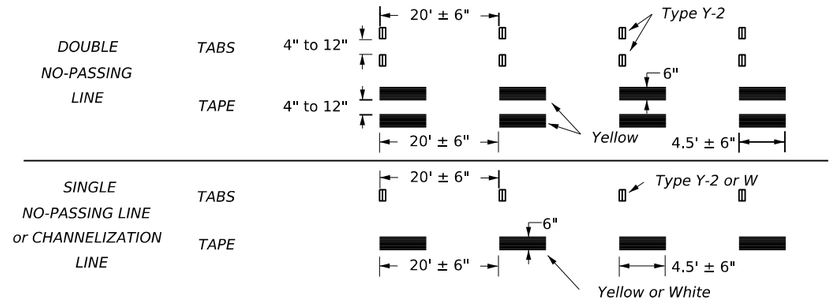
WZ(TD)-17

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	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		65

110

DATE: $DATE$ $TIME$
FILE: $FILE$

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



NOTES:

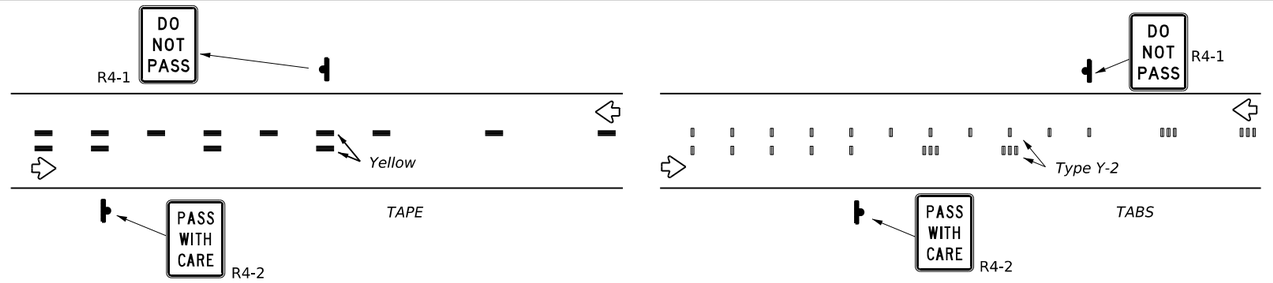
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical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

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

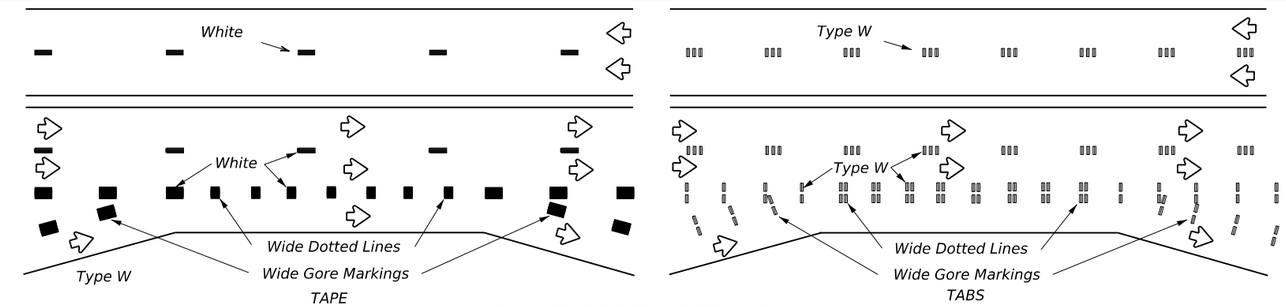
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may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

DATE: $DATE$ $TIME$
FILE: $FILE$

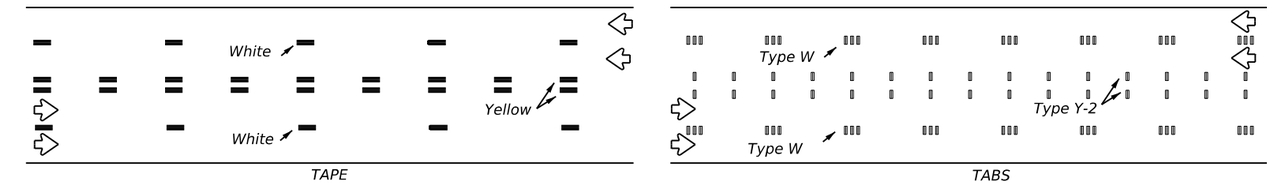
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



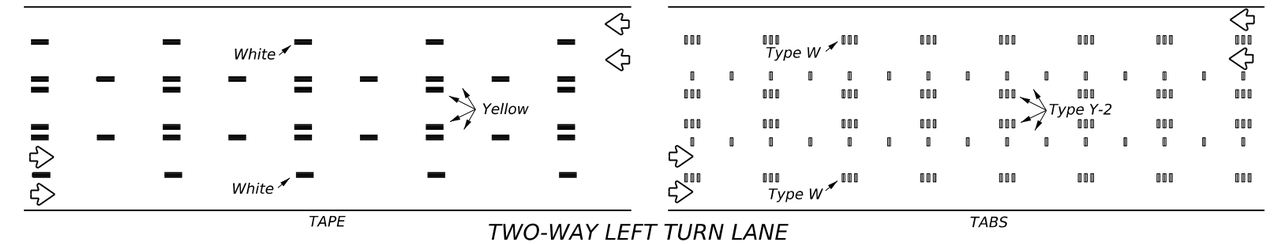
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



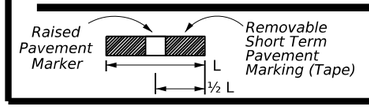
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

Texas Department of Transportation

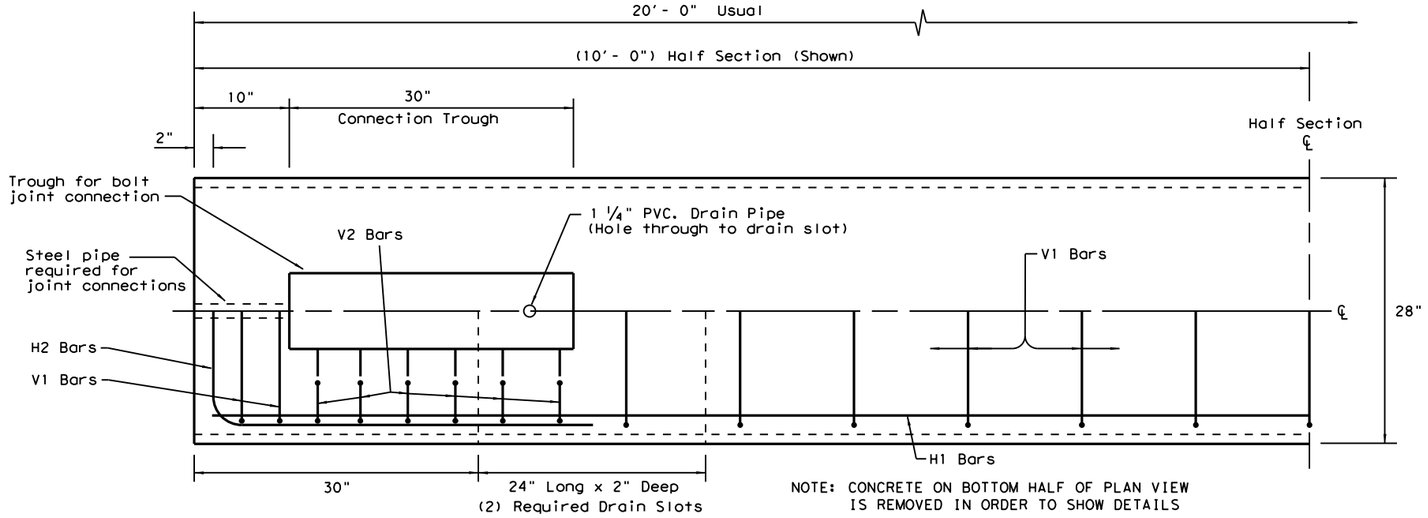
Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

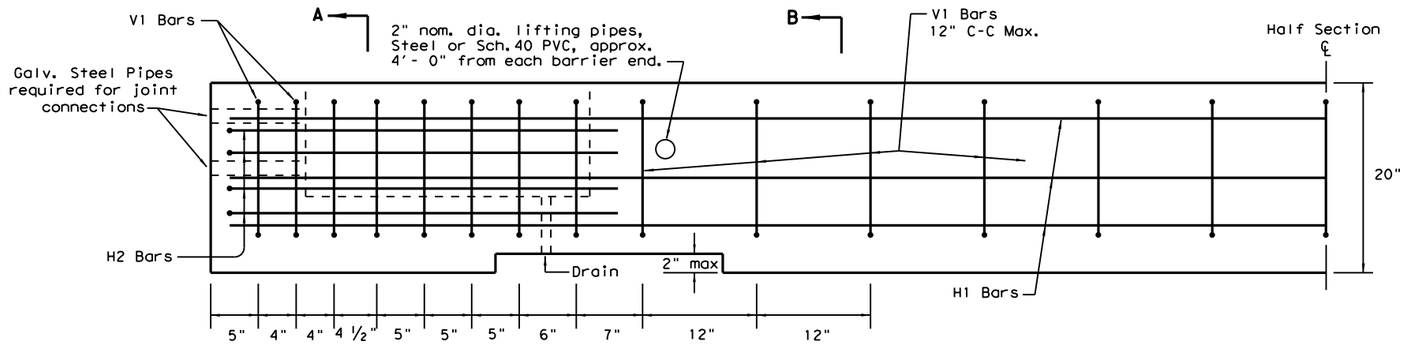
WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	WAC	BELL		66
3-03				

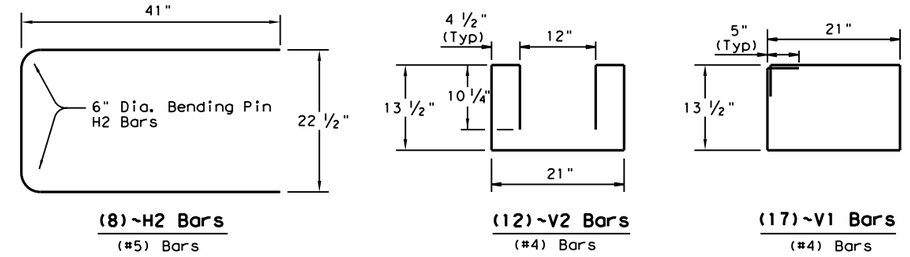
DATE: $DATE$
FILE: $FILE$



PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



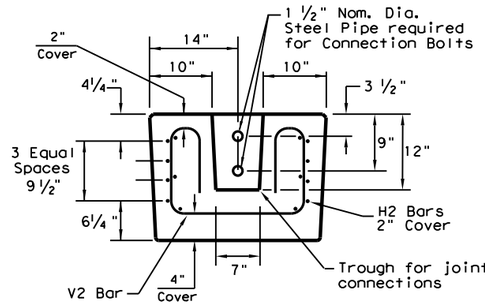
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

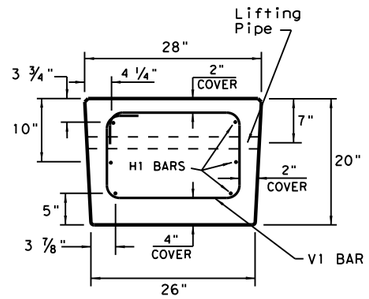
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



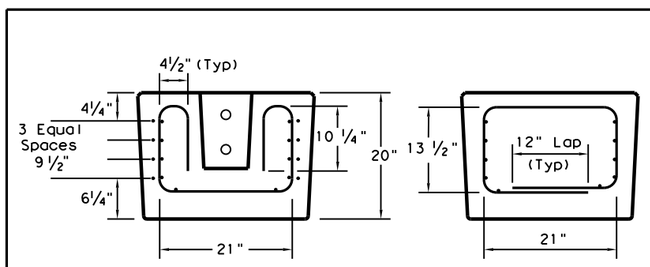
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445,"Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A
SECTION B-B

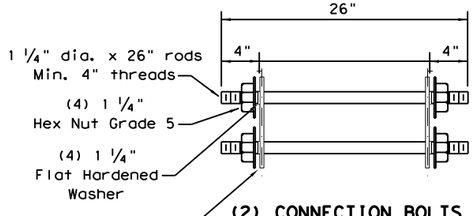
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

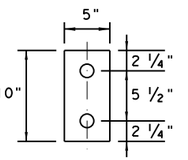


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

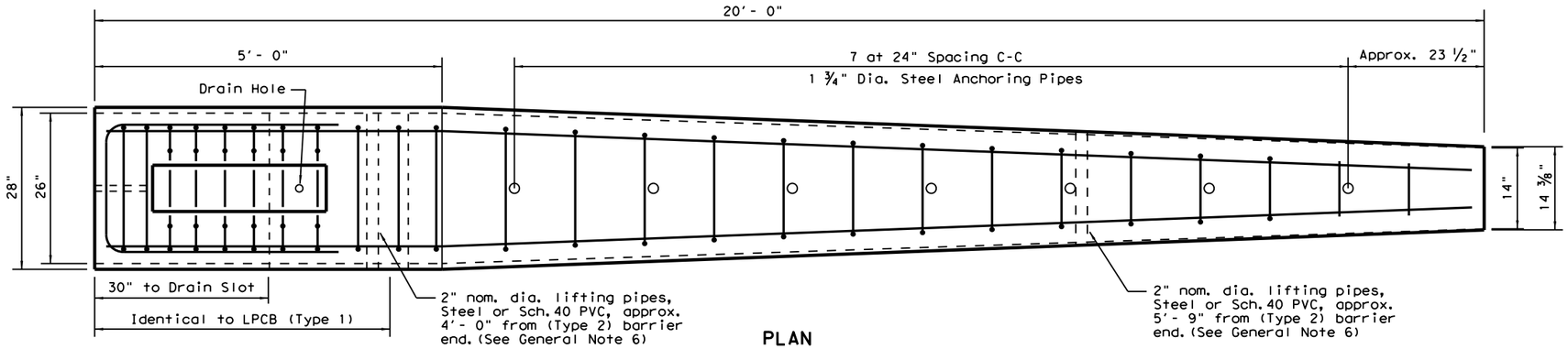
SHEET 1 OF 2

Texas Department of Transportation

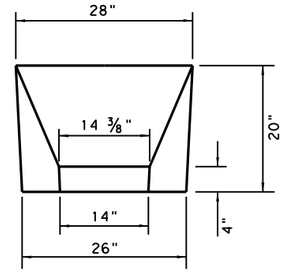
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

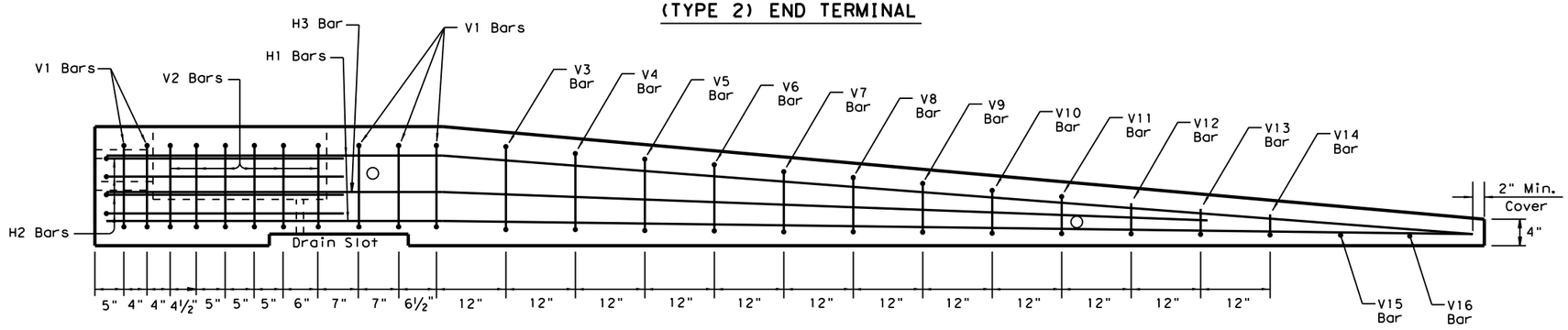
FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		67



PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

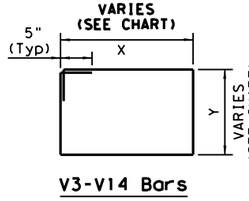


ELEVATION
(TYPE 2) END TERMINAL

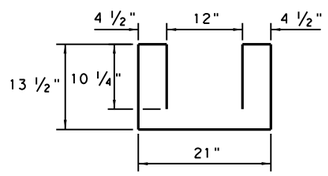
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

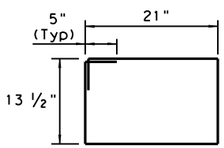
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



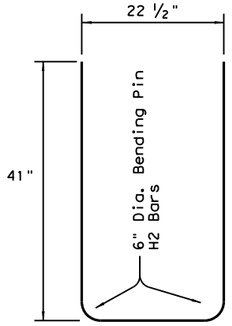
V3-V14 Bars



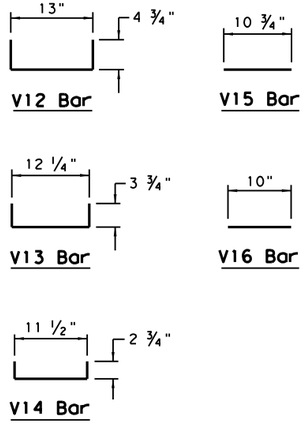
(6)~V2 Bars



(5)~V1 Bars



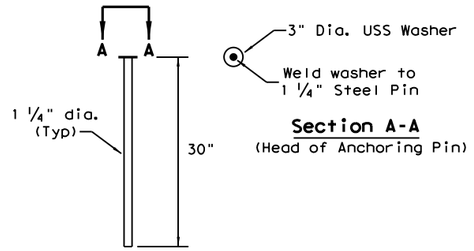
(4)~H2 Bars
(#5) Bars



Note: All V Bars are (#4)

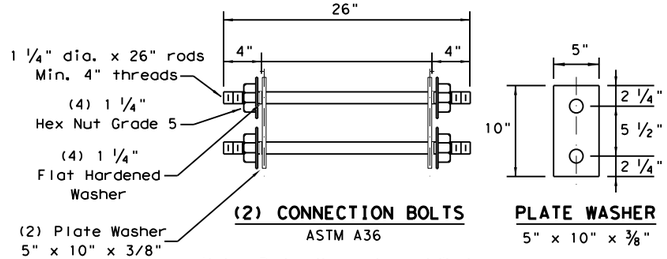
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)

Section A-A
(Head of Anchoring Pin)

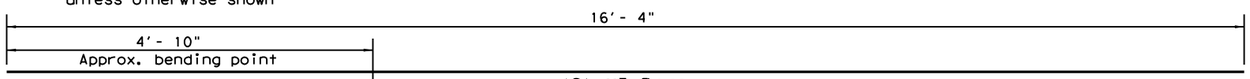


(2) CONNECTION BOLTS
ASTM A36

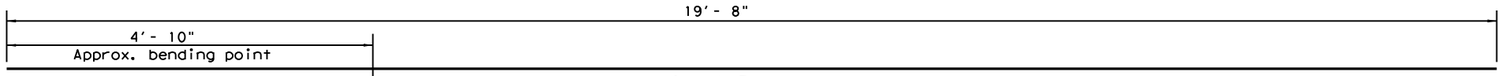
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

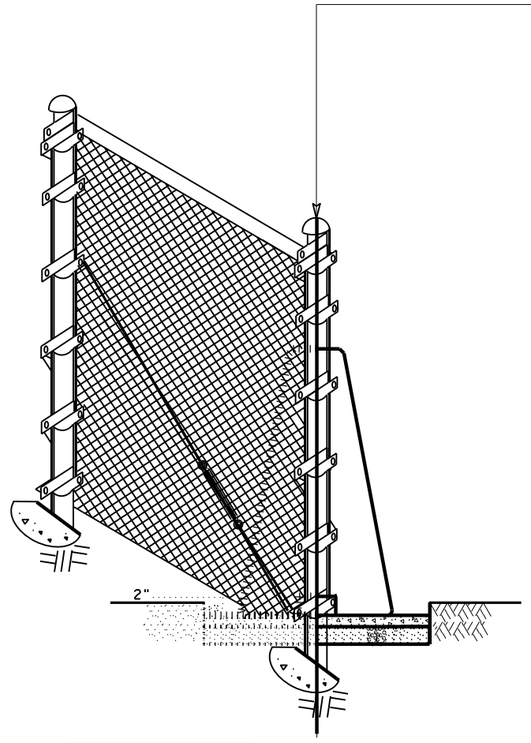
Texas Department of Transportation

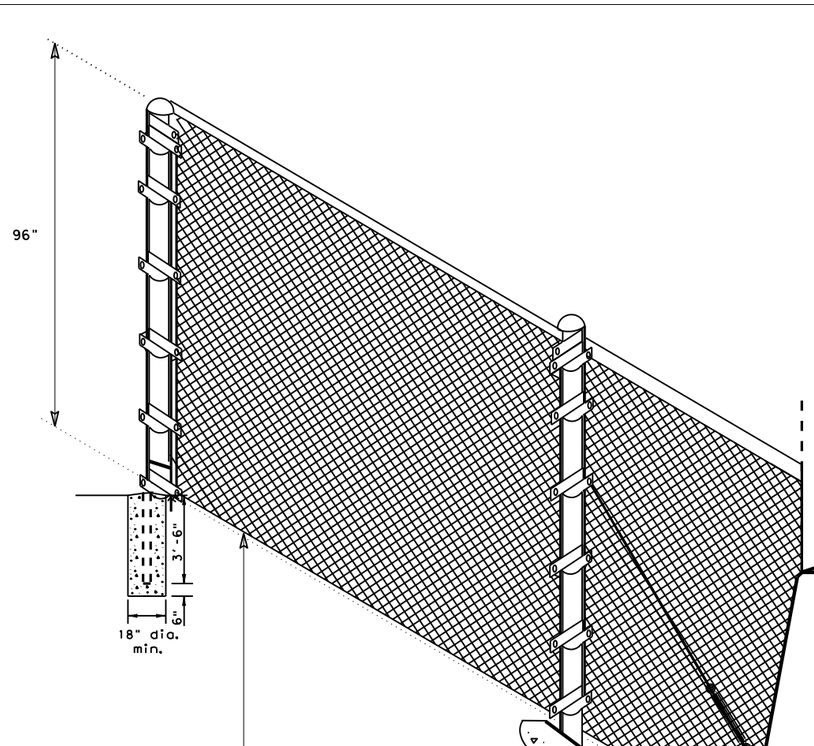
Design Division Standard

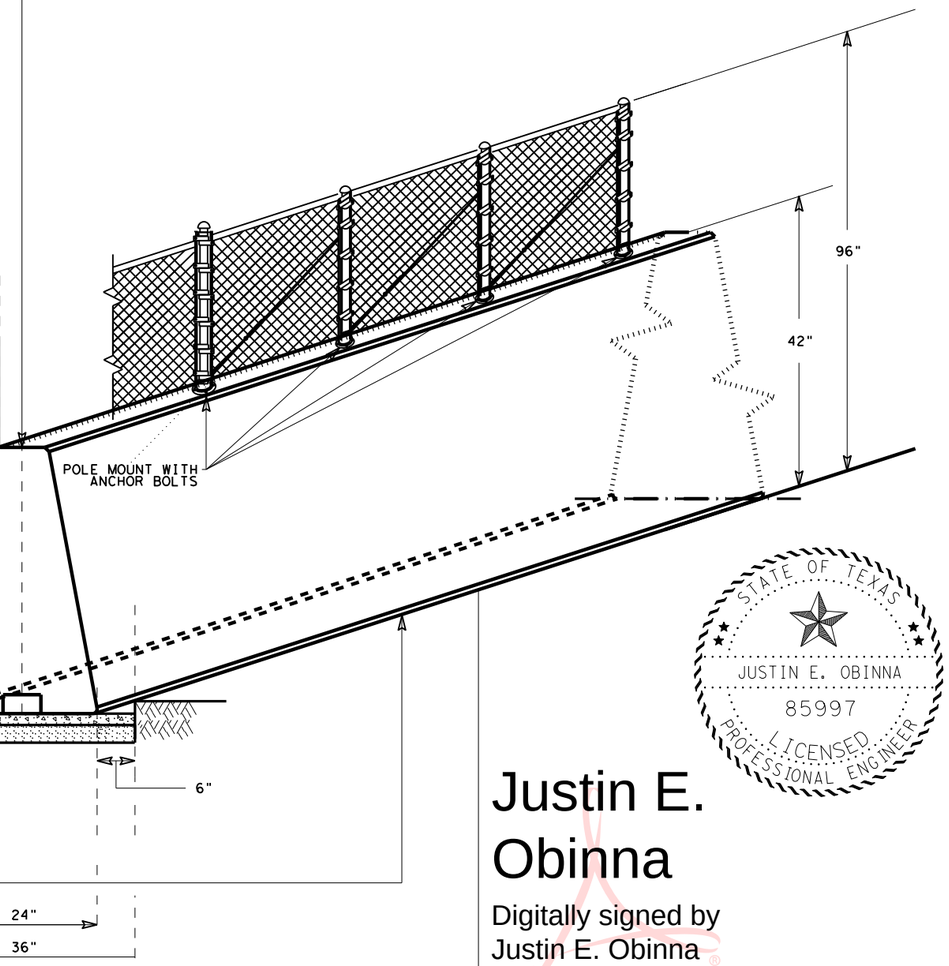
LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		68

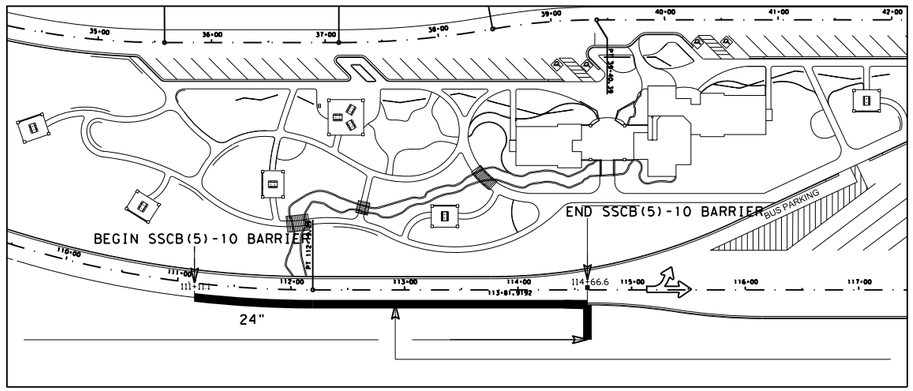
DATE: $DATE$
FILE: $FILE$







438 6005	529 6037
CLEANING AND SEALING JOINTS	CONC CURB & GUTTER TY II (MOD)
LF	LF
	800



*NOTES

SEE STANDARDS FOR PINNING DETAILS

ENSURE GAPS ARE CLOSED AT THE CORNERS WITH HEAVY DUTY EXPANDED METAL

FIELD VERIFY CUTTING DIMENSIONS

FOUNDATION PAD TO BE SUBSIDIARY TO BARRIER

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.15 11:57:21 -05'00'

05/15/2024

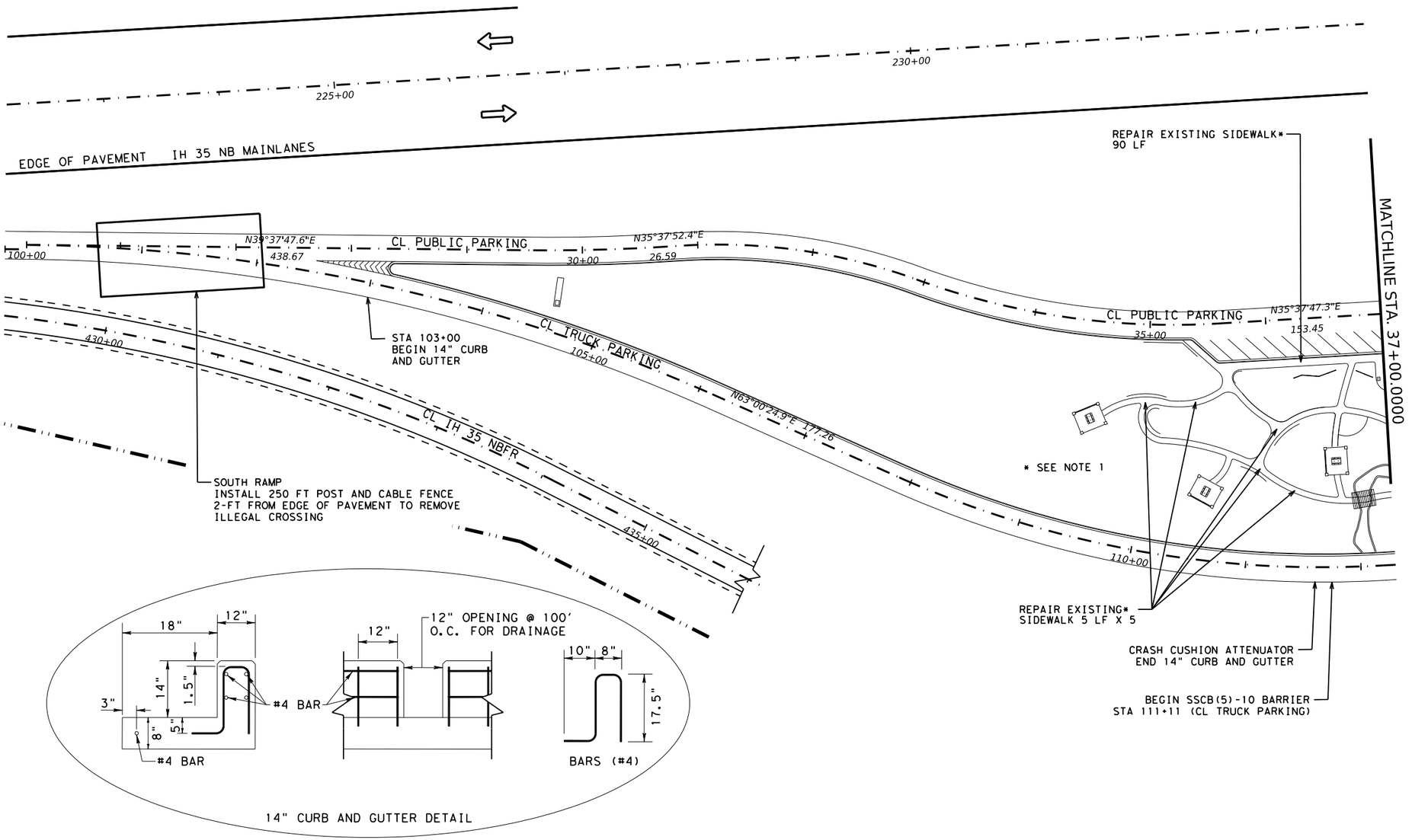
Texas Department of Transportation

MNT Division Details

FENCE CONNECTION DETAILS TO PRECAST BARRIER (TYPE 1) PINNED PLACEMENT

FILE: MNT Details	DN: TxDOT	CK: JEO	DW: JEO	CK:
©TxDOT April 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		69

LOCATION	104 6015	529 6037	545 6007	772 6003
	REMOVING CONC (SIDEWALKS)	CONC CURB & GUTTER TY II (MOD)	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	POST AND CABLE FENCE (NEW INSTALLATION)
	SY	LF	EA	LF
Northbound - Sht. 1	64	800	1	250



0 50 100
SCALE IN FEET

NOTES

1. EXISTING SIDEWALK TO BE GRINDED WHERE INDICATED TO PROVIDE CROSS SLOPES OF 2.08% OR LESS AND LONGITUDINAL (RUNNING) SLOPE OF 5% OR LESS. CONTRACTOR TO SUBMIT PROPOSED GRINDING MEANS AND METHODS TO TXDOT FOR REVIEW AND APPROVAL. TO BE PAID UNDER ITEM 104 6015.

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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IH 35
PLAN LAYOUT
NORTHBOUND

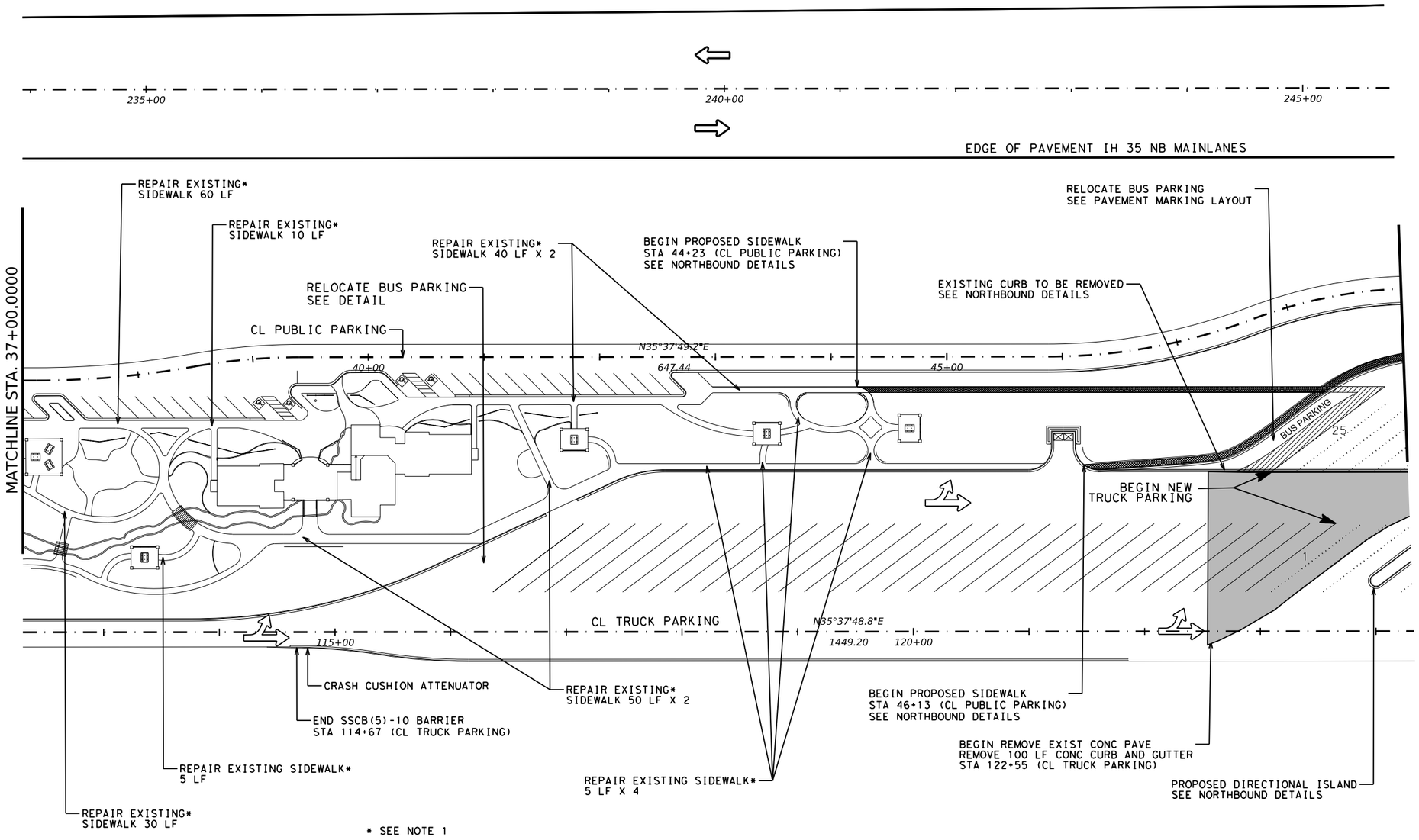
SHEET 1 OF 3

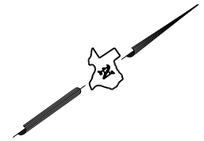
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70

DATE: $DATE$ $TIME$
FILE: $FILE$

LOCATION	104 6001	104 6015	104 6022	512 6013	545 6007	550 6036	552 6009
	REMOVING CONC (PAV)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB AND GUTTER)	PORT CTB (DES SOURCE) (SGL SLP) (TY 1)	CRASH CUSH ATTEN (INSTL) (L) (N) (TL3)	CHAIN LINK FENCE (INSTALL)	GATE (SPECIAL)
	SY	LF	LF	LF	EA	SF	EA
Northbound - Sht. 2	1891	169	100	360	1	1620	1





NOTES
1. EXISTING SIDEWALK TO BE GRINDED WHERE INDICATED TO PROVIDE CROSS SLOPES OF 2.08% OR LESS AND LONGITUDINAL (RUNNING) SLOPE OF 5% OR LESS. CONTRACTOR TO SUBMIT PROPOSED GRINDING MEANS AND METHODS TO TXDOT FOR REVIEW AND APPROVAL. TO BE PAID UNDER ITEM 104 6015.

05/29/2024

Justin E. Obinna

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Date: 2024.05.29 17:16:11 -05'00'

IH 35
PLAN LAYOUT
NORTHBOUND

SHEET 2 OF 3

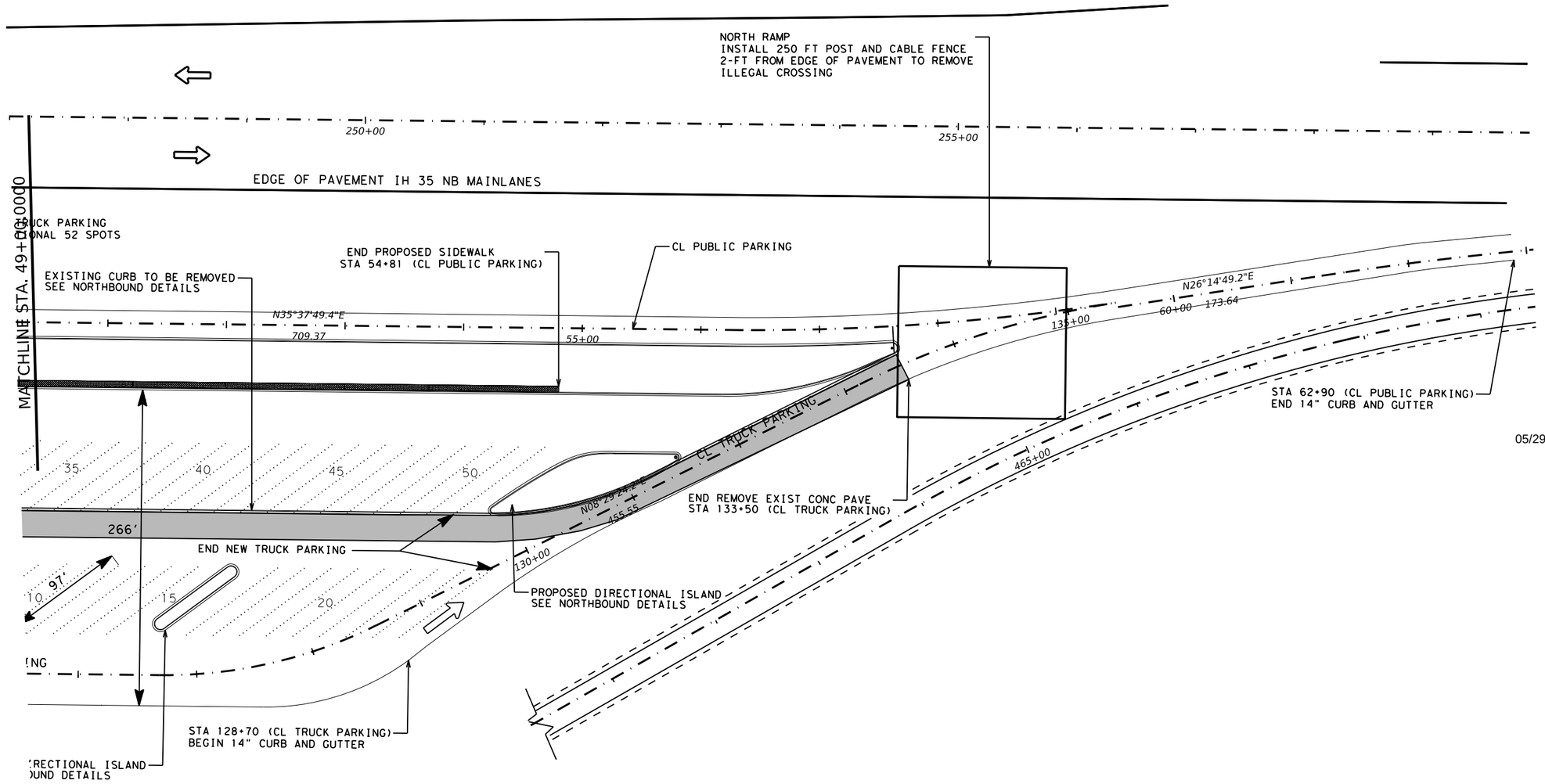
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70A

DATE: $DATE$
FILE: $FILE$
$TIME$

LOCATION	104 6001	104 6022	529 6037	772 6003
	REMOVING CONC (PAV)	REMOVING CONC (CURB AND GUTTER)	CONC CURB & GUTTER TY II (MOD)	POST AND CABLE FENCE (NEW INSTALLATION)
	SY	LF	LF	LF
Northbound - Sht. 3	2188	1159	1010	250

0 50 100
SCALE IN FEET



STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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Date: 2024.05.29 17:16:40 -05'00'

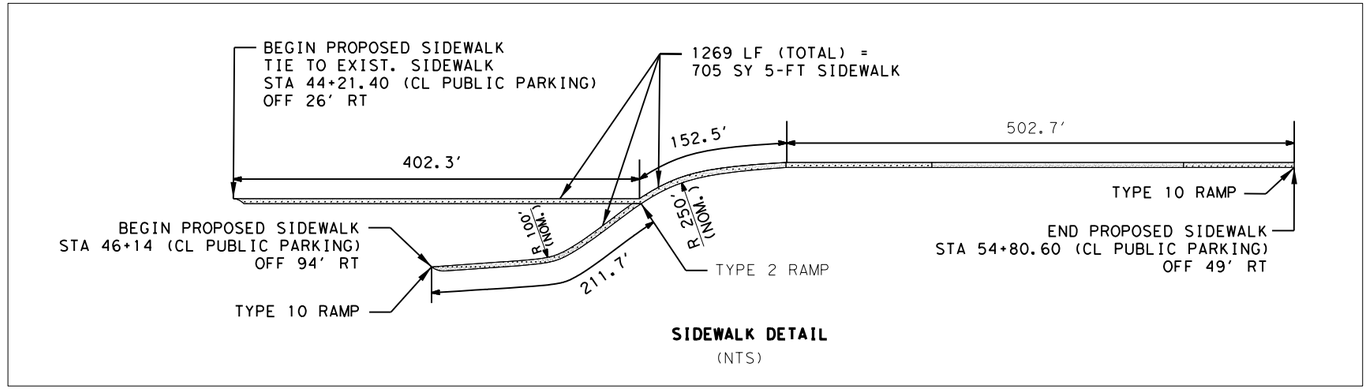
IH 35
PLAN LAYOUT
NORTHBOUND

SHEET 3 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70B

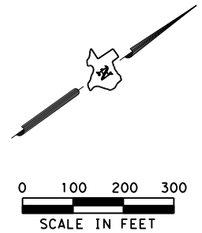
DATE: $DATE$ $TIME$
FILE: $FILE$

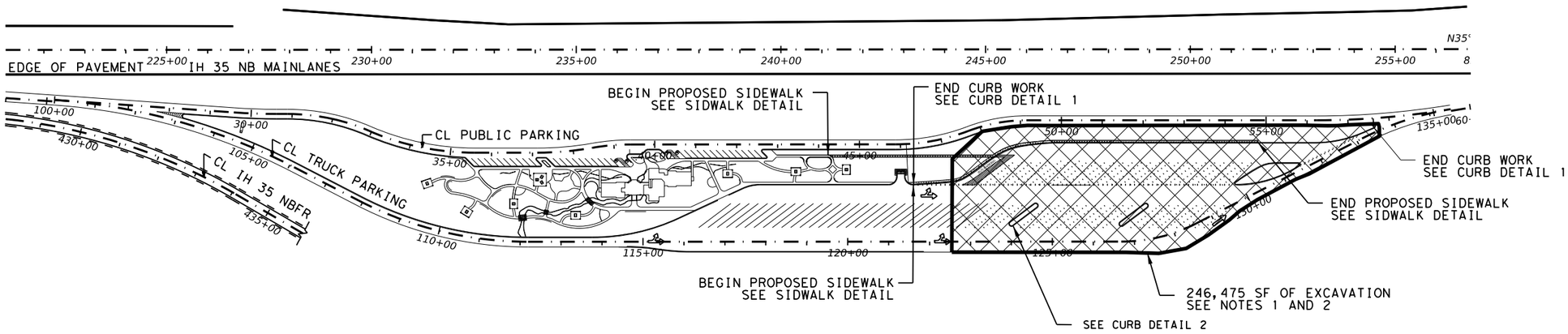


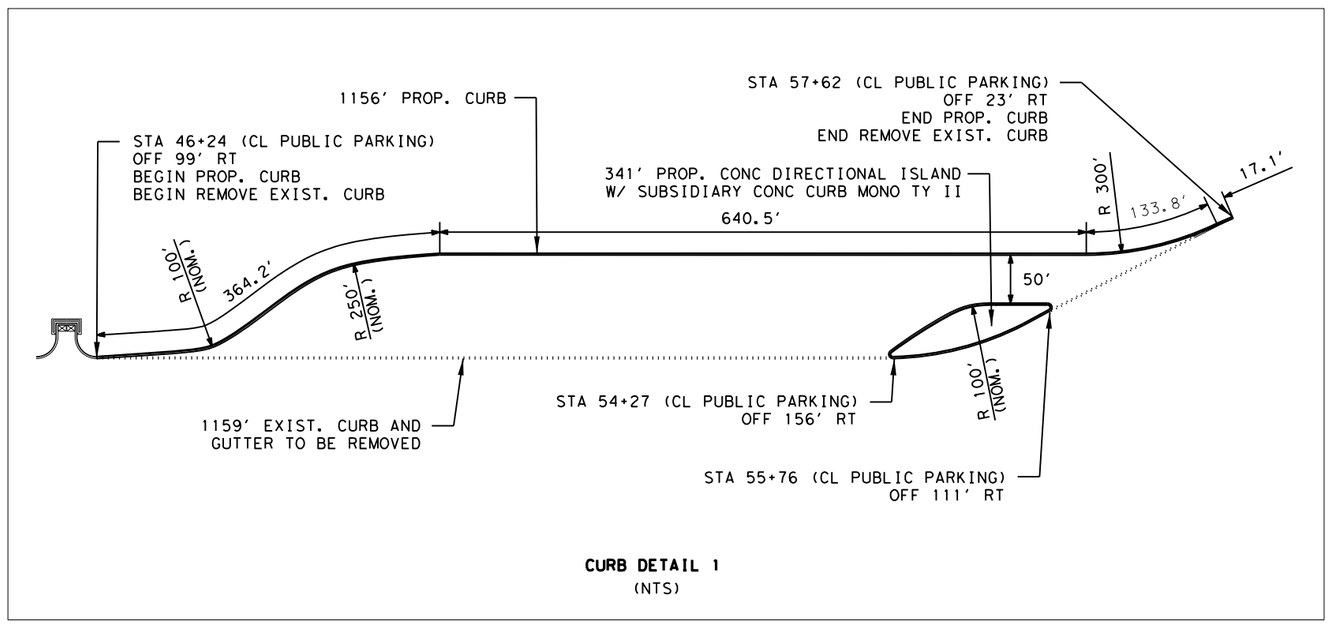
SIDEWALK DETAIL
(NTS)

NOTES:

1. EXCAVATION WITHIN THE 246,475 SF AREA INDICATED BELOW ON PLAN VIEW CONSISTS OF EXCAVATION AT 2.5 FT DEPTH. THEN TY C1 MATERIAL WILL BE HAULED IN AT 1' DEPTH.
2. CONTRACTOR TO SUBMIT TO ENGINEER FOR REVIEW AND APPROVAL A RESTORATION PLAN FOR EXISTING SPRINKLER OPERATIONS. RESTORATON PLAN IS TO MAINTAIN PRE-CONSTRUCTION WATERING PATTERNS WITHIN AREAS TO REMAIN VEGETATED AFTER COMPLETION OF PROJECT. AREAS WITH NEW IMPERVIOUS COVER DO NOT NEED SPRINKLER RESTORATION. COMPENSATION FOR MATERIALS AND LABOR TO BE PAID UNDER FORCE ACCOUNT.



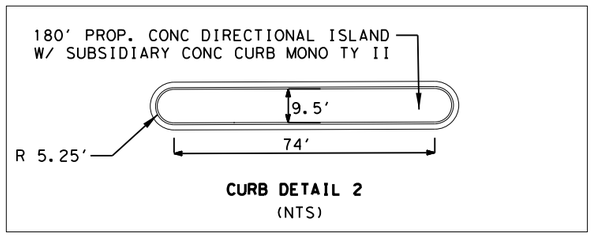




CURB DETAIL 1
(NTS)

CURB AND SIDEWALK QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
529	6005	CONC CURB (MONO) (TYII)	LF	1156
531	6002	CONC SIDEWALKS (5")	SY	705
531	6005	CURB RAMPS (TY 2)	EA	1
531	6013	CURB RAMPS (TY 10)	EA	2
536	6003	CONC DIRECTIONAL ISLAND	LF	701

EARTHWORK QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6001	EXCAVATION (ROADWAY)	CY	22822
132	6025	EMBANKMENT (FINAL) (DENS CONT) (TY C1)	CY	17982



CURB DETAIL 2
(NTS)

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.15 12:50:21 -05'00'

05/15/2024

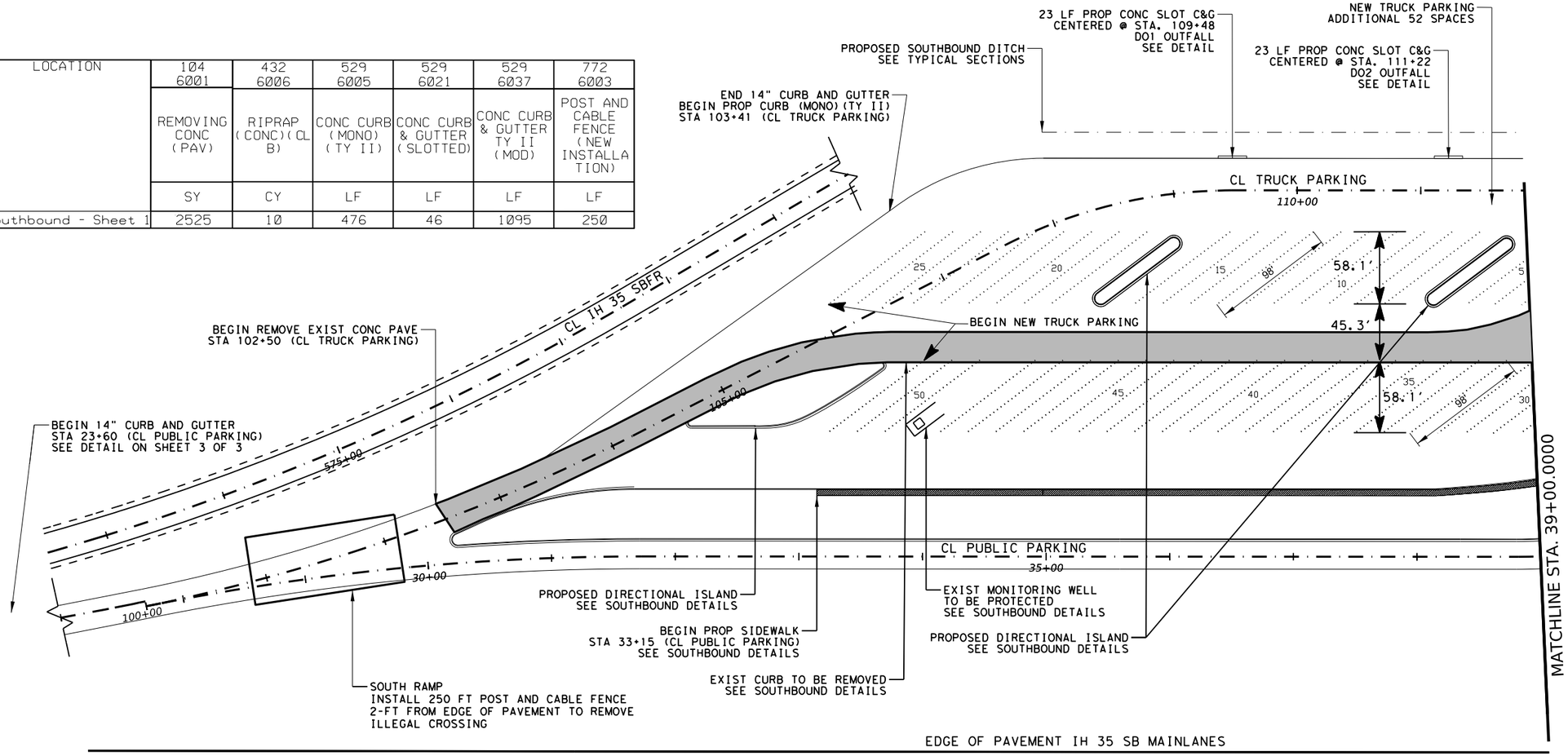
STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

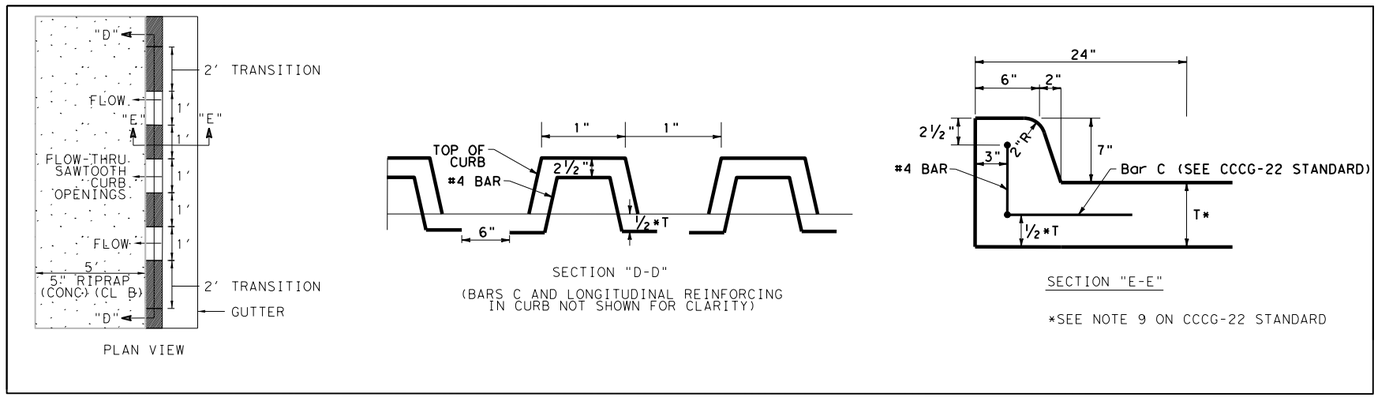
IH 35
NORTHBOUND DETAILS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70C

LOCATION	104 6001	432 6006	529 6005	529 6021	529 6037	772 6003
	REMOVING CONC (PAV)	RIPRAP (CONC)(CL B)	CONC CURB (MONO) (TY II)	CONC CURB & GUTTER (SLOTTED)	CONC CURB & GUTTER TY II (MOD)	POST AND CABLE FENCE (NEW INSTALLATION)
	SY	CY	LF	LF	LF	LF
Southbound - Sheet 1	2525	10	476	46	1095	250





SLOTTED CURB AND GUTTER DETAIL
(NTS)

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

05/29/2024

Justin E. Obinna

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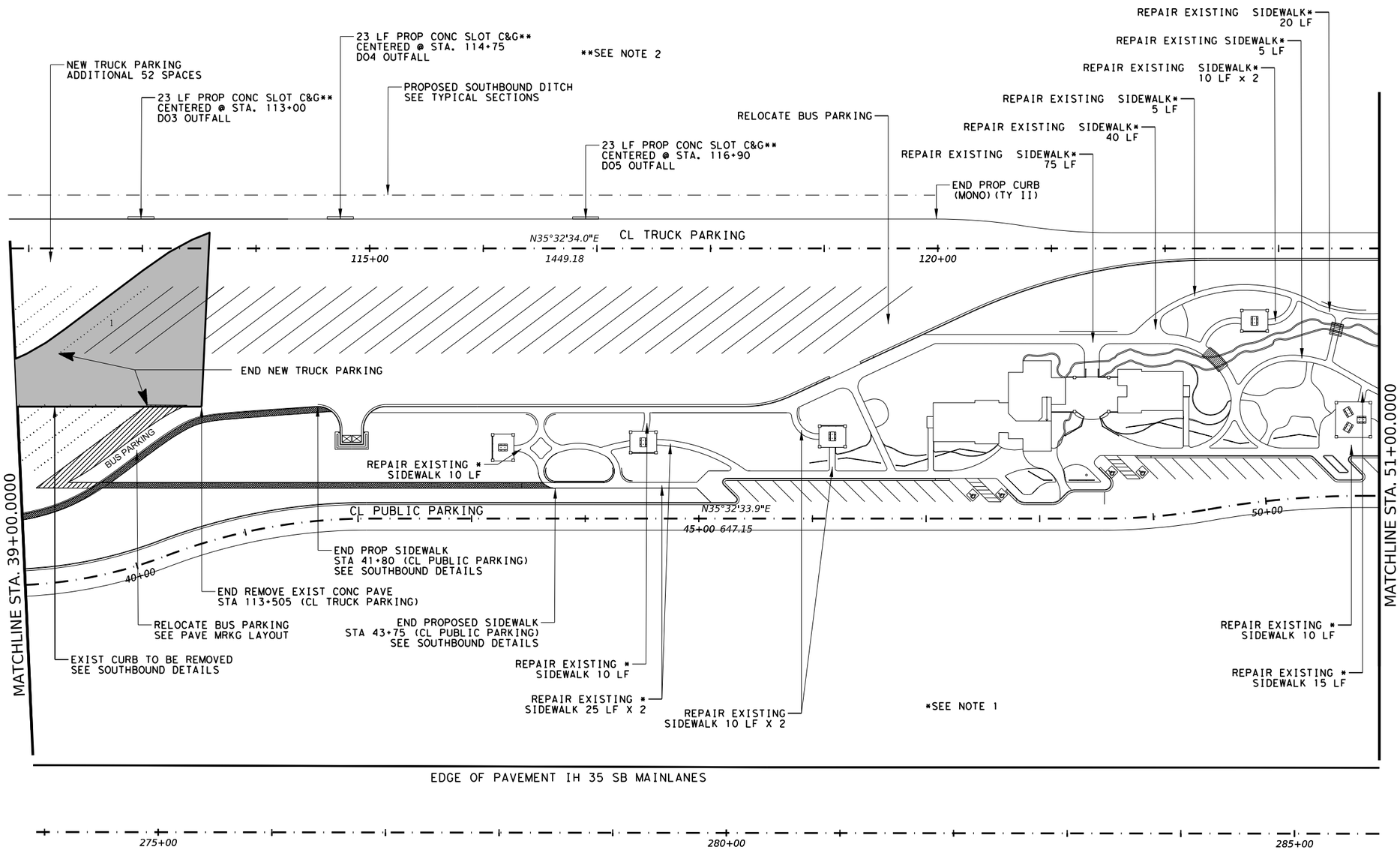
Date: 2024.05.29 17:19:44 -05'00'

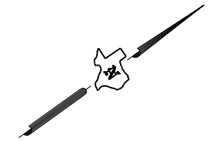
IH 35
PLAN LAYOUT
SOUTHBOUND

SHEET 1 OF 3

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70D

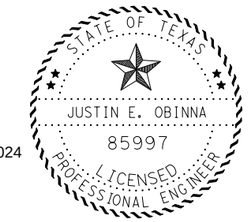




0 50 100
SCALE IN FEET

NOTES

1. EXISTING SIDEWALK TO BE GRINDED WHERE INDICATED TO PROVIDE CROSS SLOPES OF 2.08% OR LESS AND LONGITUDINAL (RUNNING) SLOPE OF 5% OR LESS. CONTRACTOR TO SUBMIT PROPOSED GRINDING MEANS AND METHODS TO TXDOT FOR REVIEW AND APPROVAL. TO BE PAID UNDER ITEM 104 6015.
2. SEE DETAIL ON SHEET 1 OF 3 FOR DIMENSIONS OF SLOTTED CURB.



05/29/2024

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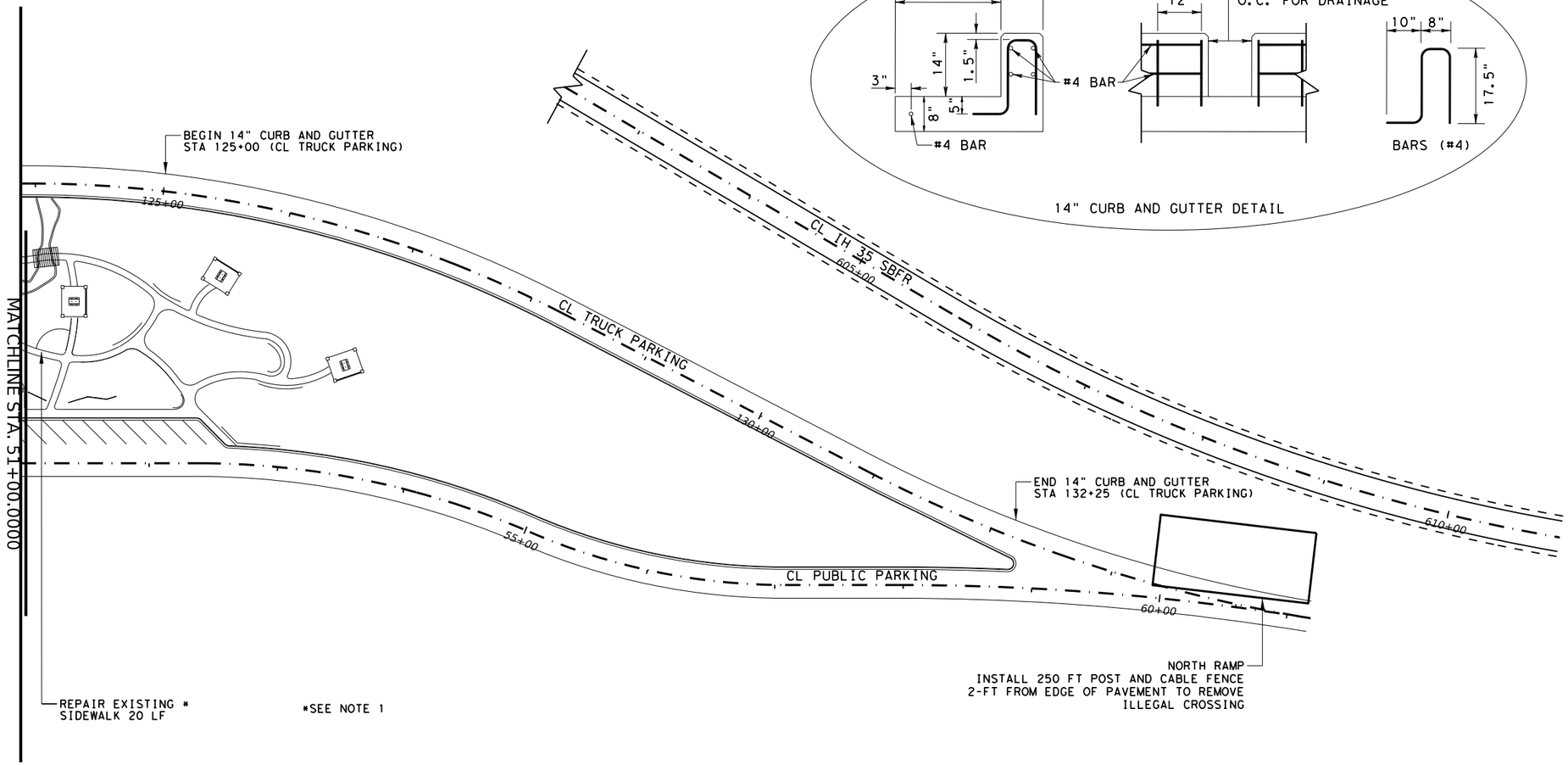
Date: 2024.05.29 17:20:14 -05'00'

LOCATION	104 6001	104 6015	529 6005	529 6021
	REMOVING CONC (PAV)	REMOVING CONC (SIDEWALKS)	CONC CURB (MONO) (TY II)	CONC CURB & GUTTER (SLOTTED)
	SY	SY	LF	LF
Southbound - Sheet 2	1831	156	749	69

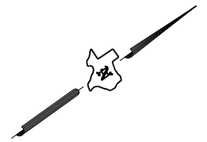
IH 35
PLAN LAYOUT
SOUTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70E



14" CURB AND GUTTER DETAIL

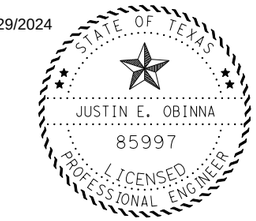


NOTES

1. EXISTING SIDEWALK TO BE GRINDED WHERE INDICATED TO PROVIDE CROSS SLOPES OF 2.08% OR LESS AND LONGITUDINAL (RUNNING) SLOPE OF 5% OR LESS. CONTRACTOR TO SUBMIT PROPOSED GRINDING MEANS AND METHODS TO TXDOT FOR REVIEW AND APPROVAL. TO BE PAID UNDER ITEM 104 6015.

LOCATION	104 6015	529 6037	772 6003
	REMOVING CONC (SIDEWALKS)	CONC CURB & GUTTER TY II (MOD)	POST AND CABLE FENCE (NEW INSTALLATION)
	LF	LF	LF
Southbound - Sheet 3	11	725	250

05/29/2024



Justin E. Obinna

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Date: 2024.05.29 17:23:05 -05'00'

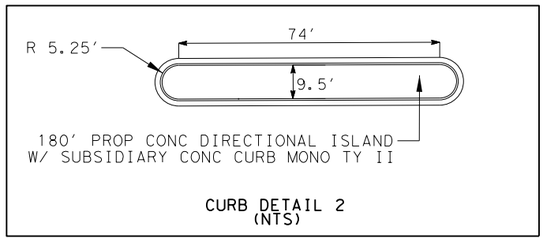
IH 35
PLAN LAYOUT
SOUTHBOUND

Texas Department of Transportation

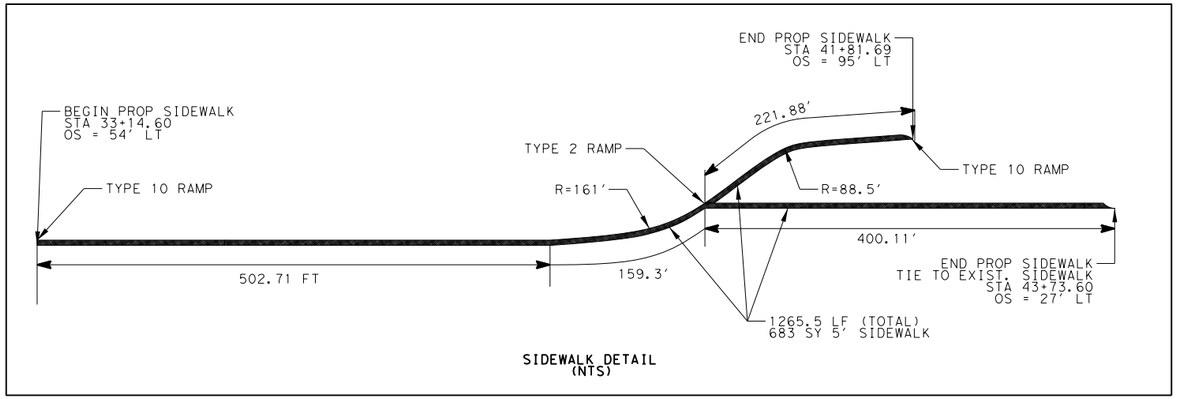
CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		7OF

CURB QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
529	6005	CONC CURB (MONO) (TYII)	LF	2688
529	6021	CONC CURB & GUTTER (SLOTTED)	LF	115
531	6002	CONC SIDEWALKS (5")	SY	683
531	6005	CURB RAMPS (TY2)	EA	1
531	6013	CURB RAMPS (TY10)	EA	2
536	6003	CONC DIRECTIONAL ISLAND	LF	705

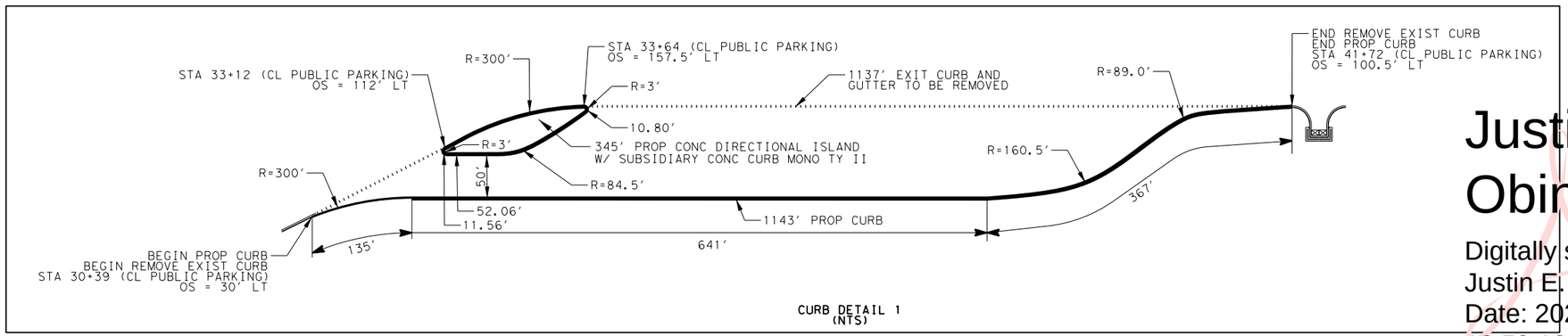
EARTHWORK QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6001	EXCAVATION (ROADWAY)	CY	23543
132	6025	EMBANKMENT (FINAL) (DENS CONT)(TY C1)	CY	17982



CURB DETAIL 2
(NTS)



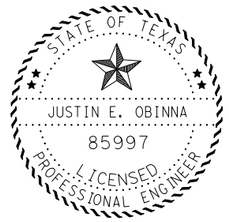
SIDEWALK DETAIL
(NTS)



CURB DETAIL 1
(NTS)

NOTES:

1. EXCAVATE 2.5' DEEP ACROSS 254,267 SF AREA INDICATED BELOW, ON DETAIL.
2. RESTORE EXISTING SPRINKLER OPERATIONS TO PRE-CONSTRUCTION PATTERNS WITHIN AREAS TO REMAIN VEGETATED. AREAS WITH NEWIMPERVIOUS COVER DO NOT NEED RESTORATION. COMPENSATION FOR MATERIALS AND LABOR TO BE PAID UNDER FORCE ACCOUNT.



IH 35
SOUTHBOUND DETAILS

Justin E. Obinna

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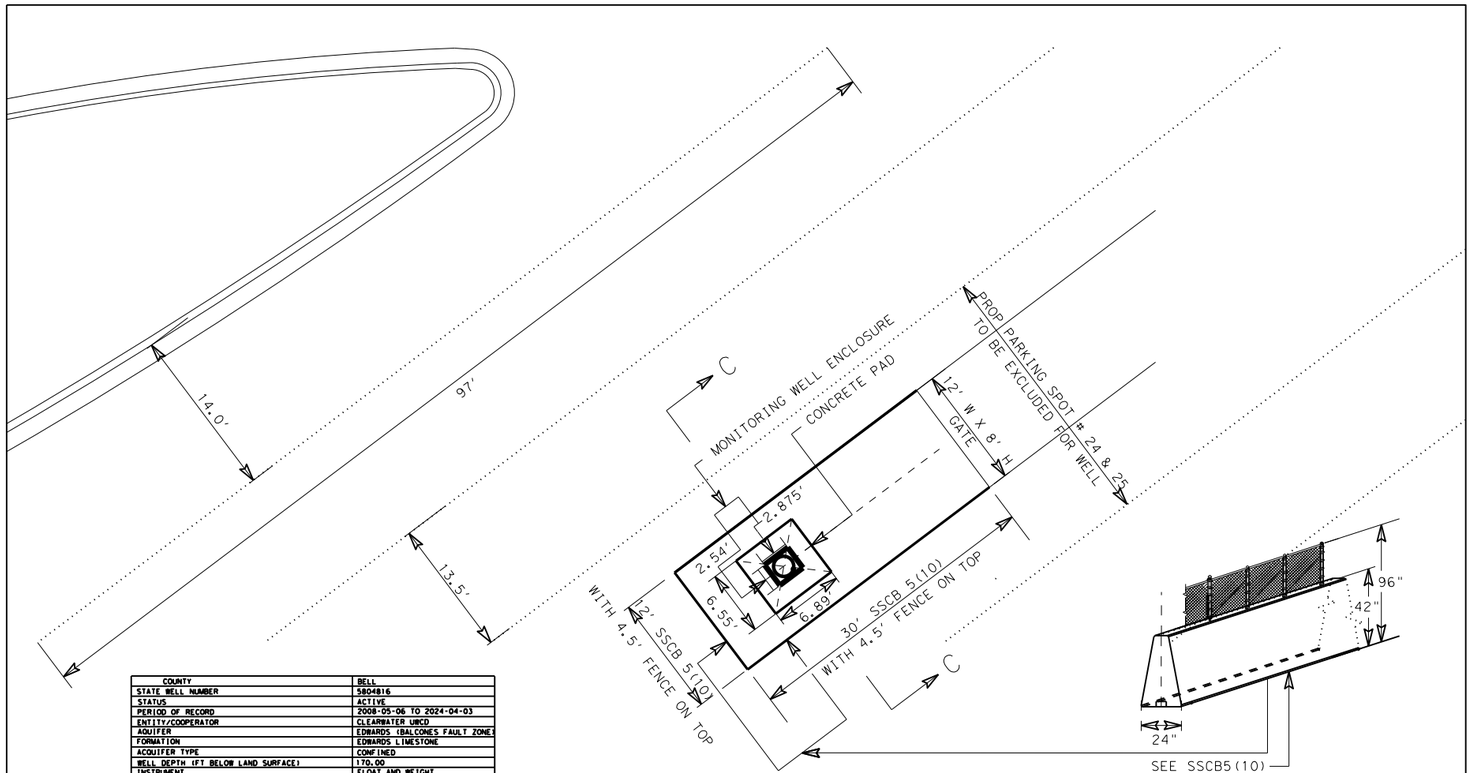
Date: 2024.05.15 12:59:13 -05'00'

05/15/2024

SHEET 1 OF 2

Texas Department of Transportation

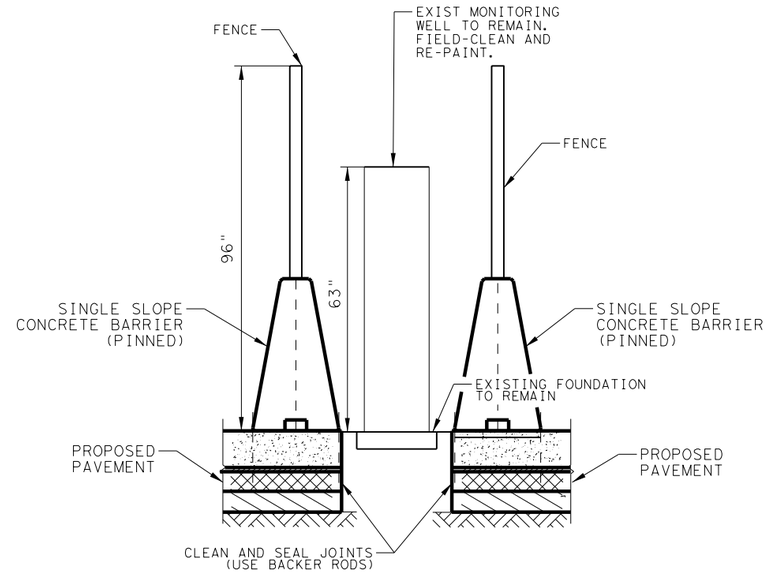
CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70G



COUNTY	BELL
STATE WELL NUMBER	5804816
STATUS	ACTIVE
PERIOD OF RECORD	2008-05-06 TO 2024-04-03
ENTITY/COOPERATOR	CLEARWATER UWCD
AQUIFER	EDWARDS (BALCONES FAULT ZONE)
FORMATION	EDWARDS LIMESTONE
ACQUIFER TYPE	CONFINED
WELL DEPTH (FT BELOW LAND SURFACE)	170.00
INSTRUMENT	FLOAT AND WEIGHT
TRANSMISSION	SATELITE
GROUNDWATER CONSERVATION DISTRICT	CLEARWATER UWCD
GROUNDWATER MANAGEMENT AREA	8
ESTIMATED LAND ELEVATION (FT ABOVE SEA LEVEL)	735
LOCATION (LAT.,LONG.)	30.9100000, -97.5550000

(FOR CONTRACTOR'S INFORMATION ONLY)

MONITORING WELL FOOTPRINT
(NTS)



TYPICAL SECTION C-C
(NTS)

438 6005	446 6029	512 6013	550 6036	552 6009
CLEANING AND SEALING JOINTS	CLEAN AND PAINT EXIST STR (REF NO. 1)	PORT CTB (DES SOURCE)(SGL SLP)(TY 1)	CHAIN LINK FENCE (INSTALL)	GATE (SPECIAL)
LF	LS	LF	SF	EA
28	1	72	65	1

05/29/2024

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STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

IH 35
SOUTHBOUND DETAILS

SHEET 2 OF 2

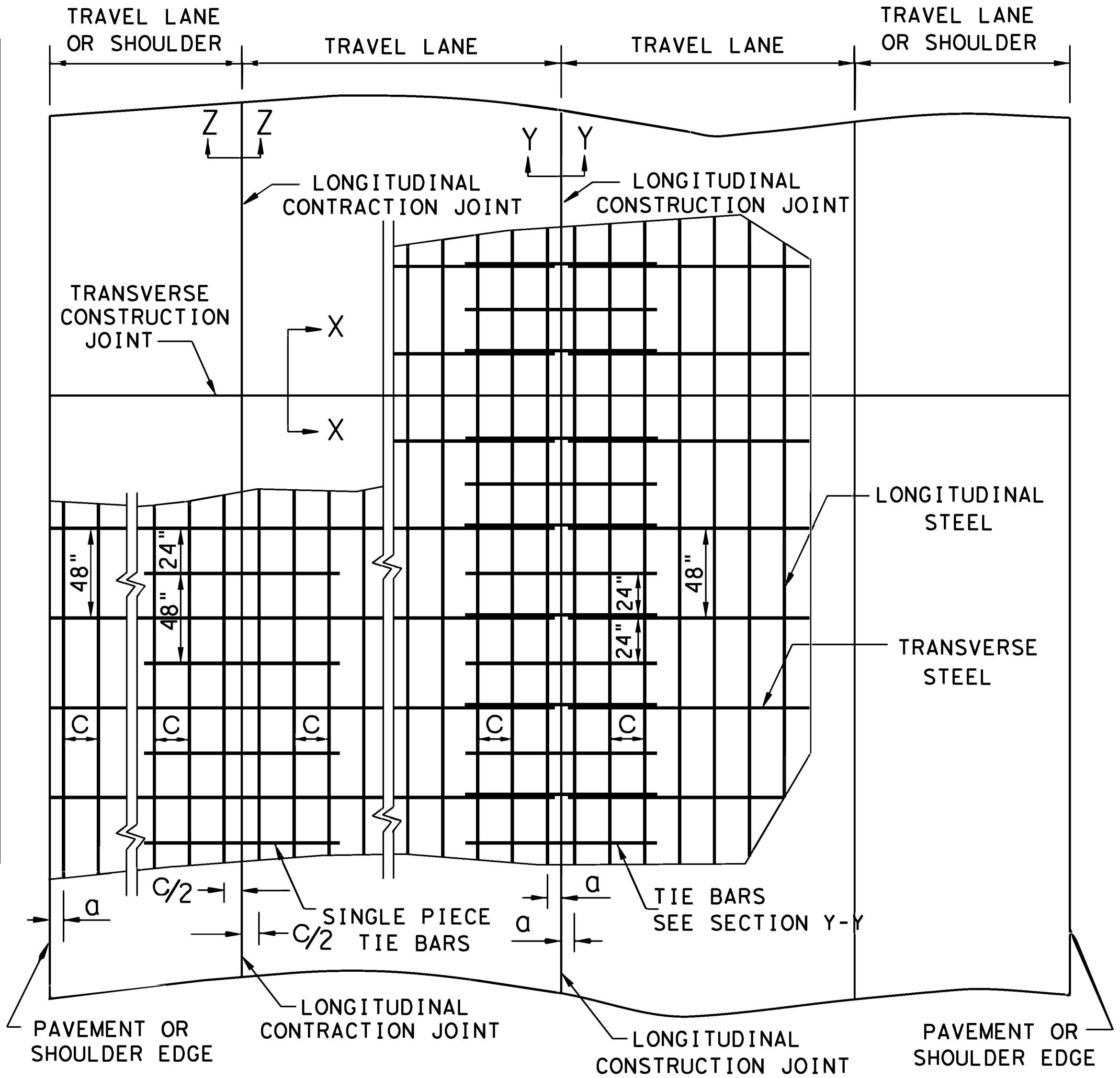
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		70H

TABLE NO. 1 LONGITUDINAL STEEL				
SLAB THICKNESS AND BAR SIZE		LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT	LONG. STEEL VERTICAL POSITION FROM BOTTOM OF PAVEMENT
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	T1 (IN.)
7.0	#5	6.5	3 TO 4	3.5
7.5	#5	6.0	3 TO 4	3.75
8.0	#6	9.0	3 TO 4	4.0
8.5	#6	8.5	3 TO 4	4.25
9.0	#6	8.0	3 TO 4	4.5
9.5	#6	7.5	3 TO 4	4.75
10.0	#6	7.0	3 TO 4	5.0
10.5	#6	6.75	3 TO 4	5.5
11.0	#6	6.5	3 TO 4	6.0
11.5	#6	6.25	3 TO 4	6.5
12.0	#6	6.0	3 TO 4	7.0
12.5	#6	5.75	3 TO 4	7.5
13.0	#6	5.5	3 TO 4	8.0

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5*	48	#5*	48	#5*	24
8.0 - 13.0	#5*	48	#6	48	#6	24

*CONTRACTOR MAY USE #6 REINFORCING STEEL INSTEAD OF #5 REINFORCING STEEL OR COMBINATION OF EACH SIZE

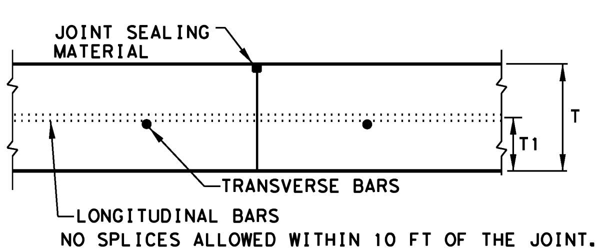


TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)

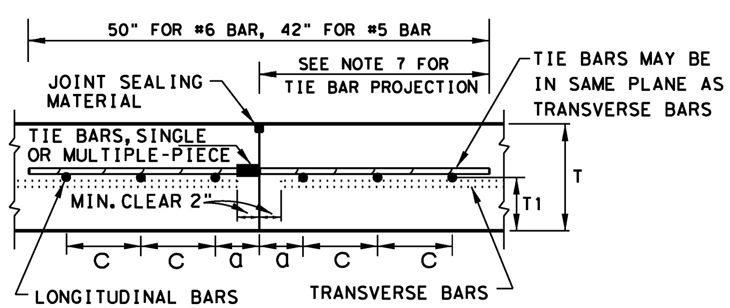
GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO. 1 AND TABLE NO. 2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO. 1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. for #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND CURB AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



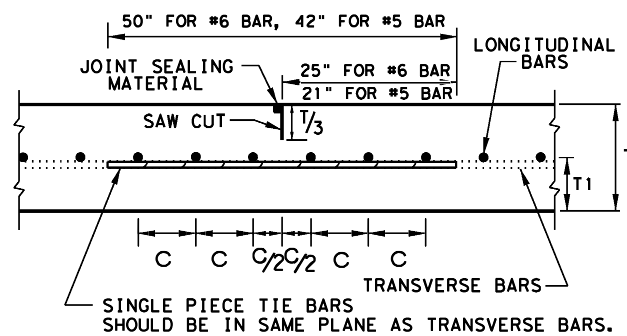
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

Texas Department of Transportation — Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

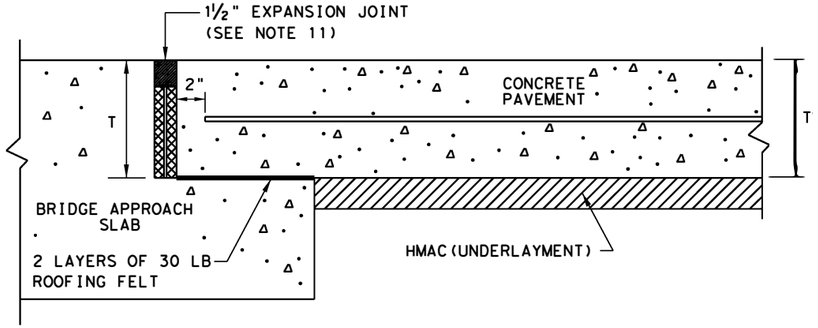
ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

CRCP(1)-23

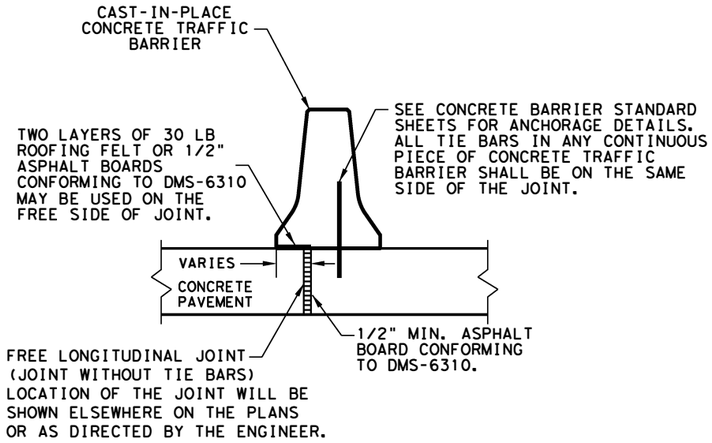
FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
	CONT	SECT	JOB	HIGHWAY
REVISIONS: APRIL 2023: REVISED LONG. STEEL VERTICAL LOCATION; REMOVED ADDITIONAL TIEBAR AT TRANSVERSE CONSTRUCTION JOINTS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		71

DATE:
FILE:

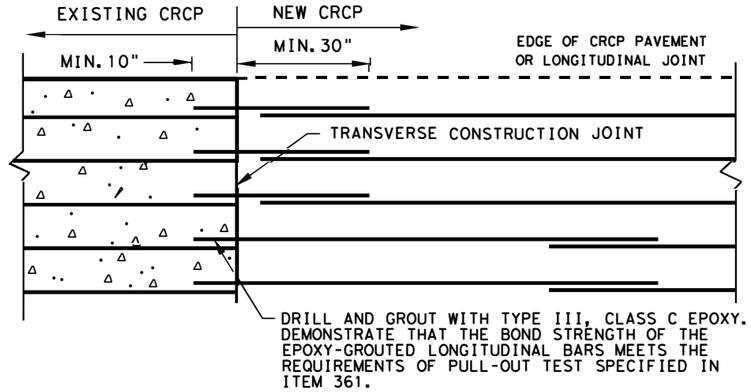
DATE:
FILE:



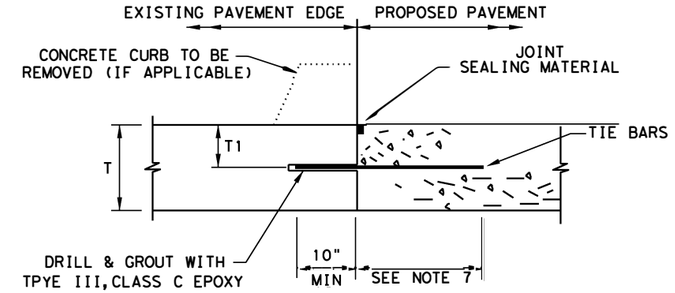
TRANSVERSE EXPANSION JOINT DETAIL AT BRIDGE APPROACH



CENTERLINE FREE LONGITUDINAL JOINT DETAIL

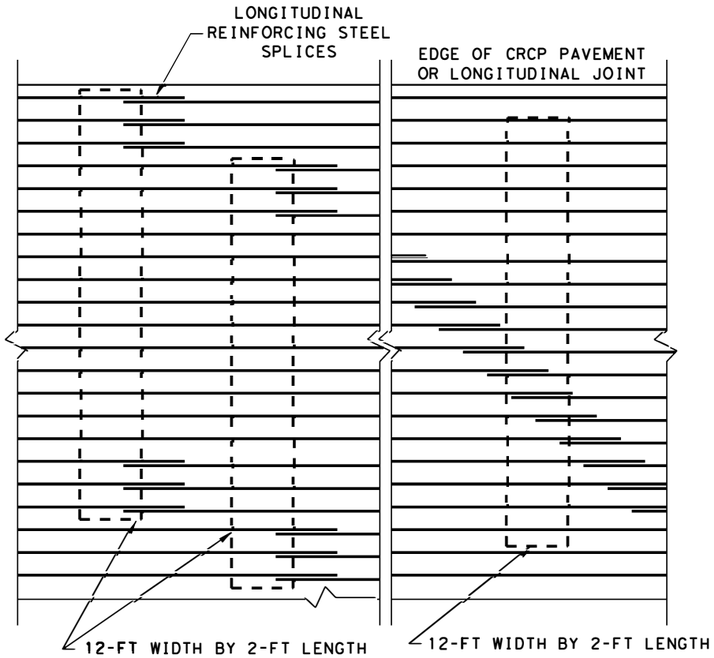


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



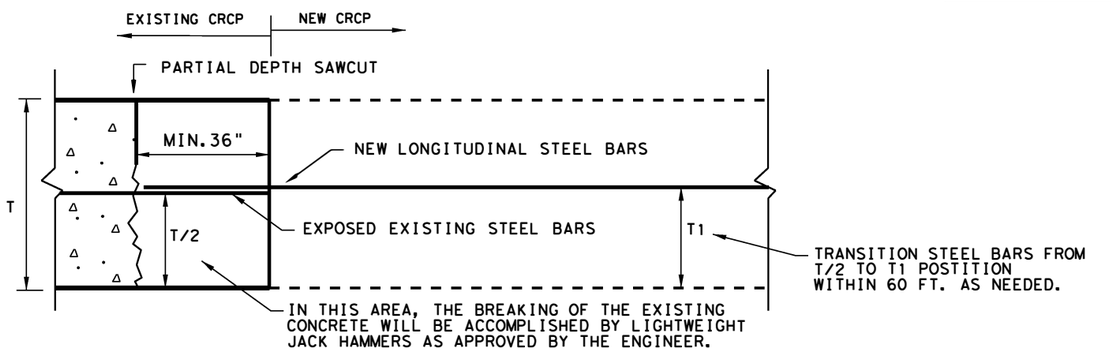
1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER PAVEMENTS, USE #5 TIE BARS FOR LESS THAN 8" THICK PAVEMENTS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

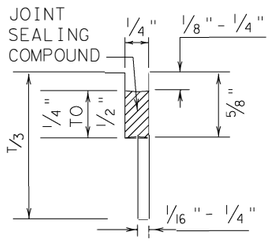
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

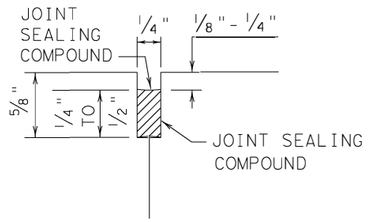
CRCP(1)-23

FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:			
©TxDOT: APRIL 2023	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0015	07	087		IH 35		
APRIL 2023: MODIFIED EXPANSION JOINT DETAIL AT BRIDGE APPROACH SLAB	DIST	COUNTY			SHEET NO.		
	WAC	BELL			72		

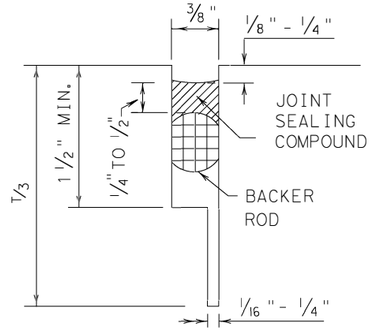
METHOD B: JOINT SEALING COMPOUND



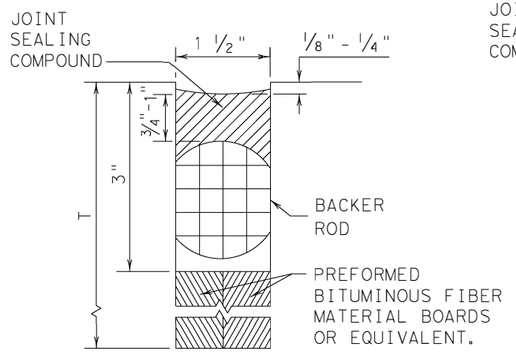
LONGITUDINAL SAWED CONTRACTION JOINT



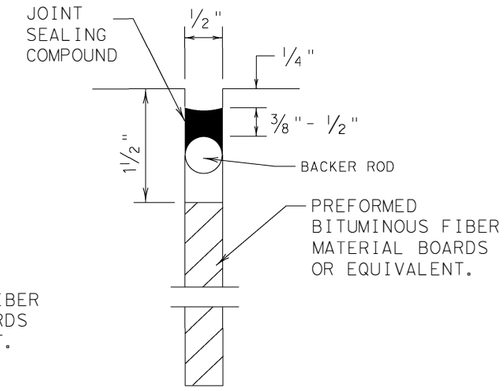
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

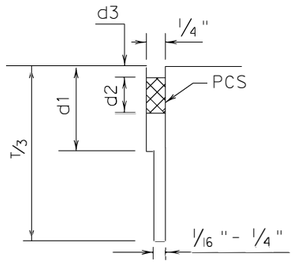


TRANSVERSE FORMED EXPANSION JOINT

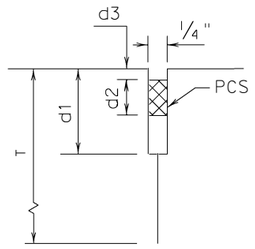


FORMED ISOLATION JOINT

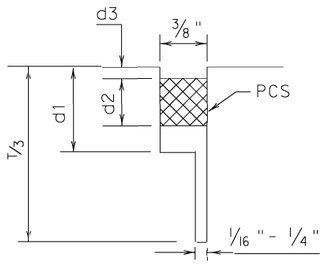
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



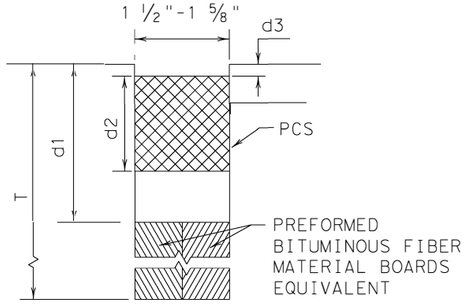
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation — Design Division Standard

CONCRETE PAVING DETAILS

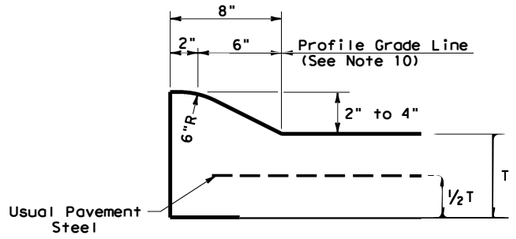
JOINT SEALS

JS-14

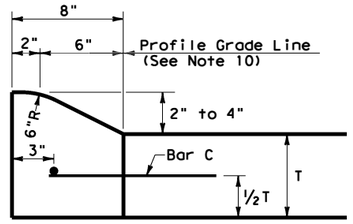
FILE: js14.dgn	DN: TxDOT		DN: HC	DW: HC		CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0015	07	087		IH 35	
	DIST	COUNTY				SHEET NO.
	WAC	BELL				73

DATE:
FILE:

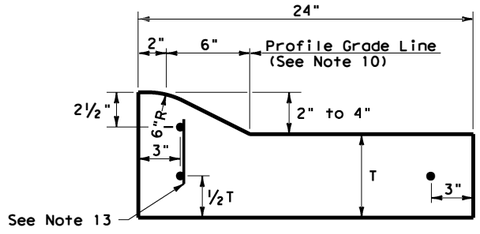
DATE:
FILE:



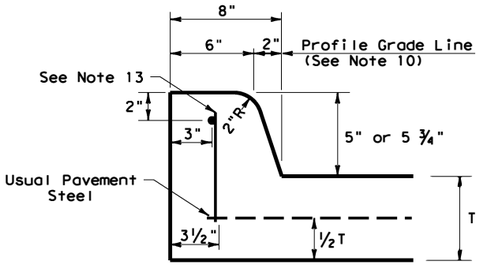
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



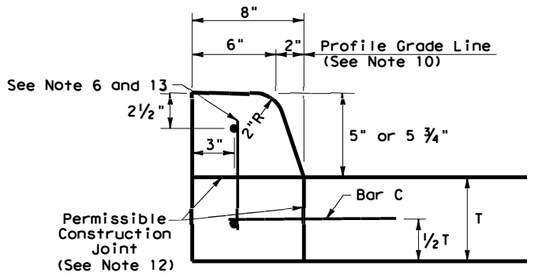
TYPE I CURB
2" - 4" HEIGHT



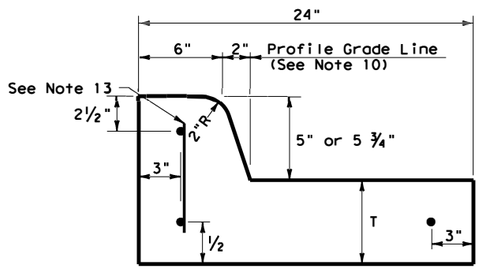
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



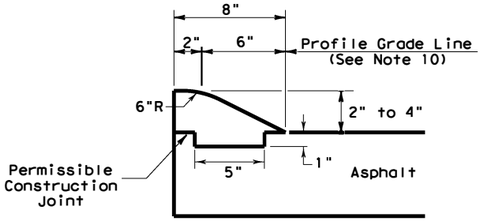
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



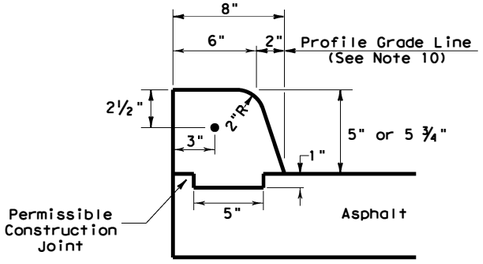
TYPE II CURB
5" - 5 ¾" HEIGHT



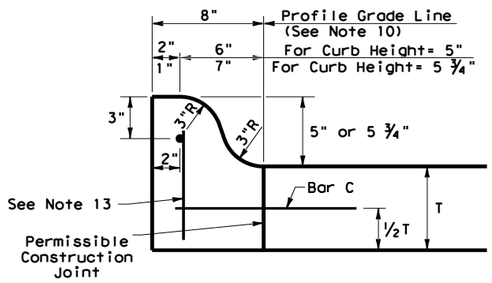
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



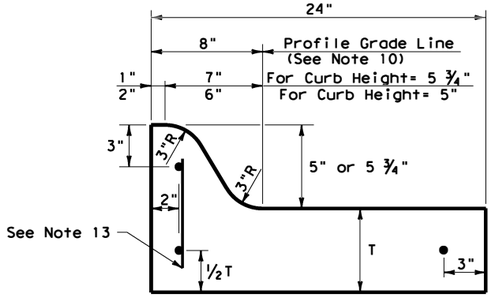
TYPE III CURB (KEYED)
2" - 4" HEIGHT



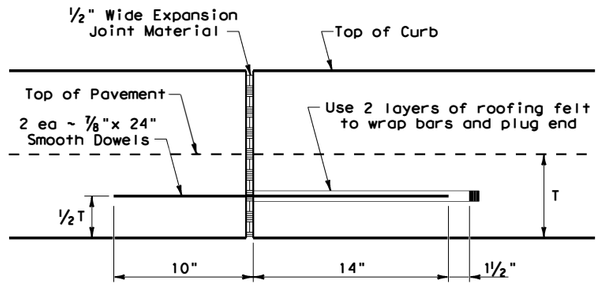
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

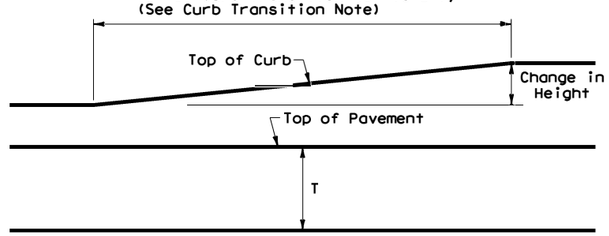


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

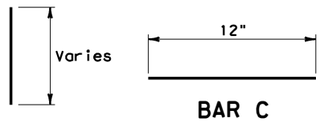
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

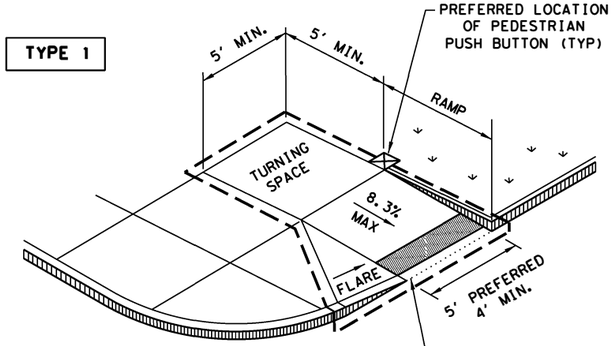
CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
©TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		74

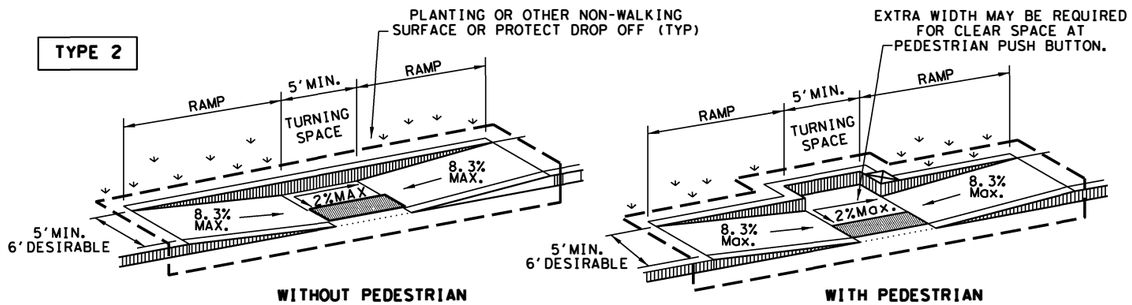
DATE:
FILE:

TYPE 1



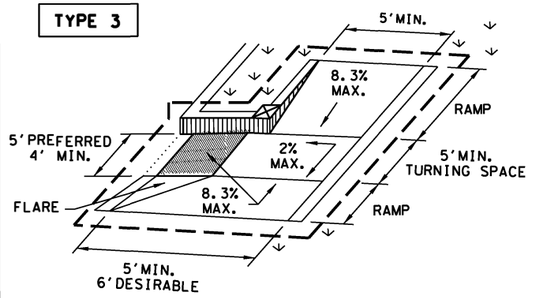
PERPENDICULAR CURB RAMP

TYPE 2

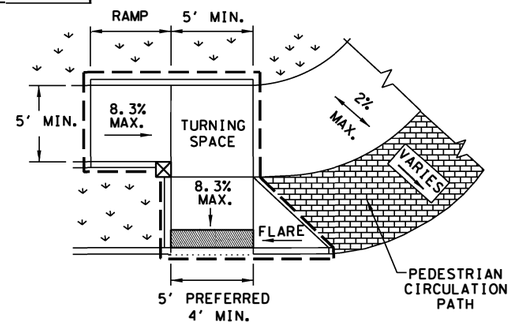


PARALLEL CURB RAMP

TYPE 3

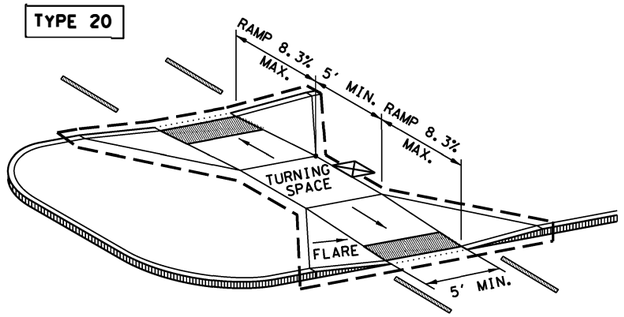


TYPE 6



COMBINATION CURB RAMPS

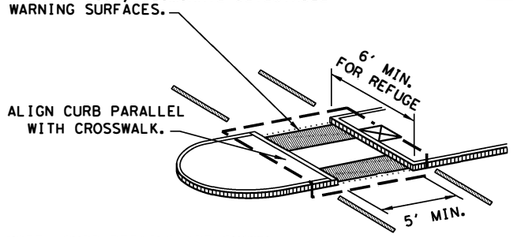
TYPE 20



CURB RAMPS AT MEDIAN ISLANDS

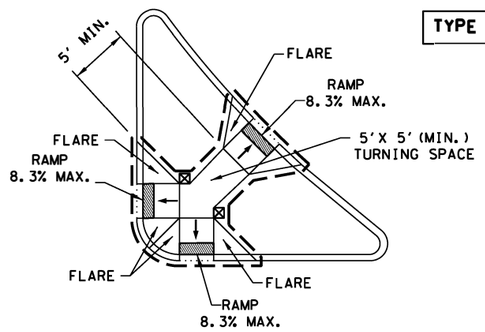
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21



NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

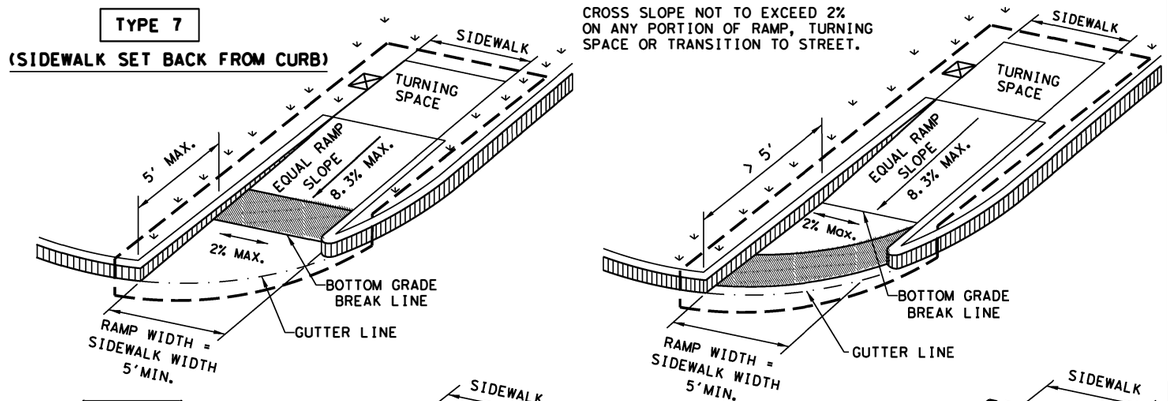
TYPE 22



COMBINATION ISLAND RAMPS

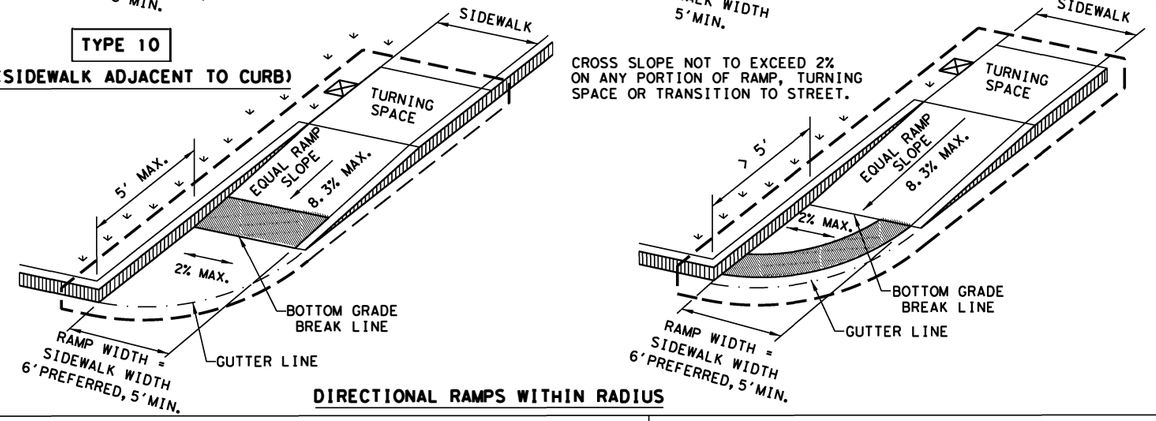
TYPE 7
(SIDEWALK SET BACK FROM CURB)

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



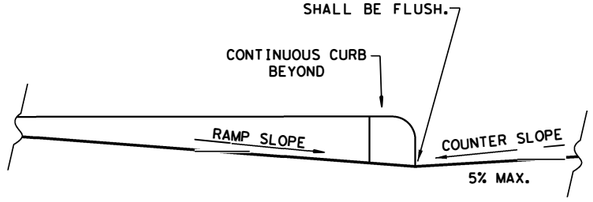
TYPE 10
(SIDEWALK ADJACENT TO CURB)

CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



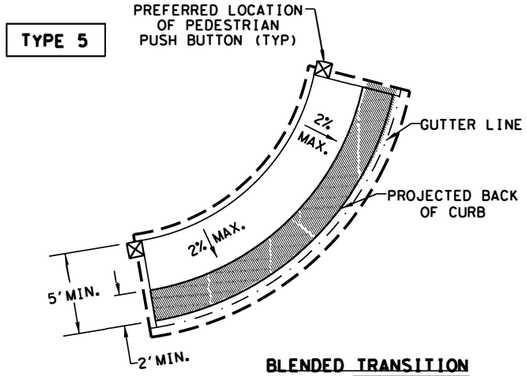
DIRECTIONAL RAMPS WITHIN RADIUS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	WAC	BELL		75

DATE:
FILE:

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

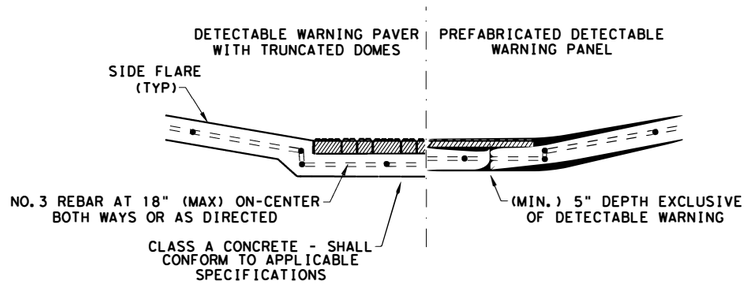
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

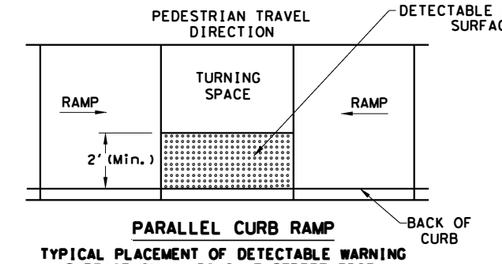
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

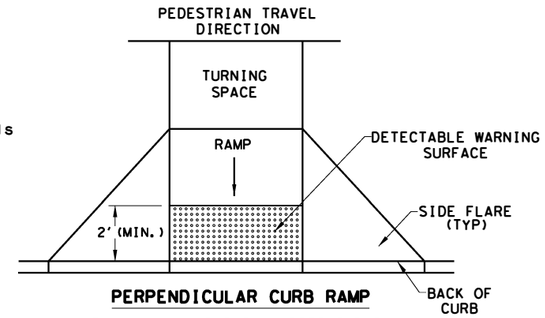


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

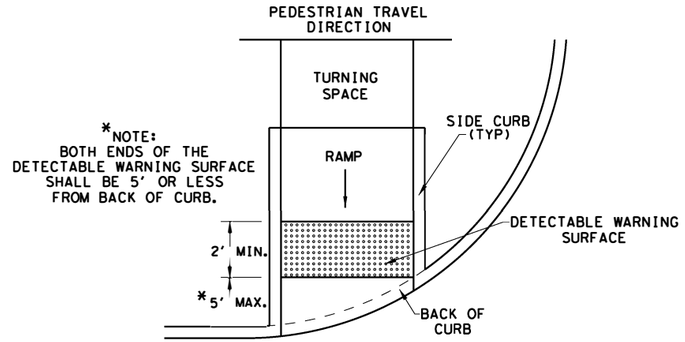
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

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PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JC
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	WAC	BELL			76

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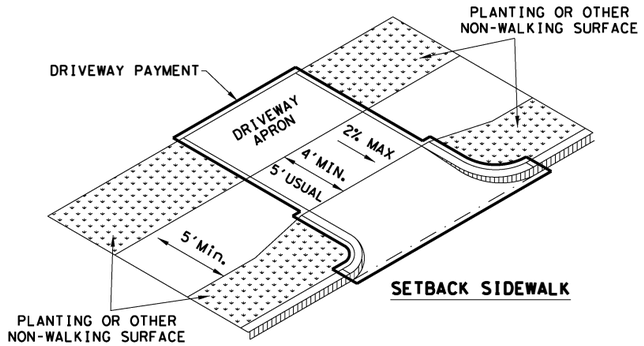
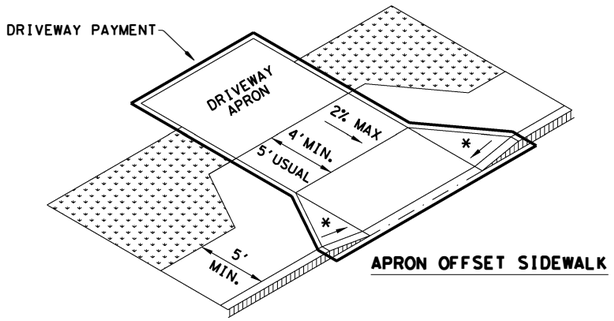
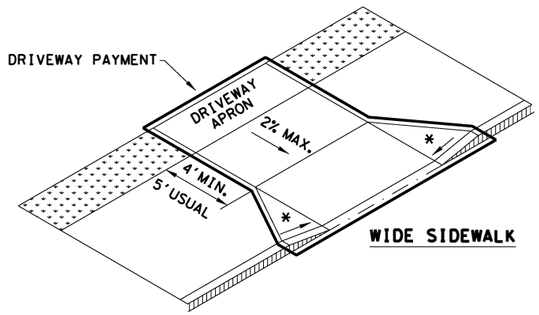
SIDEWALK TREATMENT AT DRIVEWAYS



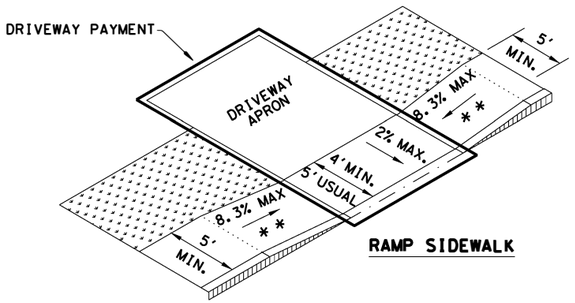
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

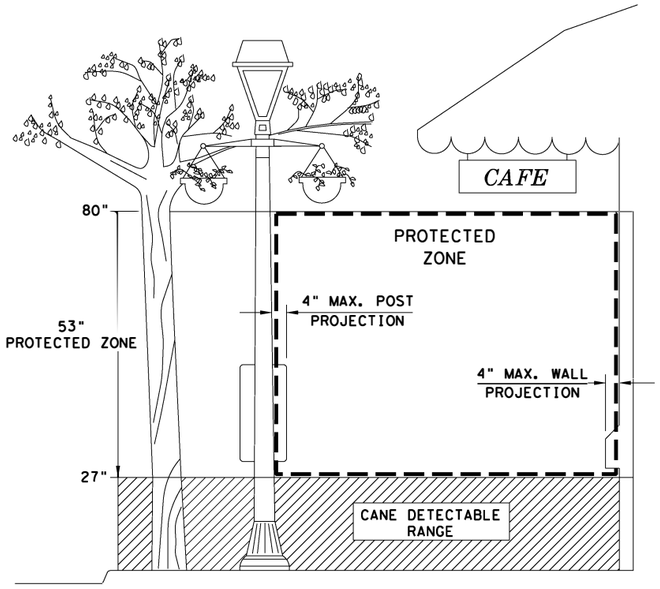


RAMP SIDEWALK

NOTES:

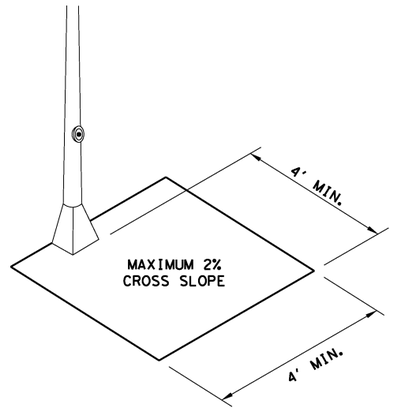
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

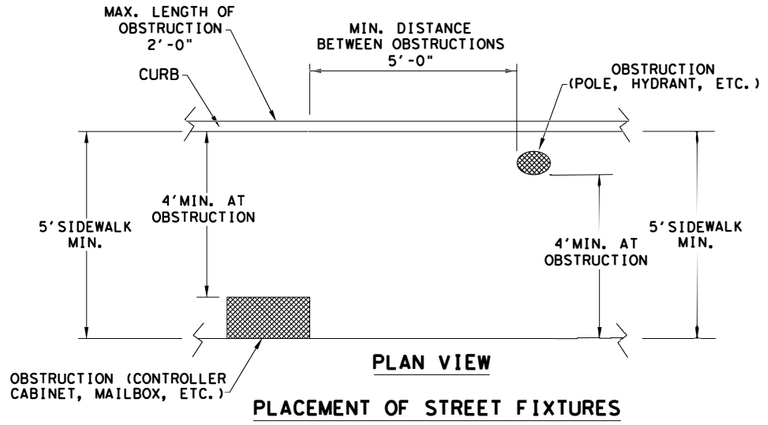


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



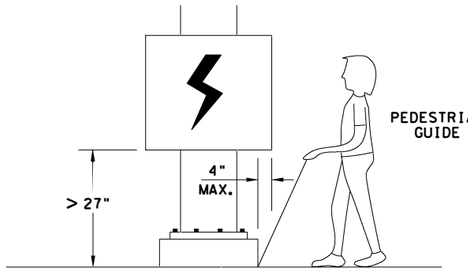
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



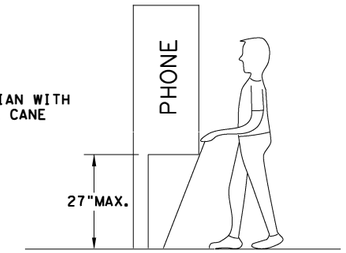
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
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	WAC		BELL		77

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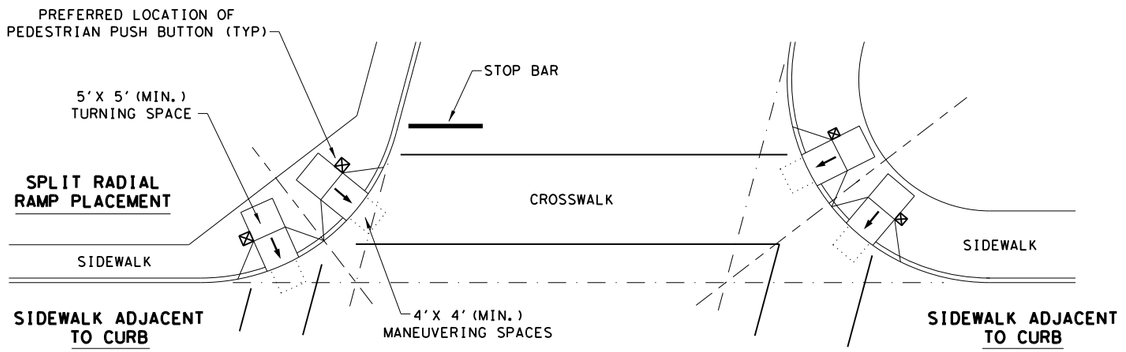
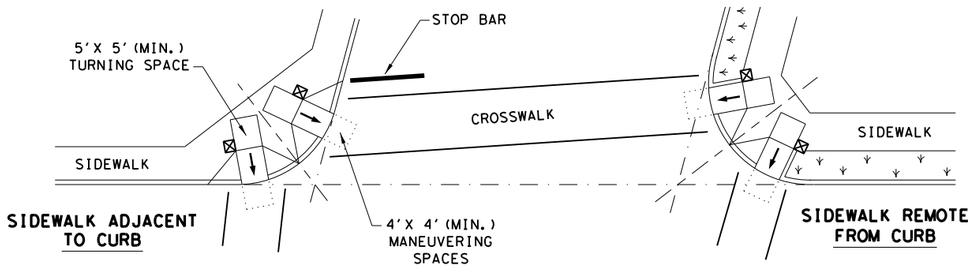
TYPICAL CROSSING LAYOUTS

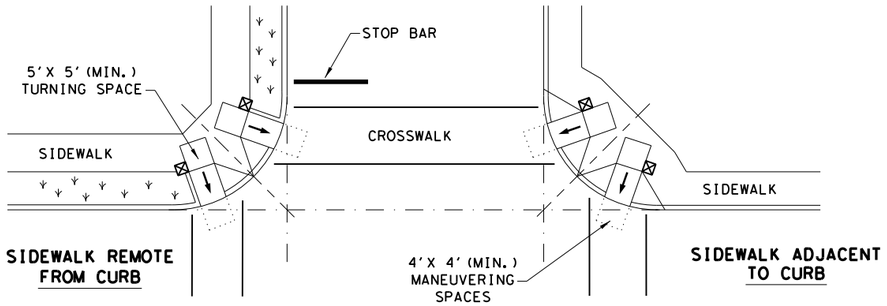
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



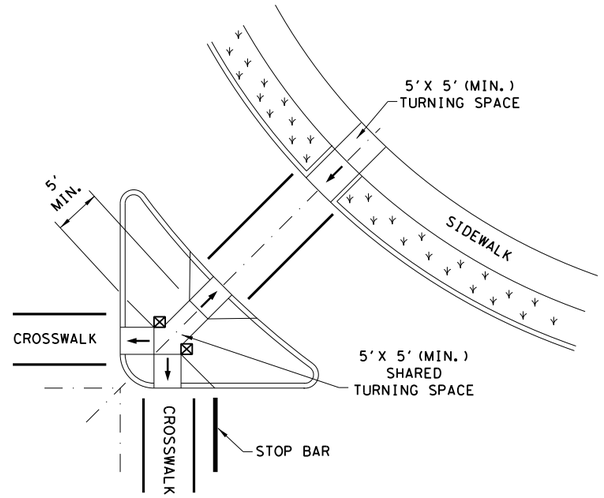
SKEWED INTERSECTION WITH "LARGE" RADIUS



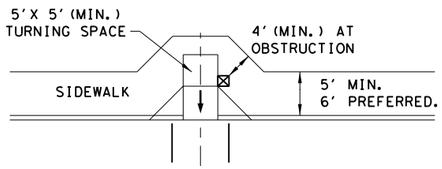
SKEWED INTERSECTION WITH "SMALL" RADIUS

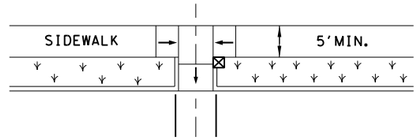


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
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REVISIONS	0015	07	087	IH 35	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	WAC	BELL		78	

DATE:
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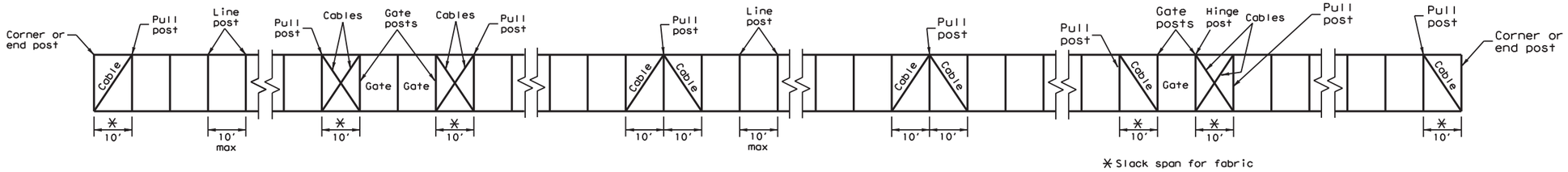
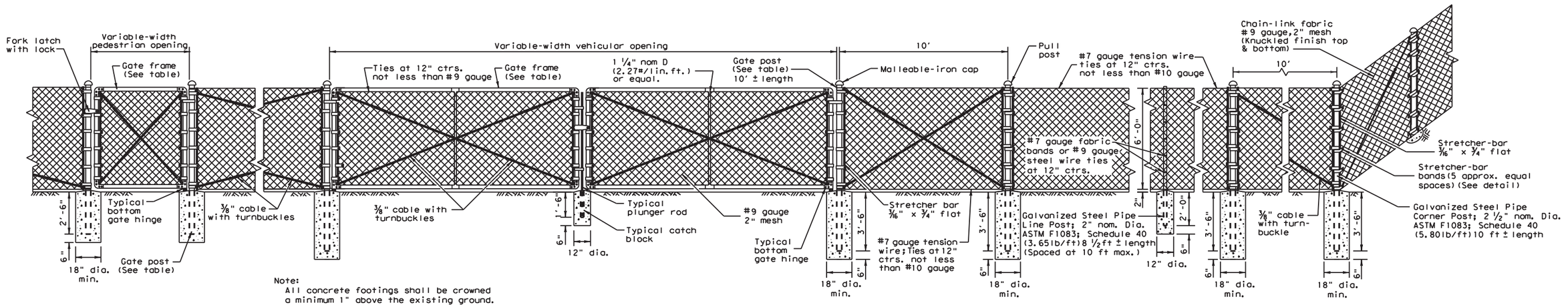


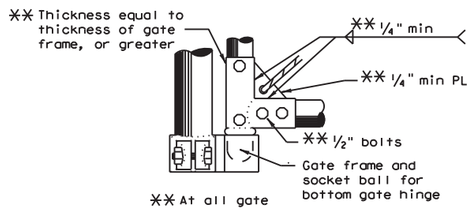
TYPICAL CABLE AND POST ARRANGEMENT



Note:
All concrete footings shall be crowned a minimum 1" above the existing ground.

CHAIN-LINK BARRIER FENCE (6 FT.)

Foundation designs shown are "minimums" for a 6 ft. fence.
Taller fences may require larger foundation designs.

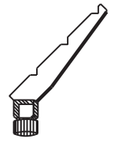


TYPICAL BOTTOM GATE HINGE

GATE (TYPES AND SIZES)	
Single Inclusive	Double Inclusive
Up to 6' Over 6' to 12' Over 12' to 18' Over 18'	Up to 12' Over 12' to 26' Over 26' to 36' Over 36'

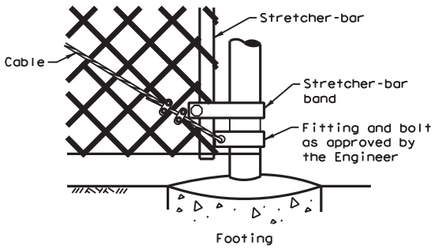
GATE FRAME (WEIGHT)		GATE POST (WEIGHT)	
SIZE	WT./LIN. FT.	SIZE	WT./LIN. FT.
1 ½" nom dia. or equal	2.72 Lbs.	2 ½" nom dia. or equal	5.79 Lbs.
		3 ½" nom dia. or equal	9.11 Lbs.
		6" nom dia.	18.97 Lbs.
		8" nom dia.	24.70 Lbs.

TYPICAL STRETCHER-BAR BAND

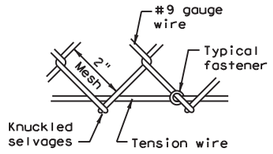


"OPTIONAL" 3 WIRE 45° BARBED WIRE ARM

Barbed wire arm related items shall conform to Item 550, "Chain Link Fence."



TERMINAL POST DETAIL



FABRIC & TENSION WIRE DETAIL, TOP & BOTTOM

GENERAL NOTES

1. Items hereon shall conform to Item 550, "Chain Link Fence."
2. Typical installation plan may vary as shown elsewhere on the plans or as directed by the Engineer. Location of gates shown elsewhere on plans.
3. Gate-frame members shall be bolted, at frame corners, to joint fittings with four ½" bolts per joint.
4. All cable connections are to be made with two ⅜" cable clamps.
5. All pull posts and end posts and their foundations shall have the same respective dimensions as those shown for corner post.
6. All pull post shall be furnished with two stretcher bars.
7. One end of each turnbuckle may be attached directly to fittings with a clevis.
8. Concrete footings are to be crowned at the top to shed water.

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Design Division Standard

CHAIN LINK FENCE

CLF-10

FILE: clf10.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
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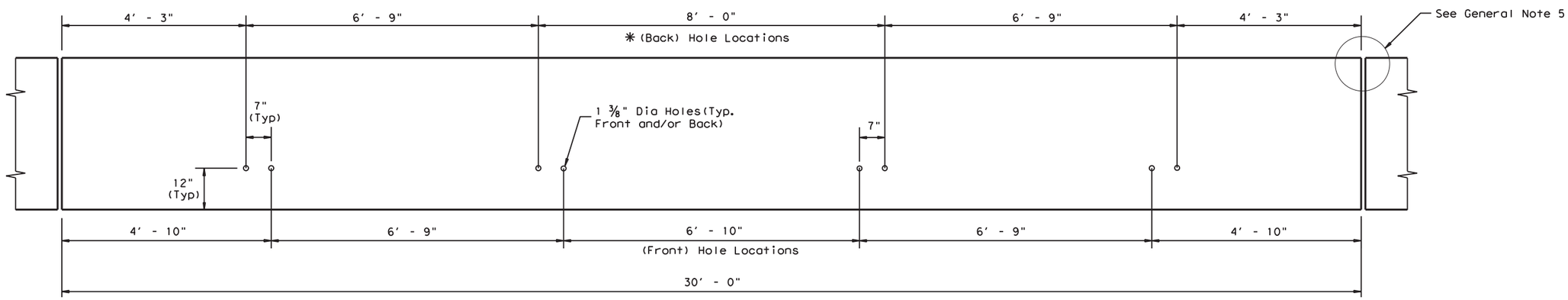
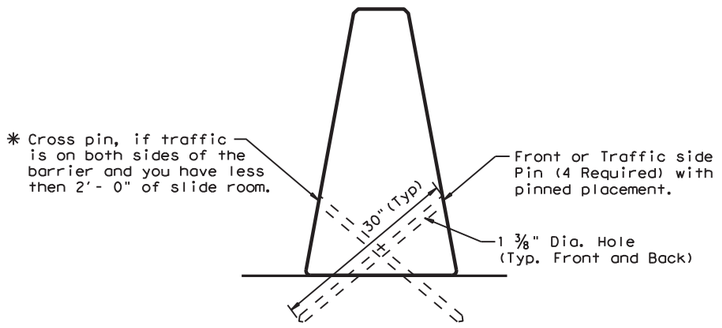


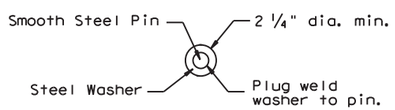
DETAIL 1

Precast SSCB(42")
Showing hole locations

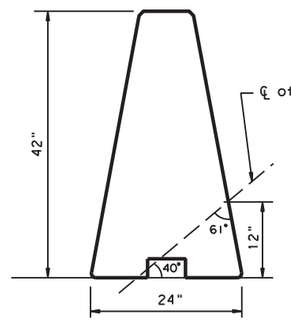


DETAIL 2

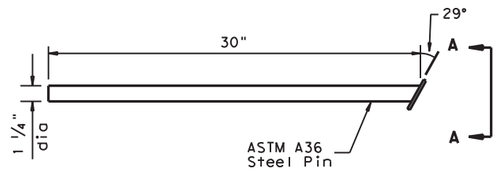
Placement on (ACP)
Asphalt Conc. Pavement
or Treated Base Material
(30" Pin required)



VIEW A-A

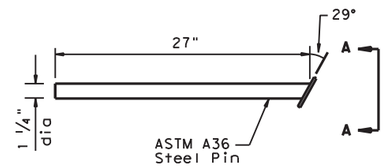


HOLE LOCATION DETAIL



(30") PIN DETAIL

See Detail 2



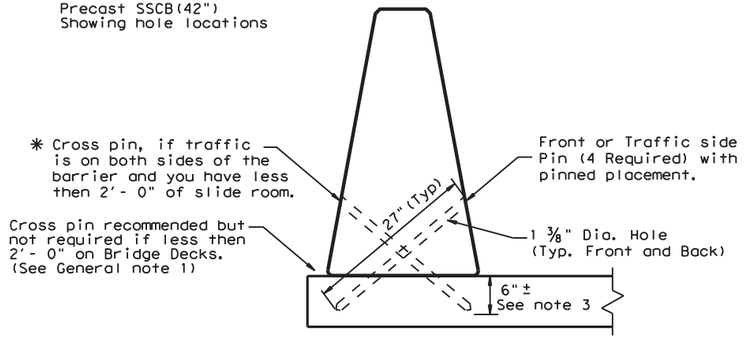
(27") PIN DETAIL

See Detail 3

Note:
Steel washer welded to pin at 29° angle so that the washer is flush with barrier surface. (See View A-A)

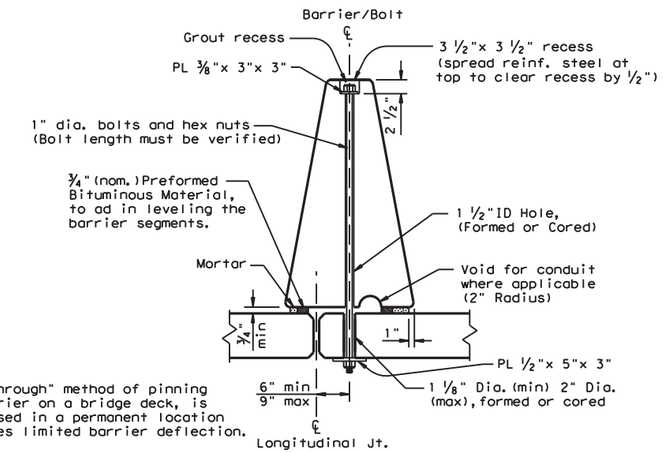
DETAIL 3

Bridge Deck or CRCP
(27" Pin required).



CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less then 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
2. Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
3. The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing though the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
4. Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
5. See SSCB(2) standard sheet for reinforcement requirements and joint connection types.
6. The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 ¼in. pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
7. The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
8. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 700 lbs per foot.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1) PINNED PLACEMENT

SSCB(5)-10

FILE: sscb510.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
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REVISIONS	0015	07	087	IH 35
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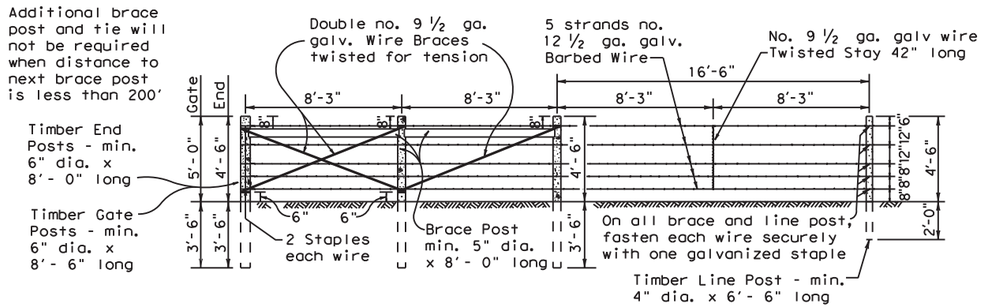
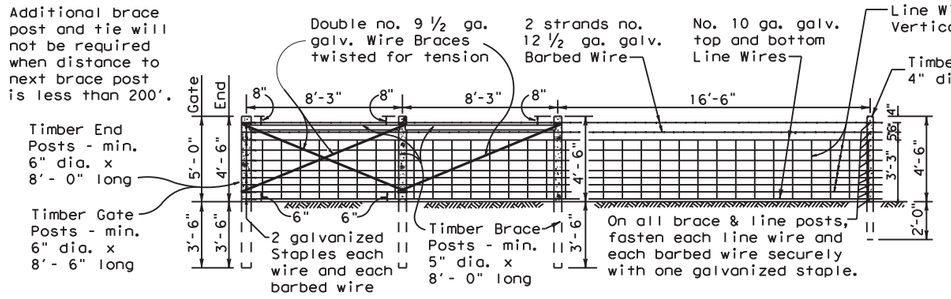


SECTION GALVANIZED BARBED WIRE FENCE WITH WOOD POSTS

Bracing Detail Used at Ends and Gates

TYPE "A" FENCE

(See General Note 6)



SECTION GALVANIZED WOVEN WIRE FENCE WITH WOOD POSTS

Bracing Detail Used at Ends and Gates

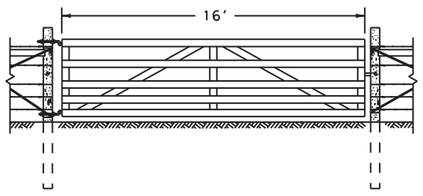
TYPE "B" FENCE

(See General Note 6)

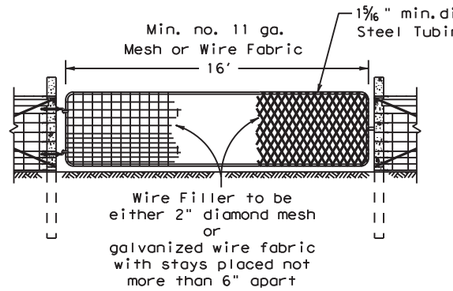
TABLE OF EQUIVALENT SIZES FOR OPTIONAL SHAPE

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

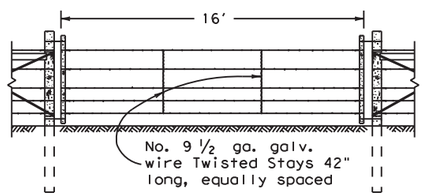
Metal gate shall consist of 5 panels not less than 4'- 4" high and shall be aluminum or galvanized metal and of good quality. Gate and hardware shall meet the approval of the Engineer.



DETAIL TYPE 1 GATE



DETAIL TYPE 2 GATE

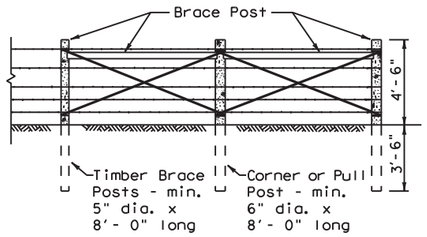


DETAIL TYPE 3 GATE

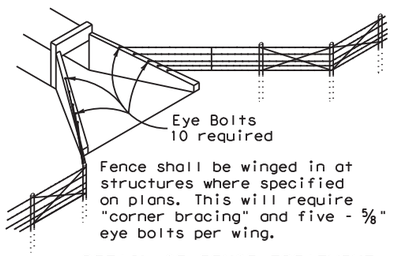
GENERAL NOTES

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

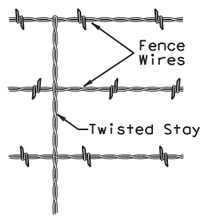
   Woven Wire Fence (Type B) shall be in accordance with ASTM A 116 (Class 1) No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
7. The location of gates and corner posts will be as indicated elsewhere on these plans.
8. Square wood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



CORNER OR PULL POST ASSEMBLY

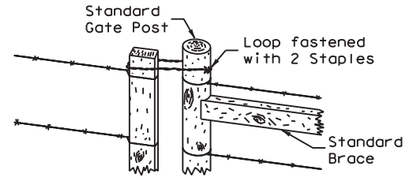


DETAIL OF FENCE TREATMENT AT STRUCTURES



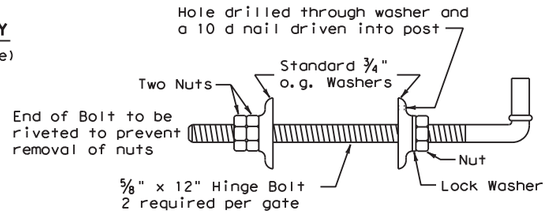
DETAIL OF STAY

(Barbed wire fence)

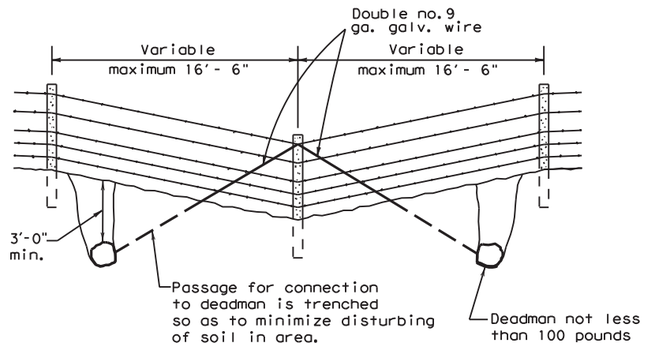


Loop to be made from two strands twisted no. 9 ½ ga. galv. smooth wire, and to be securely fastened to gate post with two galv. staples.

DETAIL FASTENER TYPE 3 GATE

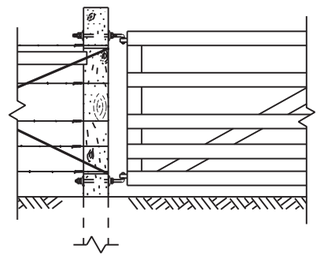


DETAIL OF GATE HINGE BOLT ASSEMBLY

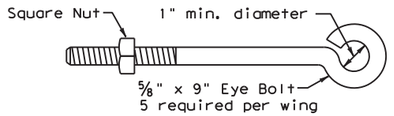


DETAIL OF FENCE SAG

(Single Line Connection)



DETAIL SHOWING INSTALLATION OF HINGES OF TYPE 1 & 2 GATE



DETAIL OF EYE BOLT

Texas Department of Transportation

Design Division Standard

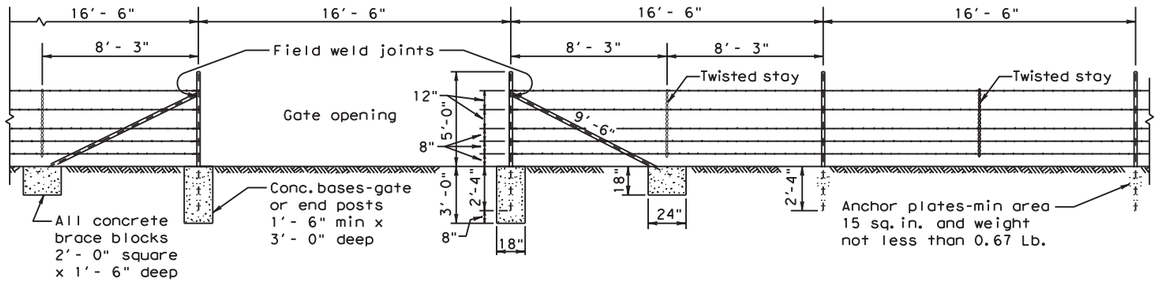
BARBED WIRE AND WOVEN WIRE FENCE

(WOOD POSTS)

WF(1)-10

FILE: wf110.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		81

DATE:
FILE:



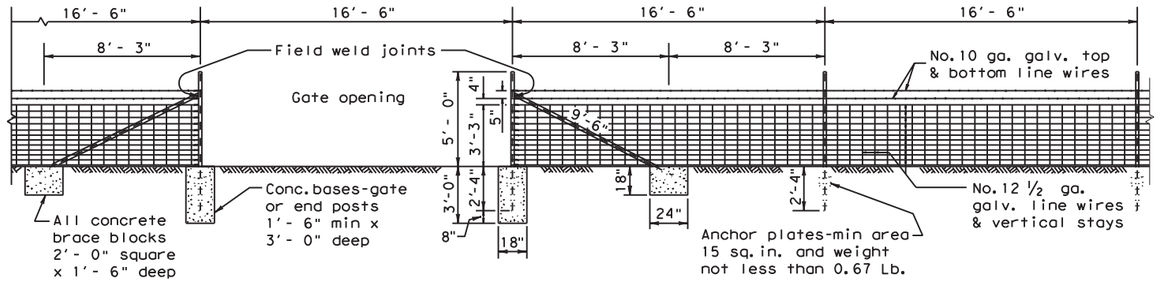
SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

TYPE "C" FENCE

(See General Note 8)

Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)

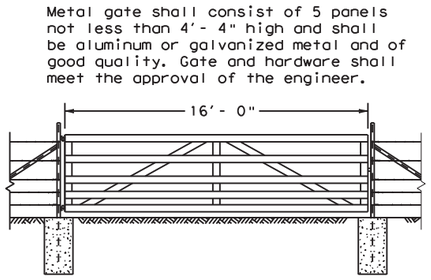


SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS

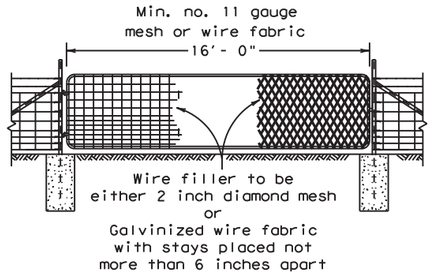
BRACING DETAIL USED AT ENDS AND GATES

TYPE "D" FENCE

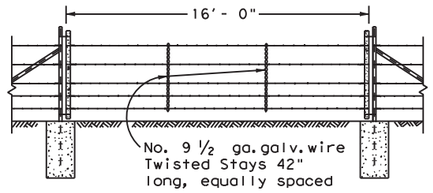
(See General Note 8)



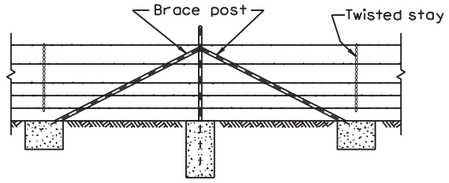
DETAIL TYPE 1 GATE



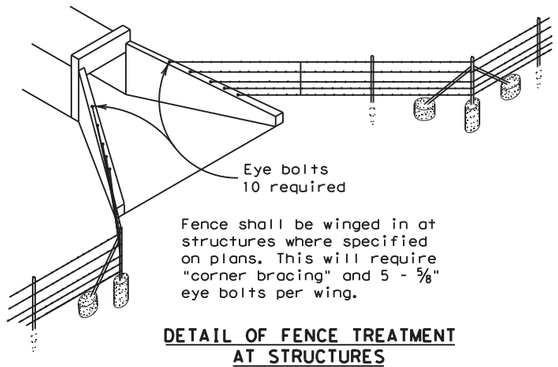
DETAIL TYPE 2 GATE



DETAIL TYPE 3 GATE

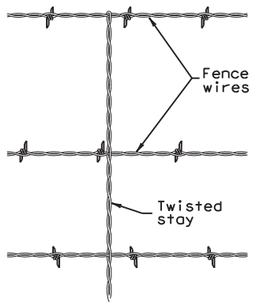


CORNER OR PULL POST ASSEMBLY



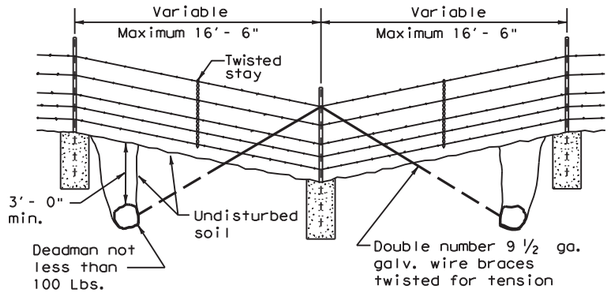
Fence shall be winged in at structures where specified on plans. This will require "corner bracing" and 5 - ⅝" eye bolts per wing.

DETAIL OF FENCE TREATMENT AT STRUCTURES

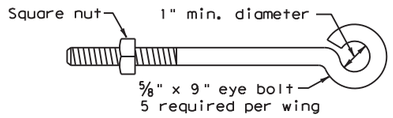


DETAIL OF STAY

(Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
6. Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1¼" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
7. If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These Items shall be in accordance with Item 552, "Wire Fence."
8. Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

   Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
9. The location of gates and corner posts will be as indicated elsewhere in these plans.

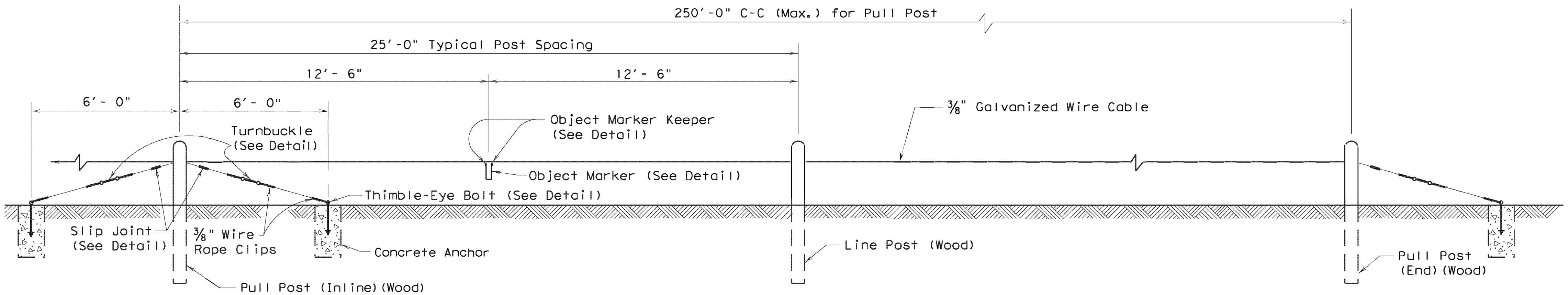
Texas Department of Transportation

Design Division Standard

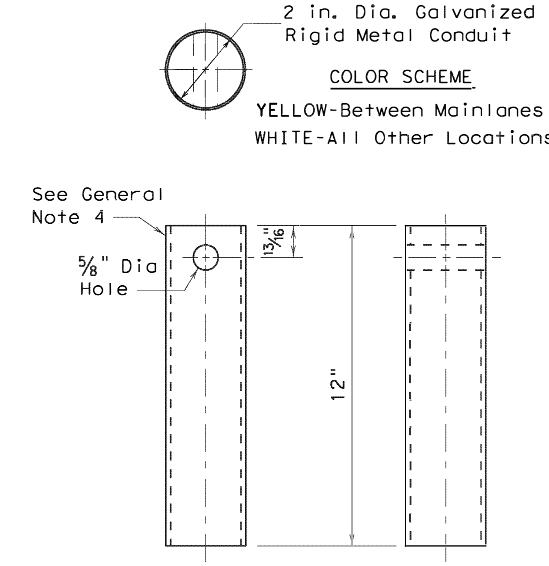
BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS)

WF(2)-10

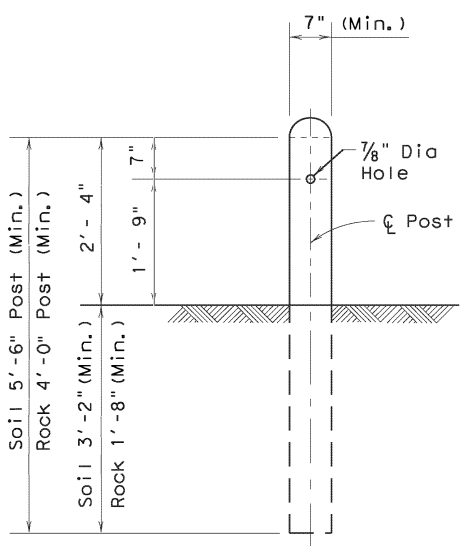
FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		82



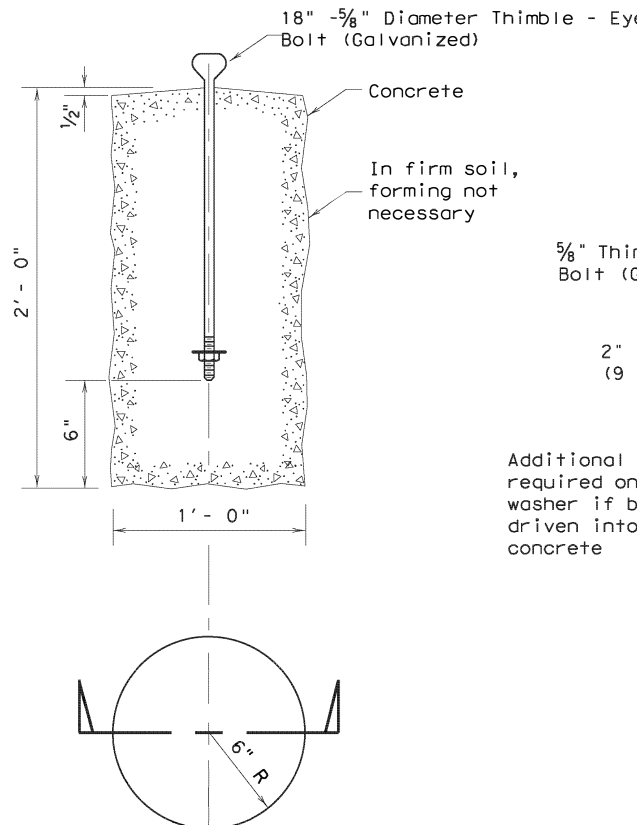
WOOD POST & CABLE UNIT



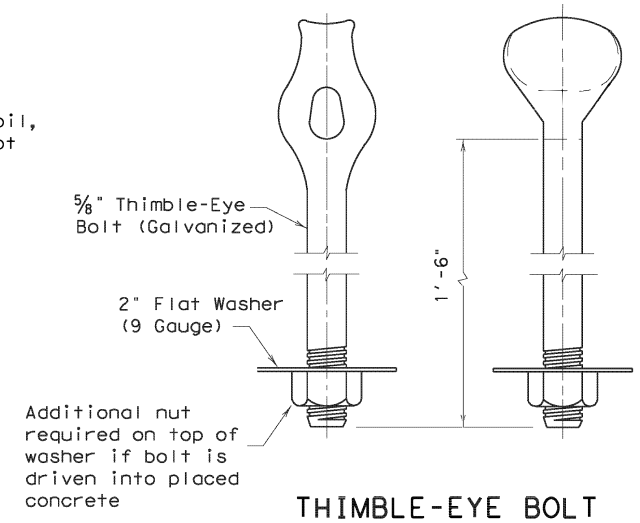
OBJECT MARKER (Reflector Detail)



WOOD POST DETAIL

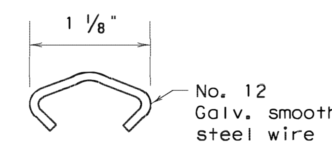


CONCRETE ANCHOR DETAILS



THIMBLE-EYE BOLT DETAILS

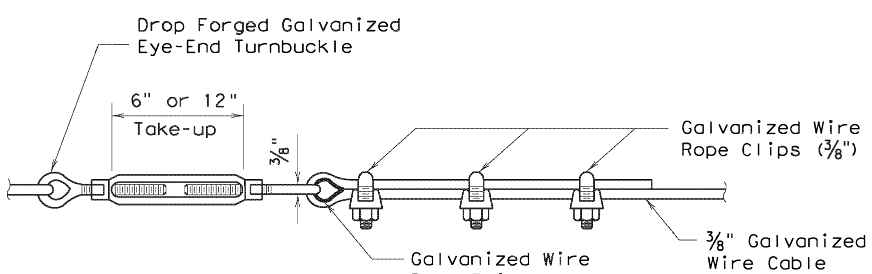
Clamp keepers on both sides of Reflector as shown above.



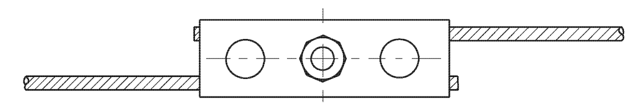
OBJECT MARKER KEEPER DETAIL

GENERAL NOTES

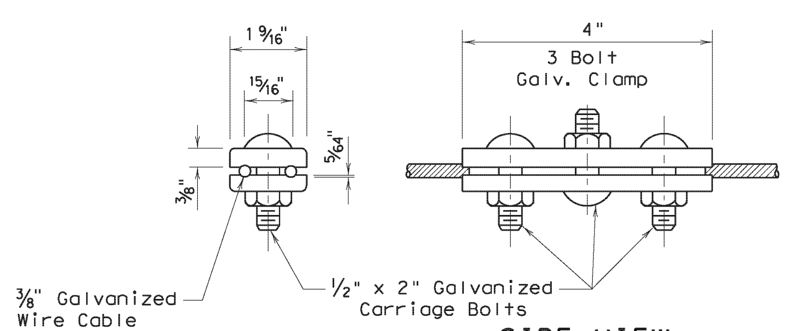
1. Furnish Class "B" or better concrete in accordance with Item 421, "Hydraulic Cement Concrete". Cure concrete anchors at least five (5) days before attaching the cable.
2. Furnish galvanized cable fittings in accordance with the Item 445, Galvanizing.
3. Furnish posts meeting the requirements of DMS 7200, "Timer Posts and Blocks for Metal Beam Guard Fence." Do not use painted timber posts.
4. Cover the entire surface of object marker (reflector) with a reflectorized sheeting material conforming to Departmental Material Specification DMS 8300, "Sign Face Materials", Type C.
5. Furnish cable conforming to ASTM designation A475.



WIRE CABLE CONNECTION (at turnbuckles & eyebolts) DETAIL



TOP VIEW



SIDE VIEW

SLIP JOINT DETAIL

LEVELS DISPLAYED														
1	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17 18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33 34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49 50	51	52	53	54	55	56	57	58	59	60	61	62	63	

Texas Department of Transportation
Maintenance Division

POST & CABLE FENCE

PCF-05

FILE: pcf05.dgn	DN:	CK:	DW: LJB	CK: JG	NEG:
© TxDOT FEB. 2005	DIST	FED REG	FEDERAL AID PROJECT		SHEET
REVISIONS 2/02 Rev. Design Div. PCF-99	WAC	6	F 2024 (924)		83
	COUNTY		CONTROL	SECT	JOB / HIGHWAY
	BELL		0015	07	087 / IH 35

DATE: $DATE$ $TIME$
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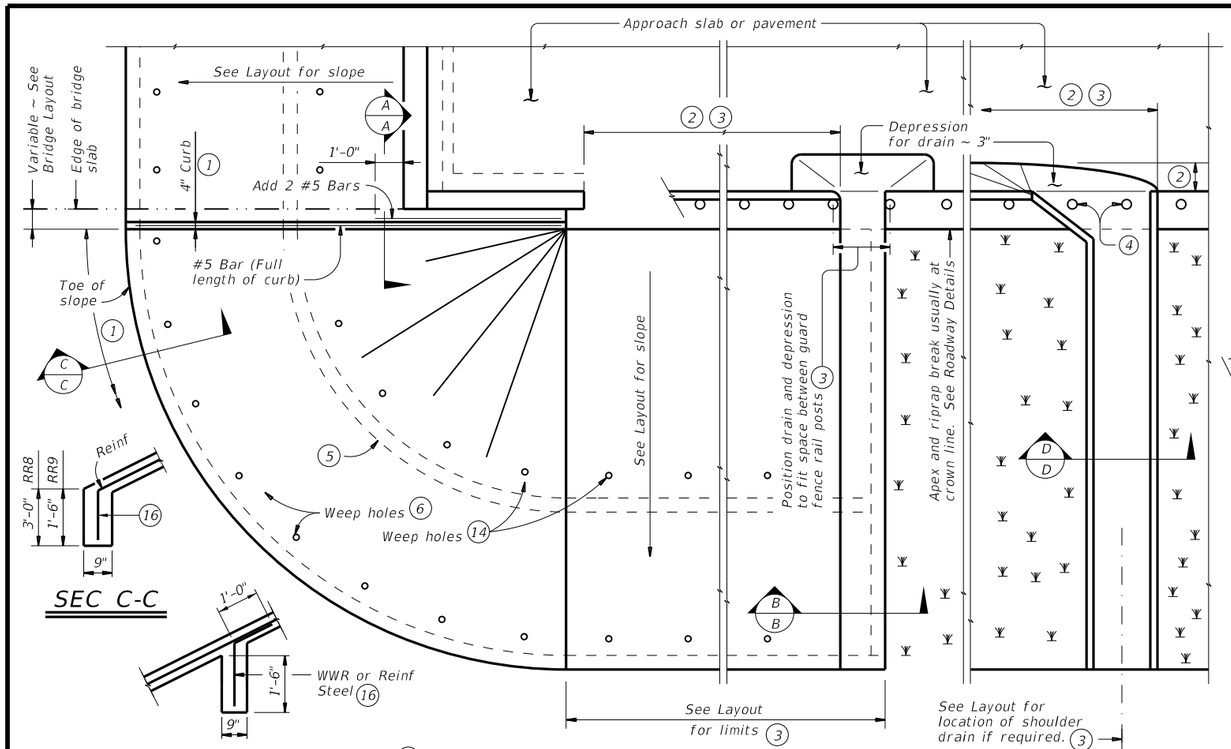
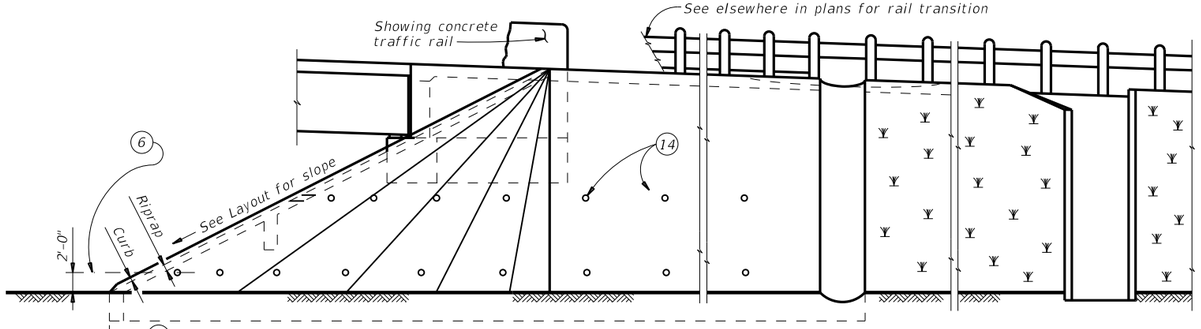


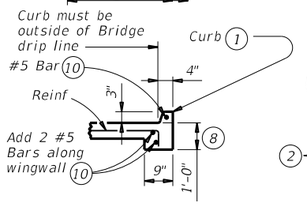
PLAN

SEC C-C

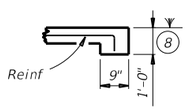
INTERMEDIATE TOEWALL



ELEVATION

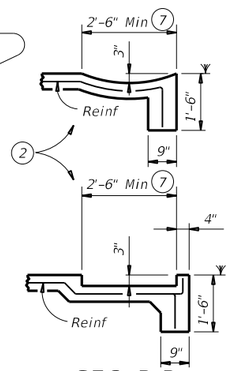


SEC A-A



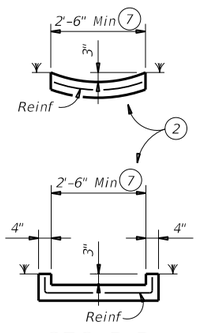
SEC B-B

(No drain)



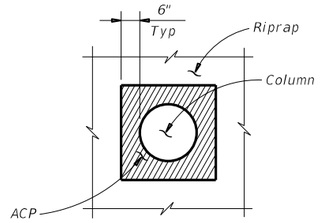
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

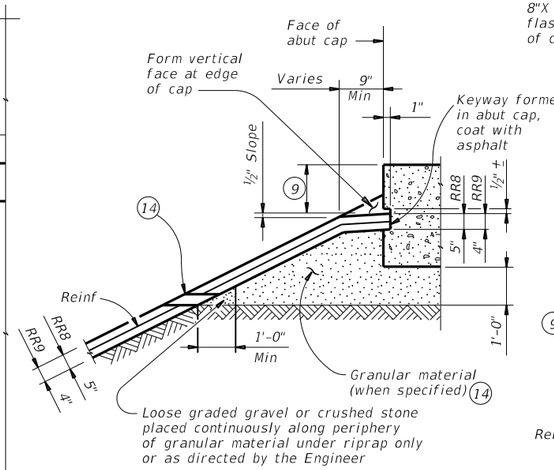
(Shoulder drain)



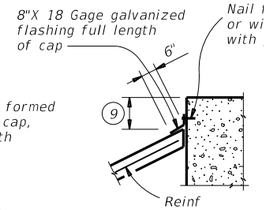
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

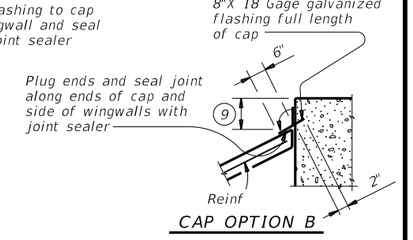
(As directed by the Engineer)



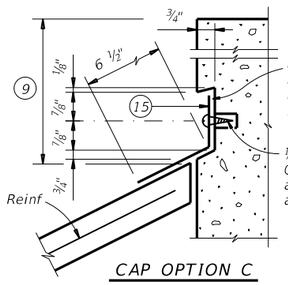
SHOWING KEYWAY OPTION



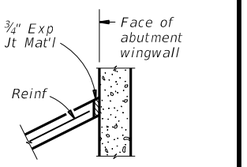
CAP OPTION A



CAP OPTION B

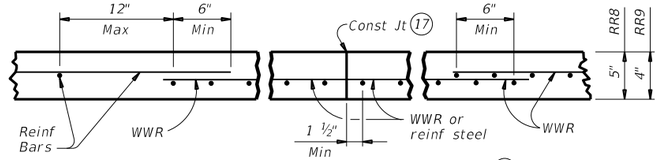


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

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)

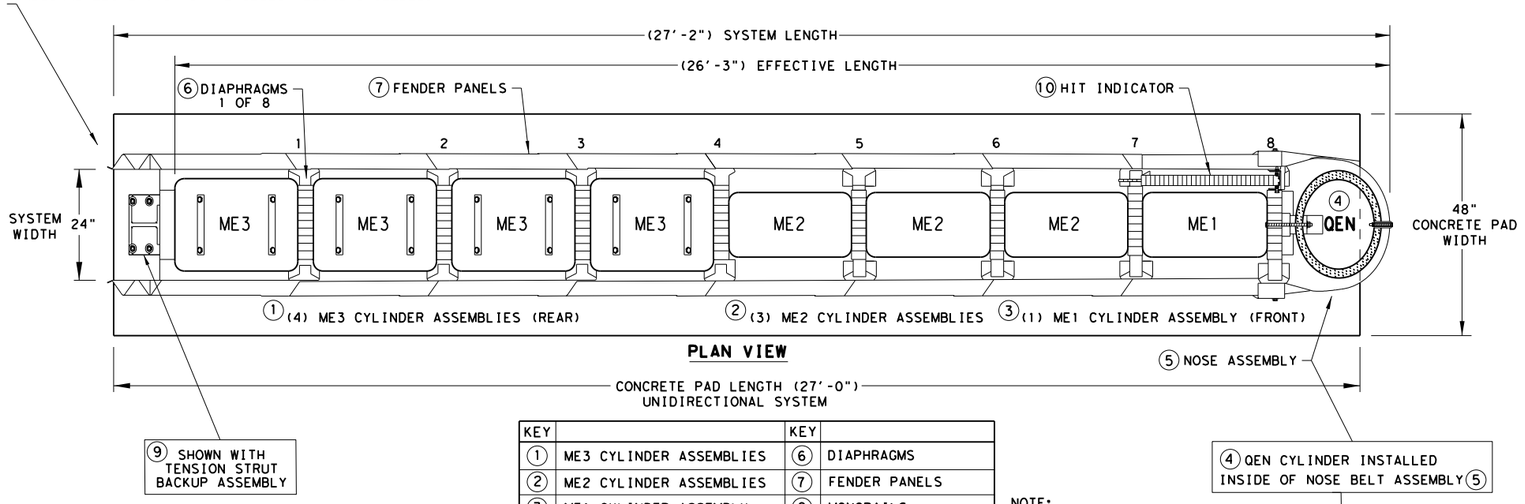
CRR

FILE: MS-CRR-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		84

DATE: $DATE$
FILE: $FILE$

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD ELITE M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD ELITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

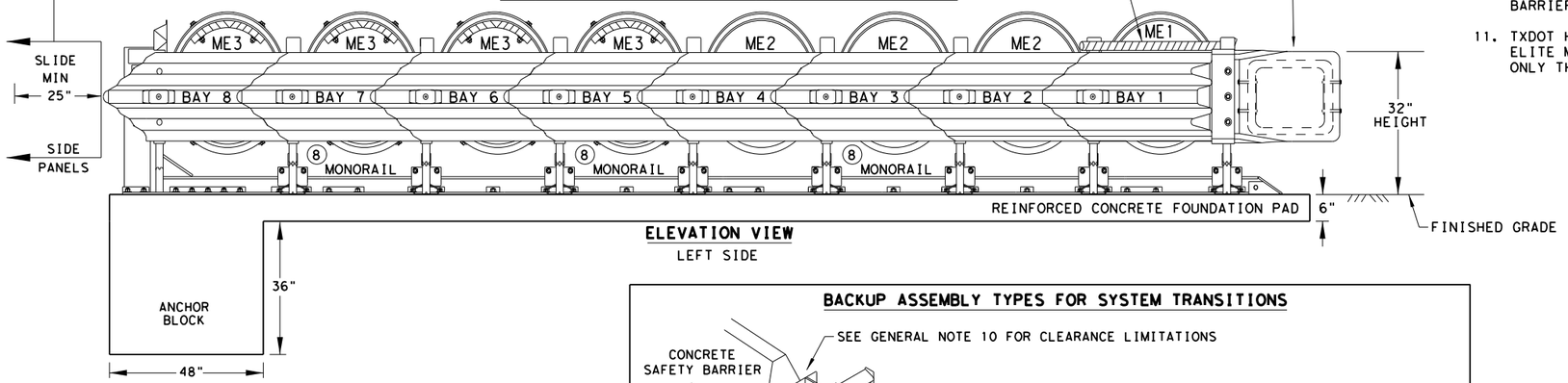
⑨ SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

KEY		KEY	
①	ME3 CYLINDER ASSEMBLIES	⑥	DIAPHRAGMS
②	ME2 CYLINDER ASSEMBLIES	⑦	FENDER PANELS
③	ME1 CYLINDER ASSEMBLY	⑧	MONORAILS
④	QEN CYLINDER	⑨	TYPE OF BACKUP
⑤	NOSE BELT ASSEMBLY	⑩	HIT INDICATOR

④ QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY ⑤

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.



ELEVATION VIEW
LEFT SIDE

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

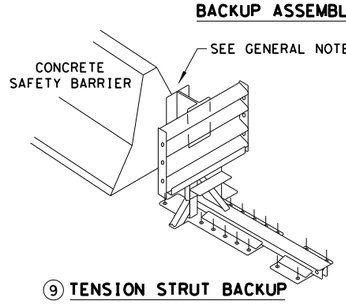
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS

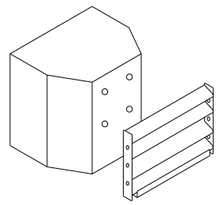


⑨ TENSION STRUT BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).



⑨ CONCRETE BACKUP

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD ELITE M10 SYSTEM AND IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD ELITE M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD ELITE M10 AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE LOCATION AND OR WIDTH OF THE QUADGUARD ELITE M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD ELITE M10, THE QUADGUARD ELITE M10 SHOULD NOT EXTEND FURTHER INTO THE TRAFFIC-SIDE OF THE BARRIER THAN THE OBSTACLE. ANY TRANSITION INSTALLED MUST EITHER BE TANGENT TO BOTH QUADGUARD ELITE M10 AND OBSTACLE OR MUST ANGLE TOWARD FIELD SIDE OF THE BARRIER.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD ELITE M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD ELITE (M10) BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS,OR DEPRESSIONS.
9. THE QUADGUARD ELITE M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD ELITE M10 SYSTEM. THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

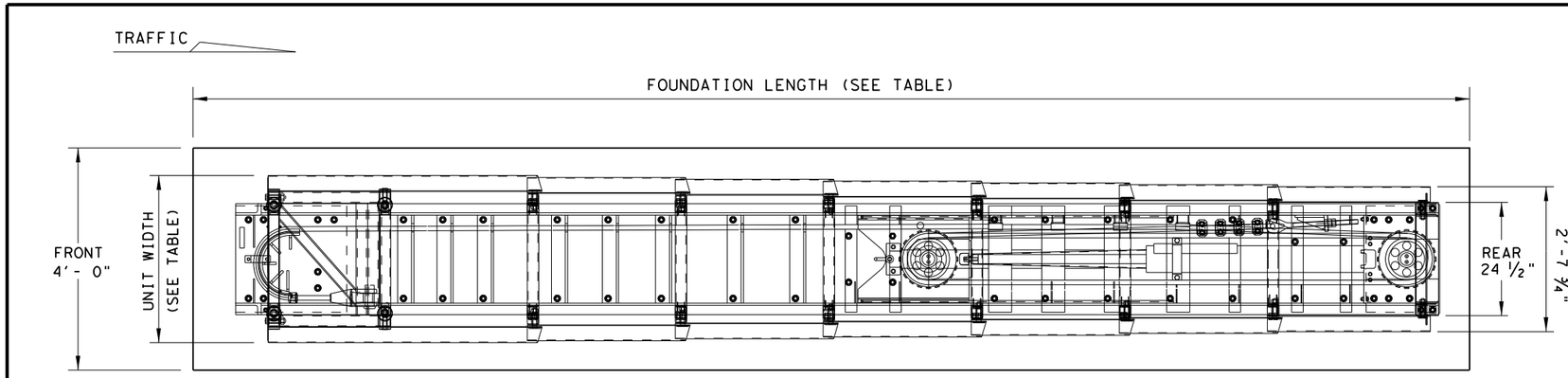
LOW MAINTENANCE

Texas Department of Transportation
Design Division Standard

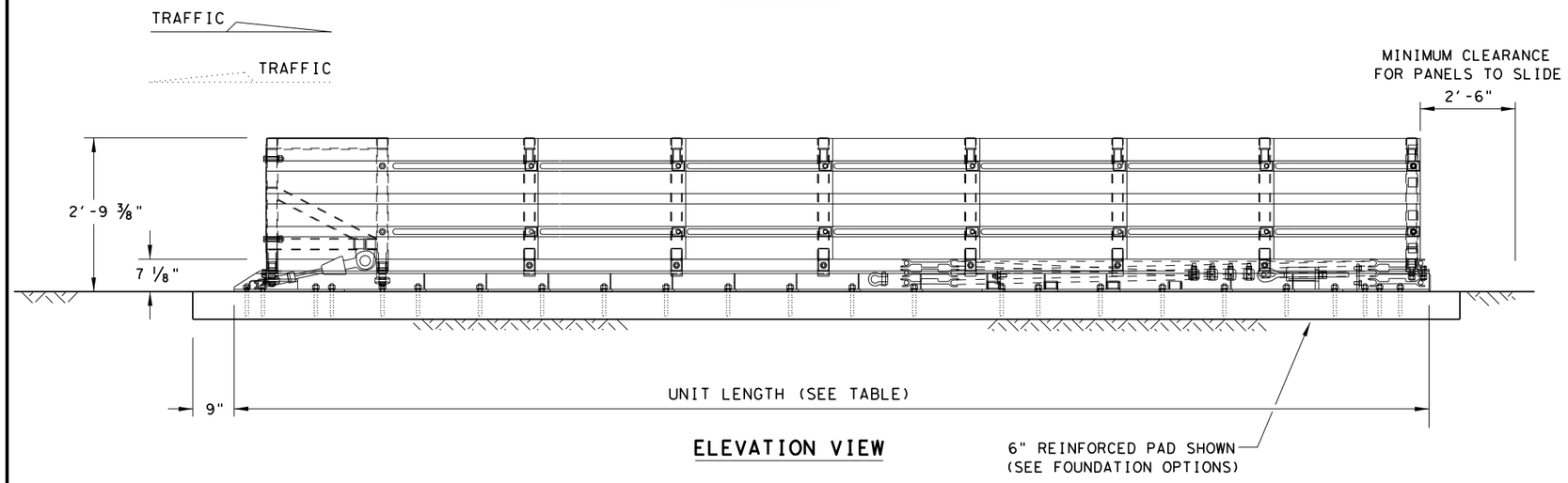
TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		84A



PLAN VIEW



ELEVATION VIEW

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: WORK AREA PROTECTION, CORP. AT (800) 327-4417, OR (630) 377-9100.
2. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION PANELS WILL BE REQUIRED.
3. ADDITIONAL DETAILS FOR THE TRANSITION OPTION AND FOUNDATION OPTION WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
4. CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
5. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE SCI100GM & SCI70GM SYSTEMS SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.

NOTE:
FOR ATTACHMENT AND TRANSITIONS TO OTHER SHAPES, BARRIERS, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. (SEE MANUFACTURER'S PRODUCT MANUAL)

NOTE:
SIDE PANELS CAN TRAVEL 30" BEYOND THE LAST TERMINAL BRACE AT THE REAR OF THE CUSHION. ALL OBJECTS THAT MAY INTERFERE WITH THIS MOTION CAN AFFECT PERFORMANCE OF AND MAY CAUSE UNDUE DAMAGE TO THE CRASH CUSHION.

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13′-6"	2′-10 ⅝"	15′- 6 ¼"	24"to 36"
SCI100GM	TL-3	21′-6"	3′-1 ½"	23′- 0"	24"to 36"

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
8" UNREINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
3" MIN. ASPHALT OVER 3" MIN. CONCRETE (16 ½" ANCHOR EMBED.)
6" ASPHALT OVER 6" COMPACT SUBBASE (16 ½" ANCHOR EMBED.)
8" MINIMUM ASPHALT (16 ½" ANCHOR EMBEDMENT)

FOR STEEL PLACEMENT IN CONCRETE FOUNDATIONS, SEE MANUFACTURER'S PRODUCT MANUAL.

TRANSITION OPTIONS
CONCRETE VERTICAL WALL
CONCRETE TRAFFIC BARRIERS
GUARDRAIL (W-BEAM)
GUARDRAIL (THRIE-BEAM)

TRANSITION TYPES ARE SHOWN ELSEWHERE ON THE PLANS (I.E. ATTENUATOR LOCATION DETAILS OR IN THE GENERAL NOTES).

FOR BI-DIRECTIONAL TRANSITION PANEL AND END SHOE DETAILS, SEE MANUFACTURER'S PRODUCT MANUAL.

Texas Department of Transportation

Design Division Standard

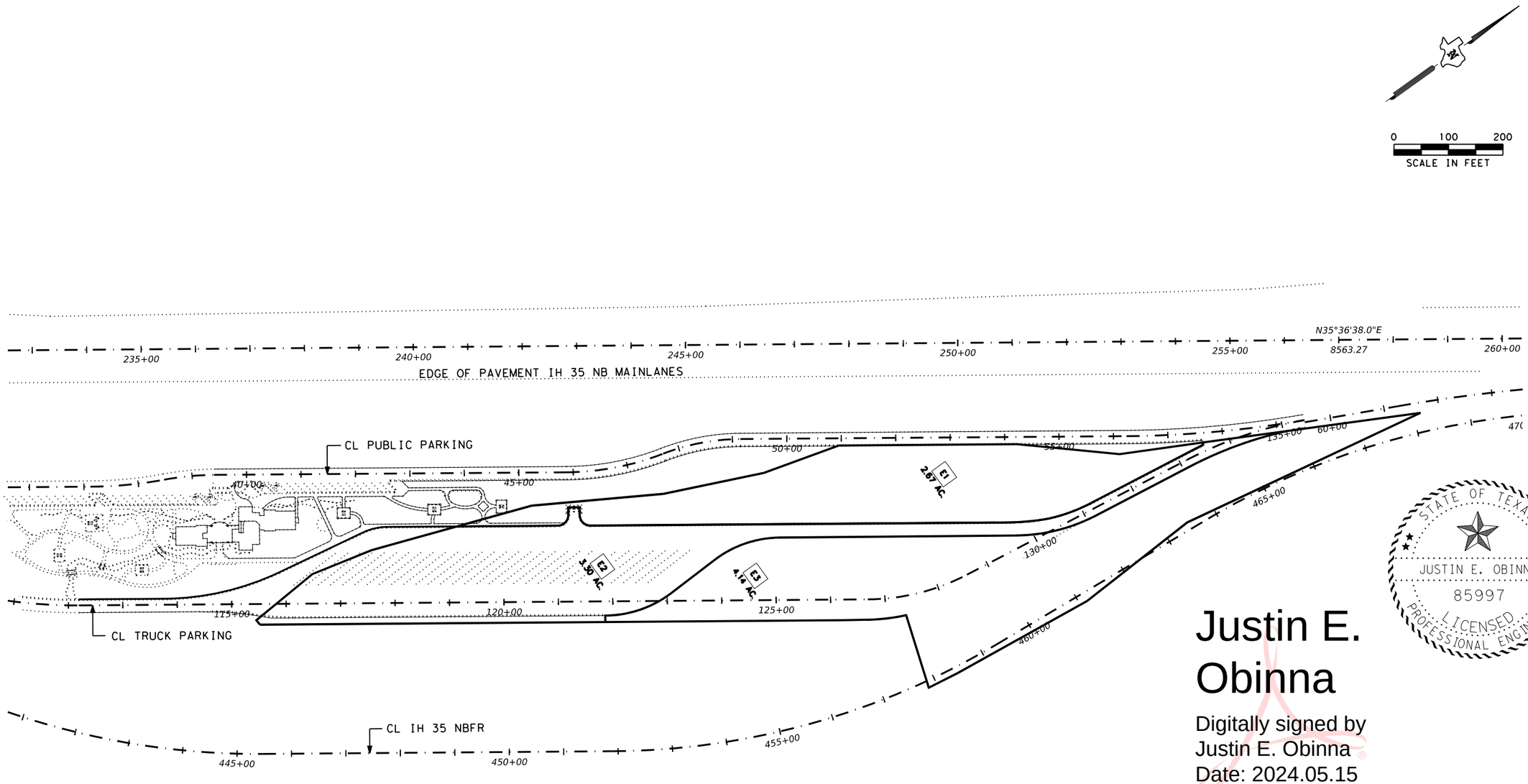
WORK AREA PROTECTION CORP (SMART-NARROW)

SMTC(N)-16

FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
REVISED 06, 2013 (VP) REVISED 03, 2016 (VP)	DIST	COUNTY		SHEET NO.
	WAC	BELL		84B

LOW MAINTENANCE

DATE: $DATE$
FILE: $FILE$



STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.15 13:08:54 -05'00'

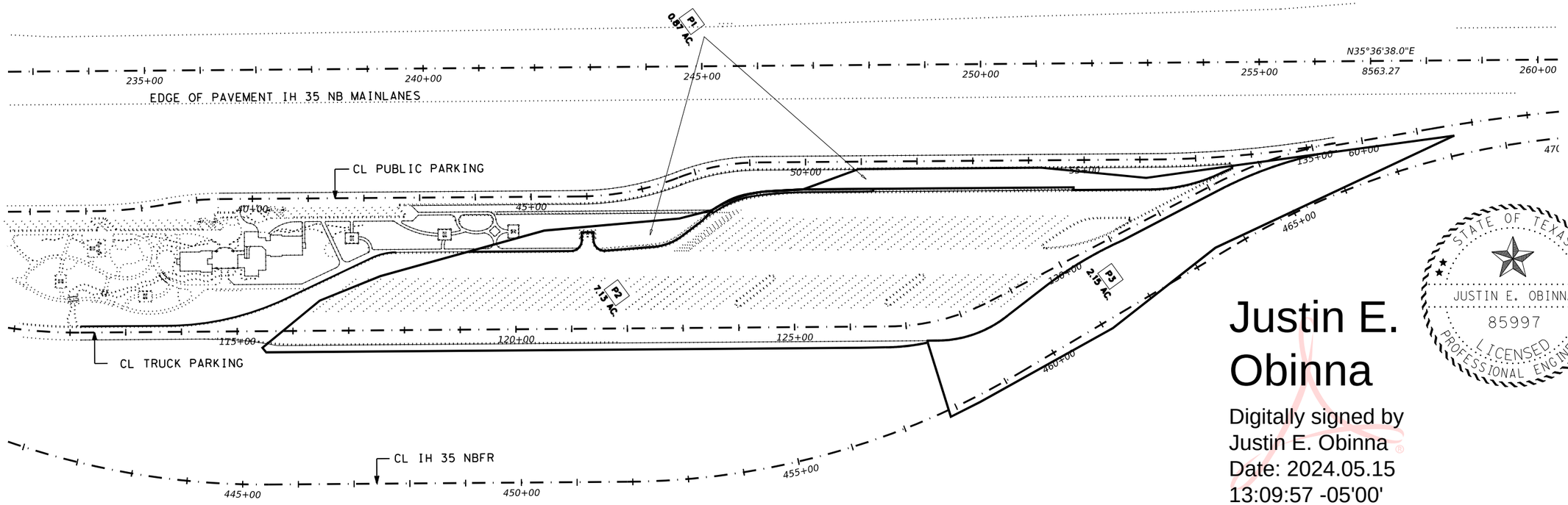
05/15/2024

IH 35
DRAINAGE AREA MAP
NORTHBOUND EXISTING

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		85



Justin E. Obinna

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Date: 2024.05.15 13:09:57 -05'00'

05/15/2024

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

IH 35
DRAINAGE AREA MAP
NORTHBOUND PROPOSED

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		86

Existing Conditions

Peak Discharge Calculations:

Area:						E1			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	2.67	2.67	2.67	2.67	2.67	*Grass, Fair, 0-2%*	2.67	116,330	100.00
C	0.25	0.30	0.34	0.41	0.53				
Tc	14.47	14.47	14.47	14.47	14.47				
I	4.30	6.42	7.89	10.39	13.53				
Q	**2.9**	**5.1**	**7.2**	**11.4**	**19.1**	**Total**	**2.67**	**116,330**	**100**

Area:						E2			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	3.30	3.30	3.30	3.30	3.30	*Asphalt*	3.13	136,332	94.72
C	0.71	0.79	0.84	0.93	0.98	*Grass, Fair, 2-7%*	0.17	7,597	5.28
Tc	10.82	10.82	10.82	10.82	10.82				
I	4.87	7.27	8.94	11.76	15.29				
Q	**11.4**	**18.9**	**24.7**	**36.0**	**49.4**	**Total**	**3.30**	**143,929**	**100**

Area:						E3			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	4.14	4.14	4.14	4.14	4.14	*Grass, Fair, 0-2%*	4.14	180,328	100.00
C	0.25	0.30	0.34	0.41	0.53				
Tc	12.70	12.70	12.70	12.70	12.70				
I	4.56	6.80	8.36	11.00	14.31				
Q	**4.7**	**8.4**	**11.8**	**18.7**	**31.4**	**Total**	**4.14**	**180,328**	**100**

Area:						Total Flows			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	10.11	10.11	10.11	10.11	10.11	*Asphalt*	3.13	136,332	30.94
C	0.40	0.46	0.50	0.58	0.68	*Grass, Fair, 0-2%*	6.81	296,658	67.33
Tc	5.00	5.00	5.00	5.00	5.00	*Grass, Fair, 2-7%*	0.17	7,597	1.72
I	6.27	9.43	11.62	15.32	20.02				
Q	**19.0**	**32.5**	**43.7**	**66.0**	**100.0**	**Total**	**10.11**	**440,587**	**100**

Runoff Coefficent Calculations:

Select Surface Type:	**Input Area (ac)**
1. Grass, Fair, 0-2%	2.67
2.	
3.	
4.	
	2.67

Select Surface Type:	**Input Area (ac)**
1. Asphalt	3.13
2. Grass, Fair, 2-7%	0.17
3.	
4.	
	3.30

Select Surface Type:	**Input Area (ac)**
1. Grass, Fair, 0-2%	4.14
2.	
3.	
4.	
	4.14

Select Surface Type:	**Input Area (ac)**
1. Asphalt	3.13
2. Grass, Fair, 0-2%	6.81
3. Grass, Fair, 2-7%	0.17
4.	
	10.11

Time of Concentration Calculations:

Equation: *0.42(nL)^.7/((P_2)^.5 s^.4)* *L/(60(16.1345)(s^.5))* *L/(60(20.3282)(s^.5))*

	Sheet Flows		**Shallow Concentrated Flow**		**Sum**
			Unpaved	**Paved**	
Length (L)	100		339	36	
Select Surface Type:	Short-grass prairie		*N/A*	*N/A*	
Manning's (n)	0.150				
Change in Elevation (ΔE)	1.00		3.46	0.55	
Slope=ΔE/L	0.0100		0.0102	0.0153	
Tc	11.48		2.75	0.24	**14.47**

	Sheet Flows		**Shallow Concentrated Flow**		**Sum**
			Unpaved	**Paved**	
Length (L)	100		627	377	
Select Surface Type:	Concrete		*N/A*	*N/A*	
Manning's (n)	0.015				
Change in Elevation (ΔE)	1.38		5.60	2.52	
Slope=ΔE/L	0.0138		0.0089	0.0067	
Tc	1.60		5.44	3.78	**10.82**

	Sheet Flows		**Shallow Concentrated Flow**		**Sum**
			Unpaved	**Paved**	
Length (L)	100		1227		
Select Surface Type:	Asphalt		*N/A*	*N/A*	
Manning's (n)	0.016				
Change in Elevation (ΔE)	0.50		12.00	8.68	
Slope=ΔE/L	0.0050		0.0098		
Tc	2.53		10.17		**12.70**

Justin E. Obinna

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Date: 2024.05.15 13:10:54 -05'00'

05/15/2024

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

IH 35
HYDRAULIC DATA SHEET
NORTHBOUND

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		87

Proposed Conditions

Peak Discharge Calculations:

Area:					P1			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	0.87	0.87	0.87	0.87	0.87	*Grass, Good, 0-2%*	0.87	37,746	100.00
C	0.21	0.25	0.29	0.36	0.49				
Tc	5.92	5.92	5.92	5.92	5.92				
I	5.99	8.99	11.07	14.58	19.02				
Q	**1.1**	**1.9**	**2.8**	**4.5**	**8.1**	**Total**	**0.87**	**37,746**	**100**

Area:					P2			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	7.13	7.13	7.13	7.13	7.13	*Asphalt*	6.81	296,511	95.53
C	0.71	0.79	0.84	0.93	0.98	*Grass, Fair, 2-7%*	0.32	13,876	4.47
Tc	10.99	10.99	10.99	10.99	10.99				
I	4.84	7.23	8.88	11.69	15.19				
Q	**24.6**	**40.7**	**53.2**	**77.4**	**106.2**	**Total**	**7.13**	**310,387**	**100**

Area:					P3			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	2.15	2.15	2.15	2.15	2.15	*Grass, Fair, 0-2%*	2.15	93,619	100.00
C	0.25	0.30	0.34	0.41	0.53				
Tc	12.70	12.70	12.70	12.70	12.70				
I	4.56	6.80	8.36	11.00	14.31				
Q	**2.4**	**4.4**	**6.1**	**9.7**	**16.3**	**Total**	**2.15**	**93,619**	**100**

Area:					TOTAL			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	10.14	10.14	10.14	10.14	10.14	*Asphalt*	6.81	296,511	67.12
C	0.57	0.64	0.69	0.77	0.85	*Grass, Fair, 0-2%*	3.02	131,365	29.74
Tc	5.00	5.00	5.00	5.00	5.00	*Grass, Fair, 2-7%*	0.32	13,876	3.14
I	6.27	9.43	11.62	15.32	20.02				
Q	**28.1**	**47.1**	**62.1**	**91.6**	**130.6**	**Total**	**10.14**	**441,752**	**100**

Area:					EX TOTAL			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	10.11	10.11	10.11	10.11	10.11	*Asphalt*	3.13	136,332	30.94
C	0.40	0.46	0.50	0.58	0.68	*Grass, Fair, 0-2%*	6.81	296,658	67.33
Tc	12.70	12.70	12.70	12.70	12.70	*Grass, Fair, 2-7%*	0.17	7,597	1.72
I	4.56	6.80	8.36	11.00	14.31				
Q	**18.4**	**31.6**	**42.5**	**64.4**	**97.9**	**Total**	**10.11**	**440,587**	**100**

Area:					CORRECTED TOTAL			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	10.11	10.11	10.11	10.11	10.11	*Concrete*	6.81	296,803	67.36
C	0.59	0.66	0.70	0.79	0.85	*Grass, Fair, 0-2%*	3.30	143,799	32.64
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**37.2**	**62.7**	**82.7**	**122.0**	**171.5**	**Total**	**10.11**	**440,602**	**100**

Area:					MAX GUTTER FILL			
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	5.13	5.13	5.13	5.13	5.13	*Concrete*	4.78	208,400	93.29
C	0.72	0.79	0.84	0.93	0.97	*Grass, Fair, 0-2%*	0.34	14,985	6.71
Tc	7.20	7.20	7.20	7.20	7.20				
I	5.64	8.45	10.40	13.69	17.82				
Q	**20.7**	**34.4**	**45.0**	**65.4**	**88.5**	**Total**	**5.13**	**223,385**	**100**

Runoff Coefficent Calculations:

	Select Surface Type:	Input Area (ac)
1.	Grass, Good, 0-2%	0.87
2.		
3.		
4.		
		0.87

	Select Surface Type:	Input Area (ac)
1.	Asphalt	6.81
2.	Grass, Fair, 2-7%	0.32
3.		
4.		
		7.13

	Select Surface Type:	Input Area (ac)
1.	Grass, Fair, 0-2%	2.15
2.		
3.		
4.		
		2.15

	Select Surface Type:	Input Area (ac)
1.	Asphalt	6.81
2.	Grass, Fair, 0-2%	3.02
3.	Grass, Fair, 2-7%	0.32
4.		
		10.14

	Select Surface Type:	Input Area (ac)
1.	Asphalt	3.13
2.	Grass, Fair, 0-2%	6.81
3.	Grass, Fair, 2-7%	0.17
4.		
		10.11

	Select Surface Type:	Input Area (ac)
1.	Concrete	6.81
2.	Grass, Fair, 0-2%	3.30
3.		
4.		
		10.11

	Select Surface Type:	Input Area (ac)
1.	Concrete	4.78
2.	Grass, Fair, 0-2%	0.34
3.		
4.		
		5.13

Time of Concentration Calculations:

Equation: *0.42(nL)^(([P])^s^)* *L/(60(16.1345)(s^))* *L/(60(20.3282)(s^))*

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)	100		375		
Select Surface Type:	Concrete		*N/A*	*N/A*	
Manning's (n)	0.015				
Change in Elevation (ΔE)	0.30		4.01	0.55	
Slope=ΔE/L	0.0030		0.0107		
Tc	2.94		2.97		**5.92**

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)	100		84	900	
Select Surface Type:	Concrete		*N/A*	*N/A*	
Manning's (n)	0.015				
Change in Elevation (ΔE)	1.38		2.00	6.12	
Slope=ΔE/L	0.0138		0.0238	0.0068	
Tc	1.60		0.45	8.95	**10.99**

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)	100		1227		
Select Surface Type:	Asphalt		*N/A*	*N/A*	
Manning's (n)	0.016				
Change in Elevation (ΔE)	0.50		12.00		
Slope=ΔE/L	0.0050		0.0098		
Tc	2.53		10.17		**12.70**

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)					
Select Surface Type:			*N/A*	*N/A*	
Manning's (n)					
Change in Elevation (ΔE)					
Slope=ΔE/L					
Tc					

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)	100		1227		
Select Surface Type:	Asphalt		*N/A*	*N/A*	
Manning's (n)	0.016				
Change in Elevation (ΔE)	0.50		12.00		
Slope=ΔE/L	0.0050		0.0098		
Tc	2.53		10.17		**12.70**

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)					
Select Surface Type:			*N/A*	*N/A*	
Manning's (n)					
Change in Elevation (ΔE)					
Slope=ΔE/L					
Tc					

	Sheet Flows		Shallow Concentrated Flow: Unpaved	Shallow Concentrated Flow: Paved	Sum
Length (L)	100				
Select Surface Type:	Concrete		*N/A*	*N/A*	
Manning's (n)	0.015				
Change in Elevation (ΔE)	1.00				
Slope=ΔE/L	0.0100				
Tc	1.82				**7.20**

Justin E. Obinna

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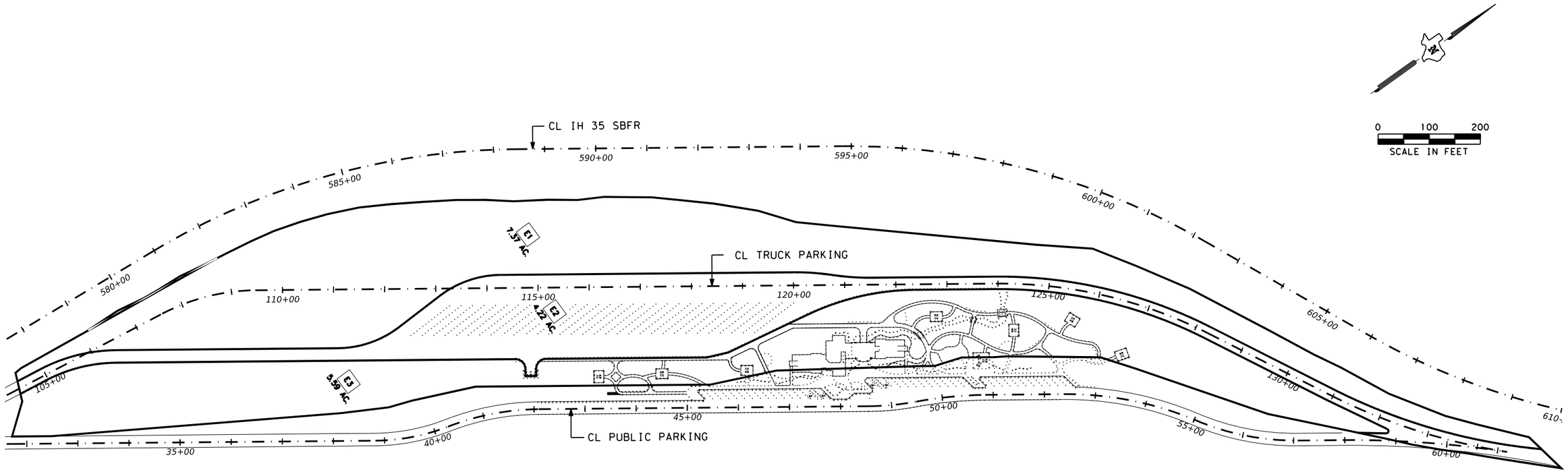
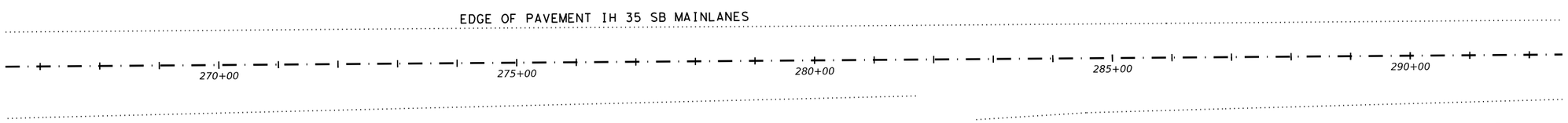
STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

IH 35
HYDRAULIC DATA SHEET
NORTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		88





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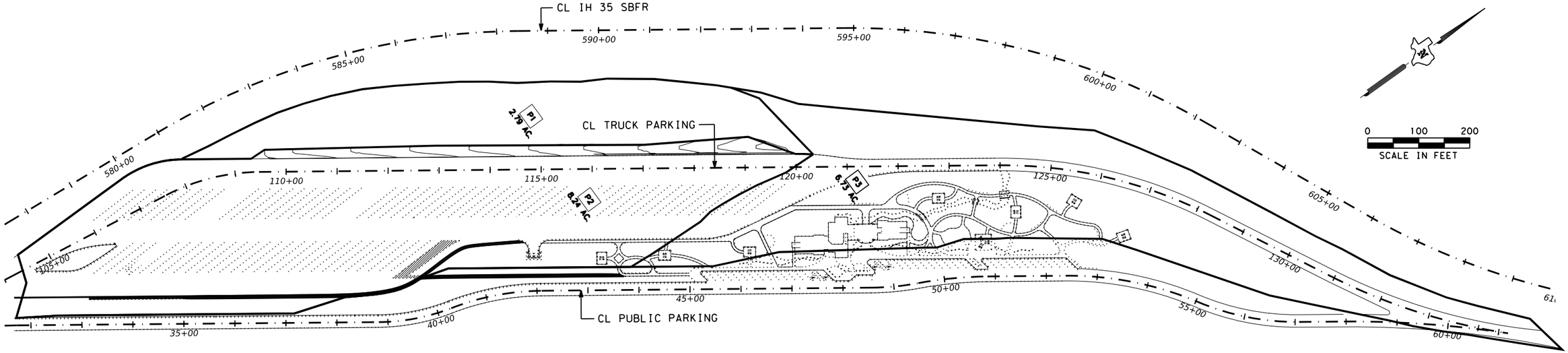
STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

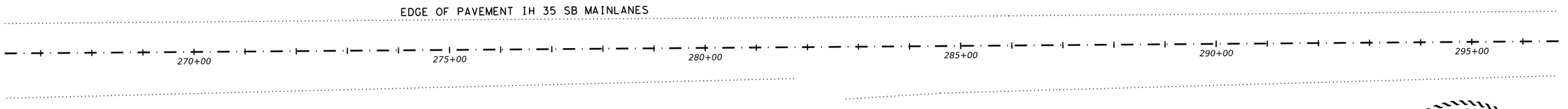
IH 35
DRAINAGE AREA MAP
SOUTHBOUND EXISTING

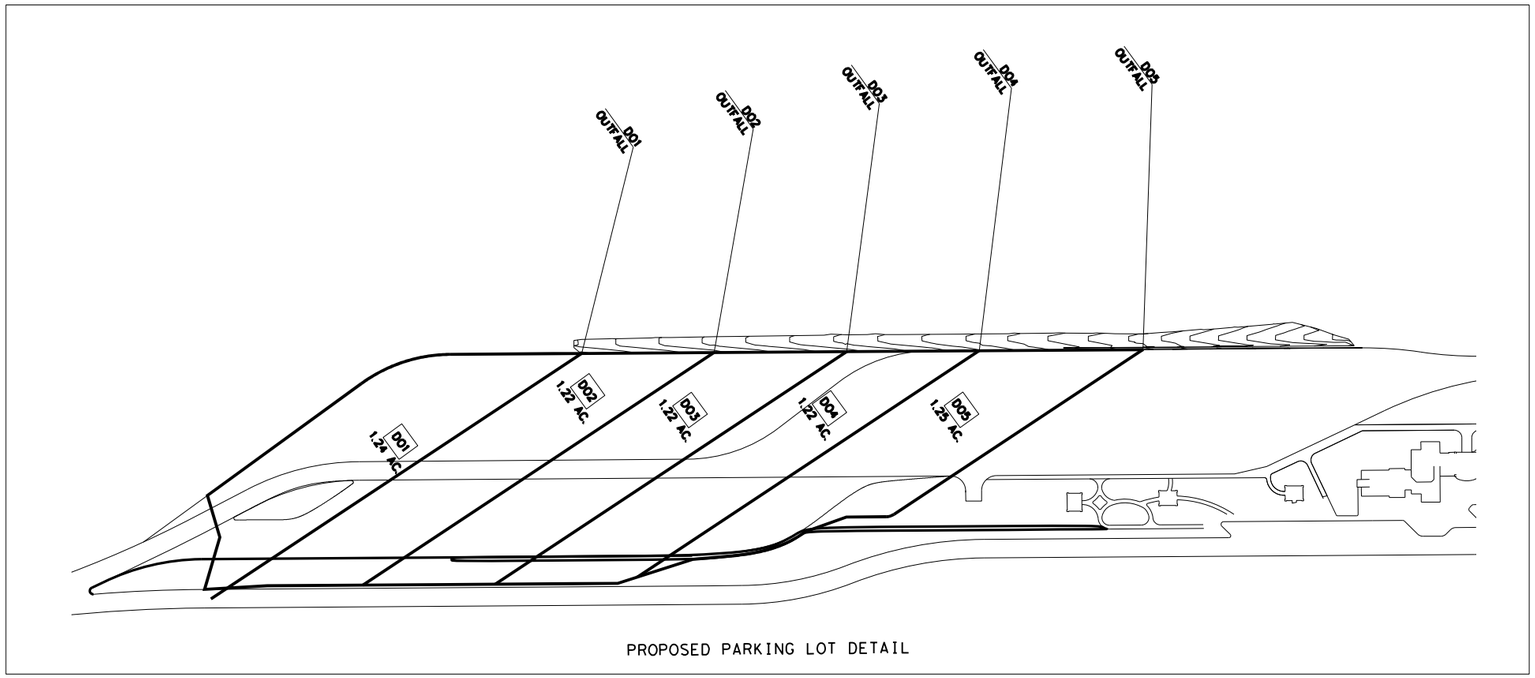
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		89



EDGE OF PAVEMENT IH 35 SB MAINLANES





PROPOSED PARKING LOT DETAIL

Justin E. Obinna

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STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

IH 35
DRAINAGE AREA MAP
SOUTHBOUND PROPOSED

SHEET 2 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		90

Existing Conditions

Peak Discharge Calculations:

Area:	E1								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	7.37	7.37	7.37	7.37	7.37	*Grass, Fair, 0-2%*	7.37	321,200	100.00
C	0.25	0.30	0.34	0.41	0.53				
Tc	20.37	20.37	20.37	20.37	20.37				
I	3.65	5.44	6.71	8.85	11.57				
Q	**6.7**	**12.0**	**16.8**	**26.7**	**45.2**	**Total**	**7.37**	**321,200**	**100**

Area:	E2								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	4.22	4.22	4.22	4.22	4.22	*Concrete*	4.22	183,650	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	11.75	11.75	11.75	11.75	11.75				
I	4.71	7.03	8.64	11.37	14.78				
Q	**14.9**	**24.6**	**32.1**	**46.5**	**62.3**	**Total**	**4.22**	**183,650**	**100**

Area:	E3								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	5.59	5.59	5.59	5.59	5.59	*Grass, Fair, 0-2%*	4.88	212,620	87.31
C	0.31	0.36	0.41	0.48	0.59	*Asphalt*	0.71	30,916	12.69
Tc	11.75	11.75	11.75	11.75	11.75				
I	4.71	7.03	8.64	11.37	14.78				
Q	**8.2**	**14.3**	**19.6**	**30.4**	**48.7**	**Total**	**5.59**	**243,536**	**100**

Area:	Total Flows								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres									
C									
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**29.8**	**51.0**	**68.5**	**103.7**	**156.3**	**Total**			

Runoff Coefficent Calculations:

	Select Surface Type:	Input Area (ac)
1.	Grass, Fair, 0-2%	7.37
2.		
3.		
4.		
		7.37

	Select Surface Type:	Input Area (ac)
1.	Concrete	4.22
2.		
3.		
4.		
		4.22

	Select Surface Type:	Input Area (ac)
1.	Grass, Fair, 0-2%	4.88
2.	Asphalt	0.71
3.		
4.		
		5.59

Time of Concentration Calculations:

Equation: *0.42(nL)^/((P.)^s^)* *L/(60(16.1345)(s^))* *L/(60(20.3282)(s^))* *L/V*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	67					3101	
Select Surface Type	Short-grass prairie		*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)	0.150					0.040	
Change in Elevation (ΔE)	0.30					49.00	
Slope=ΔE/L	0.0045					0.0158	
Tc	11.49					8.88	**20.37**

Channel Flow Parameters		
Pipe Diameter (ft)		
Velocity		*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.821**	*ft/s*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100		591	193		2368	
Select Surface Type			*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)						0.040	
Change in Elevation (ΔE)	0.30		10.72	8.68		31.32	
Slope=ΔE/L	0.0030		0.0181	0.0450		0.0132	
Tc			3.60	0.75		7.41	**11.75**

Channel Flow Parameters		
Pipe Diameter (ft)		
Velocity		*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.3260496**	*ft/s*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100		591	193		2368	
Select Surface Type			*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)						0.040	
Change in Elevation (ΔE)	0.30		10.72	8.68		31.32	
Slope=ΔE/L	0.0030		0.0181	0.0450		0.0132	
Tc			3.60	0.75		7.41	**11.75**

Channel Flow Parameters		
Pipe Diameter (ft)		
Velocity		*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.3260496**	*ft/s*

Proposed Conditions

Peak Discharge Calculations:

Area:	P1								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	2.79	2.79	2.79	2.79	2.79	*Grass, Good, 2-7%*	2.79	121,636	100.00
C	0.29	0.35	0.39	0.46	0.56				
Tc	20.37	20.37	20.37	20.37	20.37				
I	3.65	5.44	6.71	8.85	11.57				
Q	**3.0**	**5.3**	**7.3**	**11.4**	**18.1**	**Total**	**2.79**	**121,636**	**100**

Area:	P2								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	8.24	8.24	8.24	8.24	8.24	*Concrete*	7.29	317,379	88.45
C	0.69	0.76	0.81	0.90	0.94	*Grass, Good, 0-2%*	0.95	41,428	11.55
Tc	11.75	11.75	11.75	11.75	11.75				
I	4.71	7.03	8.64	11.37	14.78				
Q	**26.7**	**44.2**	**57.8**	**84.2**	**114.6**	**Total**	**8.24**	**358,807**	**100**

Area:	P3								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	6.73	6.73	6.73	6.73	6.73	*Concrete*	0.77	33,531	11.43
C	0.31	0.36	0.40	0.47	0.58	*Grass, Fair, 0-2%*	5.96	259,826	88.57
Tc	11.75	11.75	11.75	11.75	11.75				
I	4.71	7.03	8.64	11.37	14.78				
Q	**9.7**	**17.1**	**23.4**	**36.3**	**58.1**	**Total**	**6.73**	**293,357**	**100**

Runoff Coefficent Calculations:

	Select Surface Type:	Input Area (ac)
1.	Grass, Good, 2-7%	2.79
2.		
3.		
4.		
		2.79

	Select Surface Type:	Input Area (ac)
1.	Concrete	7.29
2.	Grass, Good, 0-2%	0.95
3.		
4.		
		8.24

	Select Surface Type:	Input Area (ac)
1.	Concrete	0.77
2.	Grass, Fair, 0-2%	5.96
3.		
4.		
		6.73

Time of Concentration Calculations:

Equation: *0.42(nL)^/((P.)^s^)* *L/(60(16.1345)(s^))* *L/(60(20.3282)(s^))* *L/V*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	67					3101	
Select Surface Type	Short-grass prairie		*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)	0.150					0.040	
Change in Elevation (ΔE)	0.30					49.00	
Slope=ΔE/L	0.0045					0.0158	
Tc	11.49					8.88	**20.37**

Channel Flow Parameters		
Pipe Diameter (ft)	0.5	
Velocity	**#DIV/0!**	*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.821**	*ft/s*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100		591	193		2368	
Select Surface Type			*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)						0.040	
Change in Elevation (ΔE)	0.30		10.72	8.68		31.32	
Slope=ΔE/L	0.0030		0.0181	0.0450		0.0132	
Tc			3.60	0.75		7.41	**11.75**

Channel Flow Parameters		
Pipe Diameter (ft)		
Velocity		*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.3260496**	*ft/s*

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100		591	193		2368	
Select Surface Type			*N/A*	*N/A*		Grass, Bermuda	
Manning's (n)						0.040	
Change in Elevation (ΔE)	0.30		10.72	8.68		31.32	
Slope=ΔE/L	0.0030		0.0181	0.0450		0.0132	
Tc			3.60	0.75		7.41	**11.75**

Channel Flow Parameters		
Pipe Diameter (ft)		
Velocity		*ft/s*
Channel Area (sf)	102.000	
Channel Perimeter (ft)	73.70	
Velocity	**5.3260496**	*ft/s*

Justin E. Obinna

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Date: 2024.05.15 13:15:43 -05'00'

05/15/2024

STATE OF TEXAS
JUSTIN E. OBINNA
85997
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PROFESSIONAL ENGINEER

IH 35
HYDRAULIC DATA SHEET
SOUTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		91

Proposed Conditions

Peak Discharge Calculations:

Area:	DO1								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.24	1.24	1.24	1.24	1.24	*Concrete*	1.24	53,915	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.8**	**9.7**	**12.7**	**18.4**	**24.8**	**Total**	**1.24**	**53,915**	**100**

Area:	DO2								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.22	1.22	1.22	1.22	1.22	*Concrete*	1.22	53,231	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.7**	**9.6**	**12.5**	**18.2**	**24.5**	**Total**	**1.22**	**53,231**	**100**

Area:	DO3								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.22	1.22	1.22	1.22	1.22	*Concrete*	1.22	53,161	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.7**	**9.6**	**12.5**	**18.1**	**24.4**	**Total**	**1.22**	**53,161**	**100**

Area:	DO4								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.22	1.22	1.22	1.22	1.22	*Concrete*	1.22	53,112	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.7**	**9.5**	**12.5**	**18.1**	**24.4**	**Total**	**1.22**	**53,112**	**100**

Area:	DO5								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.25	1.25	1.25	1.25	1.25	*Concrete*	1.25	54,410	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.9**	**9.8**	**12.8**	**18.6**	**25.0**	**Total**	**1.25**	**54,410**	**100**

Area:	DO6								
Event	**2-yr**	**10-yr**	**25-yr**	**100-yr**	**500-yr**	**Surface**	**Acres**	**SF**	**%**
Acres	1.24	1.24	1.24	1.24	1.24	*Concrete*	1.24	54,129	100.00
C	0.75	0.83	0.88	0.97	1.00				
Tc	5.00	5.00	5.00	5.00	5.00				
I	6.27	9.43	11.62	15.32	20.02				
Q	**5.8**	**9.7**	**12.7**	**18.5**	**24.9**	**Total**	**1.24**	**54,129**	**100**

Runoff Coefficent Calculations:

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.24
2.		
3.		
4.		
		1.24

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.22
2.		
3.		
4.		
		1.22

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.22
2.		
3.		
4.		
		1.22

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.22
2.		
3.		
4.		
		1.22

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.25
2.		
3.		
4.		
		1.25

	Select Surface Type:	Input Area (ac)
1.	Concrete	1.24
2.		
3.		
4.		
		1.24

Time of Concentration Calculations:

Equation: *0.42(nL)^/((P)^s^)* *L/(60(16.1345(s^)))* *L/(60(20.3282(s^)))* *L/V*

DO1

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			435		63	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			7.83		1.13	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			2.66		0.18	**4.28**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.852**	ft/s

DO2

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			486		175	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			8.75		3.15	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			2.97		0.50	**4.91**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.8516317**	ft/s

DO3

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			456		175	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			8.21		3.15	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			2.79		0.50	**4.72**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.8516317**	ft/s

DO4

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			456		175	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			8.21		3.15	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			2.79		0.50	**4.72**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.8516317**	ft/s

DO5

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			442		216	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			7.96		3.89	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			2.70		0.62	**4.75**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.8516317**	ft/s

DO6

	Sheet Flows		Shallow Concentrated Flow		Channel Flow		Sum
			Unpaved	Paved	Pipe Flow	Open Channel	
Length (L)	100			300		247	
Select Surface Type:	Concrete		*N/A*	*N/A*		Concrete, Smooth	
Manning's (n)	0.015					0.013	
Change in Elevation (yþ)	1.80			5.40		4.45	
Slope=ΔE/L	0.0180			0.0180		0.0180	
Tc	1.44			1.83		0.70	**3.97**

Channel Flow Parameters		
Pipe Diameter (ft):		
Velocity:		ft/s
Channel Area (sf):	3.750	
Channel Perimeter (ft):	15.86	
Velocity:	**5.8516317**	ft/s

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.15 13:16:43 -05'00'

05/15/2024

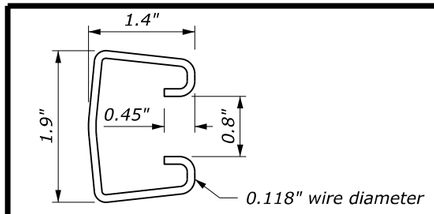
STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

IH 35
HYDRAULIC DATA SHEET
SOUTHBOUND

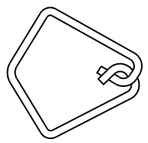
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		92

STATE	PROJECT	SHEET NUMBER
TX	0015-07-087	96



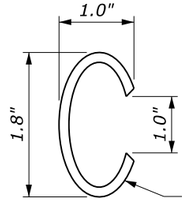
BEFORE CLOSURE



AFTER CLOSURE

NOTE:
All dimensions
are nominal

INTERLOCKING WIRE FASTENER



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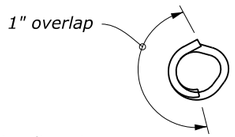
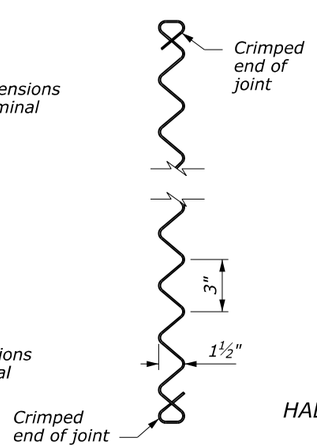


AFTER CLOSURE

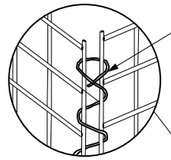
NOTE:
All dimensions
are nominal

OVERLAPPING RING WIRE FASTENER
(Not allowed for basket to basket connection)

ALTERNATE TYING FASTENERS

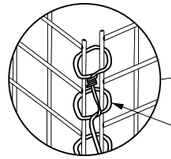


0.150" DIAMETER SPIRAL BINDER

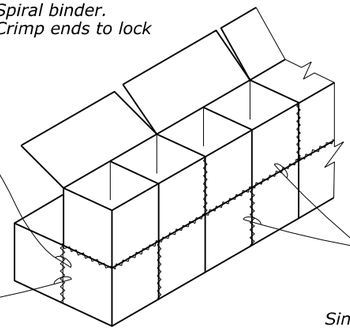


Spiral binder.
Crimp ends to lock

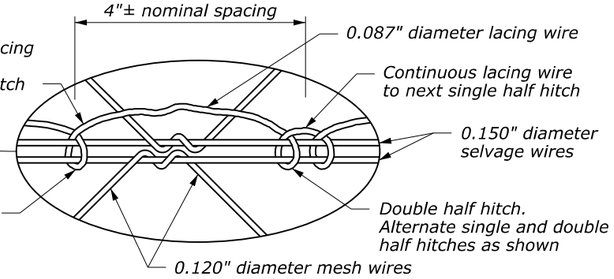
SPIRAL BINDER TIE
(Welded wire mesh)



Lacing wire. Tie with half
hitch loops at 3" spacing

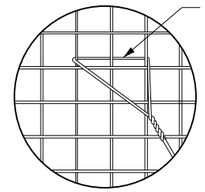


HALF HITCH LACING DETAIL
(Welded wire mesh)

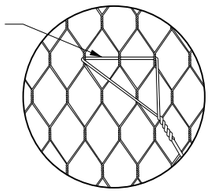


HALF HITCH LACING DETAIL
(Twisted wire mesh)

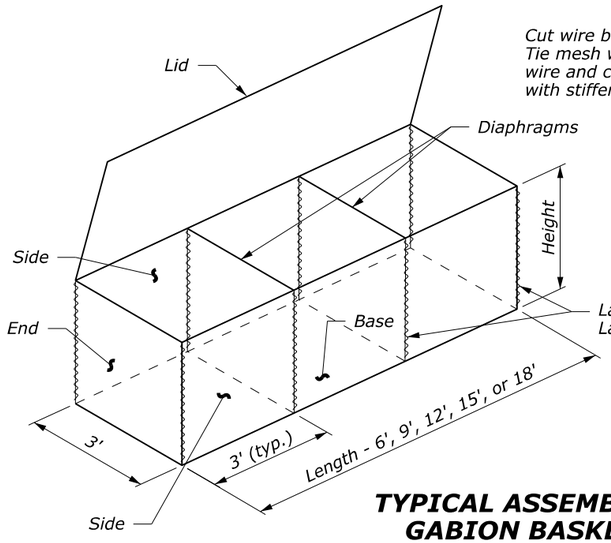
TYPICAL INSTALLATION GABION BASKETS



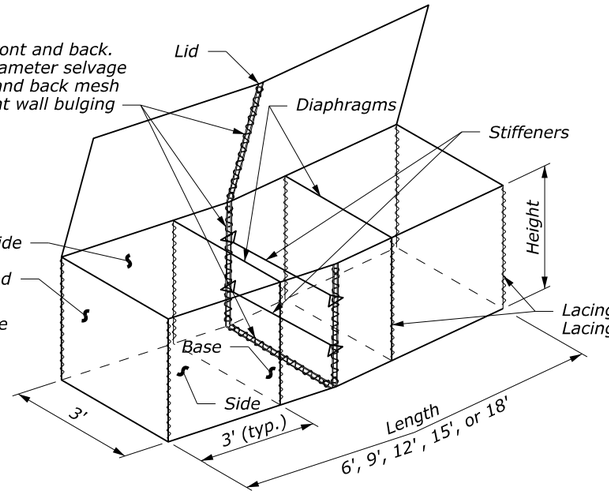
WELDED WIRE MESH



TWISTED WIRE MESH



TYPICAL ASSEMBLED GABION BASKET



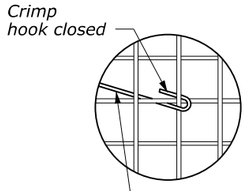
ASSEMBLED GABION BASKET IN WALL GRADE TRANSITION AREAS

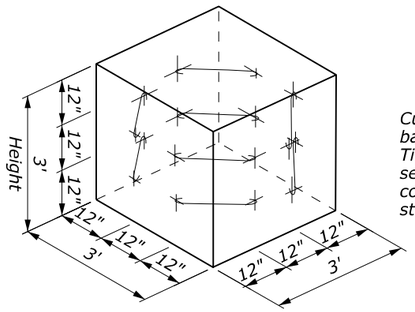
ALL END GABION CELLS

ALL INTERIOR GABION CELLS

TYPICAL STIFFENERS

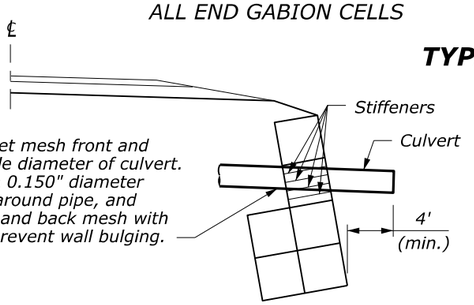
GABION BASKET NOMINAL SIZES AND CAPACITY				
Size Code Letter	Size in feet		Diaphragm Partitions	Capacity (CUYD)
	Length	Height		
A	6	3.0	1	2.00
B	9	3.0	2	3.00
C	12	3.0	3	4.00
X	15	3.0	4	5.00
Y	18	3.0	5	6.00
D	6	1.5	1	1.00
E	9	1.5	2	1.50
F	12	1.5	3	2.00
G	6	1.0	1	0.67
H	9	1.0	2	1.00
I	12	1.0	3	1.33





ALL GABION CELLS

OPTIONAL STIFFENERS WELDED WIRE GABION BASKET



Cut wire basket mesh front and
back to outside diameter of culvert.
Tie mesh with 0.150" diameter
selvage wire around pipe, and
connect front and back mesh with
stiffeners to prevent wall bulging.

TYPICAL CULVERT INSTALLATION

THROUGH GABION WALL

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

GABION BASKET

DETAIL APPROVED FOR USE --/----

REVISED:

DRAFT: 9/2011

DETAIL
W253-1

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LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER AND MODEL NUMBER	VOLTAGE	LAMPS	REMARKS
QF	HYDREL 4750L-4FT-400LMF-40K-MVOLT-MFL-KM -NJB-ZT-BL	277	LED FURNISHED 16.88(W/FT), 40K 0.24 AMPS	REPLACE EXISTING LIGHT WIHT A 4 FT LED LINEAR FLOOD LIGHT 400 LUMENS/ LINEAR FOOT FOR A TOTAL 1800 LUMEN OUTPUT. FIXTURE SHALL INCLUDE KNUCKLE MOUNTS AND INTEGRAL J-BOX. BLACK TEXTURED FINISH; ADJUSTABLE KNUCKLE REWORK EXISTING CONDUCTORS AND CONDUIT AND PULL BOXES TO LAYOUT FIXTURES AND ADJUST FIELD AIMING TO EVENLY ILLUMINATE THE ENTRY SIGN. FIXTURE SHALL HAVE AN INTEGRAL DRIVER AND JUNCTION BOX FOR WIRE SPLICING.
R	LITHONIA DSXF2 LED P1-40K-70CRI-NSP-MVOLT-HS-UBV-VG-DDRXD	277	LED FURNISHED 64 (W), 40K 0.23 AMPS	REPLACE EXISTING IN GRADE LIGHT WITH FLOODLIGHT WITH ADJUSTABLE SLIPFITTER 2-3/8" TENON. FIXTURE SHALL HAVE AN INTEGRAL DRIVER. PROVIDE IN-GRADE QUAZITE PG SERIES PULL BOX AND REWORK EXISTING CONDUIT AND CONDUCTORS AS REQUIRED. ADJUST FIXTURES LOCATIONS AND ORIENTATION TO LIGHT FLAG. PROVIDE A 2" RGS CONDUIT FROM PULL BOX TO EXTEND RACEWAY AND CIRCUIT TO NEW FIXTURE.
SB	4 QTY - LITHONIA RSX3-LED-P4-40K-R5-480-RPA-BS-DDBXD WILL BRANDS SINGLE ROUND POLE: VA-RTAA-30'-1060-D-AB- FP-DB-D4	480	LED FURNISHED 312 (W), 40K 0.64 AMPS/Each	PROVIDE NEW FOUR QUANTITY FULL CUT OFF AREA LUMINAIRE WITH UNIVERSAL MOUNTING MECHANISM MOUNTED AND A NEW SINGLE 30 FOOT ROUND ALUMINUM TAPERED POLE PRE-DRILLED WITH 4 AT 90 DEGREE DRILLED MOUNTING HOLES. PROVIDE BIRD DETERRENT SPIKES, ANCHOR BOLTS AND FULL BASE COVER.
SC	LITHONIA RSX3-LED-P4-40K-R4-480-RPA-BS-DDBXD WILL BRANDS SINGLE ROUND POLE: VA-RTAA-30'-1060-C-AB- FP-DB-D1 **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 312 (W), 40K 0.64 AMPS	PROVIDE NEW FULL CUT OFF AREA LUMINAIRE WITH UNIVERSAL MOUNTING MECHANISM MOUNTED AND NEW SINGLE ROUND ALUMINUM POLE PREDRILLED WITH 1 AT 90 DEGREE DRILLED MOUNTING HOLES. PROVIDE BIRD DETERRENT SPIKES AND FULL BASE COVER. PROVIDE FACTORY APPLIED CUSTUM ANCHOR BASE TO MATCH EXISTING ANCHOR BOLTS, CONTRACTOR SHALL FIELD VERIFY PRIOR TO SUBMITTALS.
SF	LITHONIA RSX3-LED-P4-40K-R4-480-RPA-BS-DDBXD WILL BRANDS SINGLE ROUND POLE: VA-RTAA-30'-1060-C-AB- FP-DB-D1 **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 312 (W), 40K 0.64 AMPS	PROVIDE NEW FULL CUT OFF AREA LUMINAIRE WITH UNIVERSAL MOUNTING MECHANISM MOUNTED AND NEW SINGLE ROUND ALUMINUM POLE PREDRILLED WITH 1 AT 90 DEGREE DRILLED MOUNTING HOLES. PROVIDE BIRD DETERRENT SPIKES AND FULL BASE COVER. PROVIDE FACTORY APPLIED CUSTUM ANCHOR BASE TO MATCH EXISTING ANCHOR BOLTS, CONTRACTOR SHALL FIELD VERIFY PRIOR TO SUBMITTALS.
SL	LITHONIA RSX2-LED-P4-40K-R2-480-RPA- BS-DDBXD WILL BRANDS SINGLE ROUND POLE: VA-RTAA-30'-1060-C-AB- FP-DB-D1 **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 187 (W), 40K 0.38 AMPS	PROVIDE NEW FULL CUT OFF AREA LUMINAIRE WITH UNIVERSAL MOUNTING MECHANISM MOUNTED AND NEW SINGLE ROUND ALUMINUM POLE PREDRILLED WITH 1 AT 90 DEGREE DRILLED MOUNTING HOLES. PROVIDE BIRD DETERRENT SPIKES AND FULL BASE COVER. PROVIDE FACTORY APPLIED CUSTUM ANCHOR BASE TO MATCH EXISTING ANCHOR BOLTS, CONTRACTOR SHALL FIELD VERIFY PRIOR TO SUBMITTALS.
SR	LITHONIA RSX3-LED-P4-40K-R4-480-RPA-BS-DDBXD WILL BRANDS SINGLE ROUND POLE: VA-RTAA-30'-1060-C-AB- FP-DB-D1 **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 312 (W), 40K 0.64 AMPS	PROVIDE NEW FULL CUT OFF AREA LUMINAIRE WITH UNIVERSAL MOUNTING MECHANISM MOUNTED AND NEW SINGLE ROUND ALUMINUM POLE PREDRILLED WITH 1 AT 90 DEGREE DRILLED MOUNTING HOLES. PROVIDE BIRD DETERRENT SPIKES AND FULL BASE COVER. PROVIDE FACTORY APPLIED CUSTUM ANCHOR BASE TO MATCH EXISTING ANCHOR BOLTS, CONTRACTOR SHALL FIELD VERIFY PRIOR TO SUBMITTALS.
T	LUMENPULSE PUR100V-480-CSL-L170-40K-CR170-5S-BRZ-TN4 LUMENPULSE SINGLE ROUND POLE: PL-M-4-AL-R-16-M-Q6-BRZ-QB6-AB **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 146 (W), 40K 0,304 AMPS	REPLACE EXISTING DECORATIVE FIXTURE AND POLE WITH NEW FULL CUT LUMINAIRE. REUSE EXISTING 16 FOOT POLE WITH TOP-MOUNT TENON: MOUNT NEW FIXTURE TO NEW POLE. CONTRACTOR SHALL VERIFY EXISTING POLE BOLT HOLE PATTERNS PRIOR TO ORDERING FIXTURE, CONTRACTOR SHALL MATCH EXISTING BOLT HOLE PATTERNS.
U	LUMENPULSE PUR100V-480-CSL-M110-40K-CR170-5S-BRZ-TN4 LUMENPULSE SINGLE ROUND POLE: PL-M-4-AL-R-10-M-Q6-BRZ-QB6-AB **CONTRACTOR SHALL FIELD VERIFY EXISTING BOLT HOLE PATTERNS AND PROVIDE A ANCHOR BASE PROVIDED BY THE MANUFACTURED TO MATCH EXISTING BOLT HOLE PATTERNS	480	LED FURNISHED 92 (W), 40K 0.192 AMPS	REPLACE EXISTING DECORATIVE FIXTURE AND POLE WITH NEW FULL CUT LUMINAIRE. REUSE EXISTING 10 FOOT POLE WITH TOP-MOUNT TENON: MOUNT NEW FIXTURE TO NEW POLE. CONTRACTOR SHALL VERIFY EXISTING POLE BOLT HOLE PATTERNS PRIOR TO ORDERING FIXTURE, CONTRACTOR SHALL MATCH EXISTING BOLT HOLE PATTERNS.
W	RLM CLASSICS OFFERED BY SPECTRUM LIGHTING ED2015GV-37L-40K-EX-TF2-TG2-PMXX-MWH-MB-WLKA	277	LED FURNISHED 92 (W), 40K 0.192 AMPS	REPLACE EXISTING PENDENT MOUNT FIXTURE WITH NEW EXPANDED DOME WET LISTED LUMINAIRE. FIELD ADJUST PENDENT MOUNT TO MATCH EXISTING ELEVATIONS. PROVIDE WIRE GUARD.

APPROXIMATE QUANTITIES AND UNITS: (INCLUDES THE SOUTHBOUND AND NORTHBOUND SITE)

NOTE TO CONTRACTOR: ILLUMINATION SHEETS ARE BASED ON LUMP SUM FOR ILLUMINATION NB & SB SHEETS "A" THOUGH "D" QUANTITIES LISTED ARE APPROXIMATE, FOR CONTRACTOR INFORMATION ONLY. COMPENSATION FOR THESE ITEMS IS SUBSIDIARY TO BID ITEM 7204-6001.

FIELD LOCATE EXISTING 2- 4" COMMUNICATION CONDUITS AND SIX BRANCH CIRCUITS TO INTERSECT AND EXTEND LIGHTING AND CAMERA CIRCUITS.

REWORK TWO EXISTING CIRCUITS FOR 4 EACH IN-GROUND FLAG LIGHTS CONVERT RACEWAY AND FIXTURES TO 2-3/8" TENON MOUNT ABOVE GRADE FIXTURES- 2" CONDUIT PLASTI-BOND 40 LINEAR FEET.

NEW LIGHT POLE FOUNDATIONS, SEE DETAIL#2 = 32 EACH
GROUND RODS 3/4" X 10 FOOT LONG COPPER CLAD WITH EXOTHERMIC WELDS = 32 EACH

DEMO AND REPLACE LIGHT FIXTURES AND POLES BASED ON TYPE PER LIGHTING FIXTURE SCHEDULE
QF = 6 EACH
R = 4 EACH
SB = 16 EACH
SC = 28 EACH
SF = 16 EACH
SL = 29 EACH
SR = 10 EACH
T = 38 EACH
U = 30 EACH
W = 20 EACH

CAMERA ENCLOSURE CABINETS, SEE DETAIL#5 = 12 EACH

REMOVE AND REINSTALL ALL EXISTING CAMERAS ON REPLACEMENT POLES = 14 EACH

ITEMS CALLED OUT BELOW, SEE SITE PLANS, KEYED NOTES AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
PULL BOXES MANUFACTURED BY QUAZITE PG SERIES,TIER 22 - 12X12X12 = 30 EACH
PULL BOXES MANUFACTURED BY QUAZITE PG SERIES,TIER 22 - 11X18X18 = 26 EACH
PULL BOXES MANUFACTURED BY QUAZITE PG SERIES,TIER 22 - 24X36X36 = 6 EACH

#4 AWG COPPER TYPE THHN/THWN-2 CONDUCTORS CAMERA = 18,000LINEAR FEET
#6 AWG COPPER TYPE THHN/THWN-2 CONDUCTORS LIGHTS = 30,000 LINEAR FEET
#2 AWG BARE COPPER WIRE IN TRENCH = 28,400 LINEAR FEET
#12 AWG COPPER TYPE THHN/THWN-2 CONDUCTORS FLAG LIGHTS = 120 LINEAR FEET
DETECTABLE CAUTION TAPE IN TOP PORTION OF TRENCH = 28,400 LINEAR FEET

SAW CUT AND REPAIR EXISTING PAVEMENT FOR 5-2" CONDUITS = 100 LINEAR FEET

2" UNDERGROUND PVC SCHEDULE 40 CONDUIT FIBER = 15,600 LINEAR FEET
1" UNDERGROUND PVC SCHEDULE 40 CONDUIT FIBER = 800 LINEAR FEET
1" UNDERGROUND PVC SCHEDULE 40 CONDUIT CAMERA CIRCUIT = 6,000 LINEAR FEET
1" UNDERGROUND PVC SCHEDULE 40 CONDUIT LIGHT CIRCUIT = 6,000 LINEAR FEET

1" LIQUID TIGHT FLEXIBLE CONDUIT CAMERA FOR POWER 200 LINEAR FEET
1" LIQUID TIGHT FLEXIBLE CONDUIT CAMERA FOR FIBER 200 LINEAR FEET

RACK MOUNTED FIBER PATCH PANEL WITH MOUNTING HARDWARE

TEST RESULTS FOR ALL FIBER PULLED

FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SC58 = 3,400 LINEAR FEET
FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SB33 = 3,000 LINEAR FEET
FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SC53 = 2,400 LINEAR FEET
FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SC29 = 3,400 LINEAR FEET
FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SC35 = 3,000 LINEAR FEET
FIBER CABLE: OPTIC-CORE NON-METALLIC 6-PAIR INDOOR/OUTDOOR RATED, SINGLE-MODE CABLE PULLED IN CONDUIT TO FIXTURE SC32 = 2,400 LINEAR FEET

GENERAL NOTES APPLIES TO ALL ILLUMINATION SHEETS

1. NOTE THAT CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC BY THEIR NATURE, AND ARE NOT INTENDED TO SHOW EVERY CONNECTION IN DETAIL OR EVERY PIPE OR CONDUIT IN ITS EXACT LOCATION. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY COMPONENTS AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL SYSTEM. THE CONTRACTOR SHALL COORDINATE THE VARIOUS TRADES IN ORDER TO AVOID INTERFERENCE BETWEEN THE VARIOUS SEGMENTS OF THE PROJECT.
2. CONTRACTOR SHALL COORDINATE THE FINAL ACTUAL LOCATIONS IN THE FIELD WITH THE TEXAS DEPARTMENT OF TRANSPORTATION OWNER REPRESENTATIVE. THE FINAL LOCATIONS SHALL BE DETERMINED IN THE FIELD PRIOR TO COMMENCING WORK, FIELD VERIFY ALL DIMENSIONS PRIOR TO BID. NO ADDITIONAL COMPENSATION WILL BE GIVEN OR CONSIDERED FOR REASONABLE CHANGES IN THE FINAL LOCATIONS. CONTRACTOR SHALL CALL TEXAS 811 AND FIELD IDENTIFY ALL UNDERGROUND UTILITIES. ALL LISTED ITEMS BELOW SHALL BE PROTECTED OR REPAIRED TO MATCH EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

2.1. WATERLINES, IRRIGATION WATER LINES, DRIP IRRIGATION SYSTEM AND IRRIGATION ELECTRICAL CONTROLS, VALVES, ELECTRICAL CONDUITS, UNDERGROUND COMMUNICATIONS, SANITARY WASTE PIPING, LANDSCAPING WEED CONTROL BARRIER FABRICS, LANDSCAPING MULCH, LANDSCAPING GRAVEL ROCK, LANDSCAPING EDGING AND VEGETATION PLANTS, BUILDING FINISHES.

2.2. THE CONTRACTOR SHALL REPAIR ALL DAMAGED CAUSED BY THE CONTRACTOR AND MAKE GOOD AND REPAIR AND/OR REPLACE TO MATCH PRIOR CONDITIONS AT THE CONTRACTORS EXPENSE. CONTRACTOR IS NOT RESPONSIBLE TO REPAIR DISTURBED GRASS. ALL WORK SHALL BE PERFORMED IN A NEAT AND ORDERLY AND PROFESSIONAL MANNER. DO NOT DISTURB EXISTING CONCRETE SIDEWALKS AND CONCRETE CURBING TO REMAIN, BORE UNDER THE SIDE WALK AND CONCRETE CURBS. CONTRACTOR HAS THE OPTION TO PROVIDE DIRECTIONAL BORING OR TRENCHING.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED OSHA SAFETY STANDARDS DURING CONSTRUCTION INCLUDING TRENCHING. CONTRACTOR SHALL PROVIDE SIGNS AND PEDESTRIAN BARRIER CONTROL DEVICES DURING THE CONSTRUCTION OF THE PROJECT. CONTRACTOR SHALL PROVIDE BARRICADES, SAFETY DEVICES, TO ESTABLISH SAFE WORKING CONDITIONS AND TO PROTECT THE PUBLIC. PROVIDE TEMPORARY COVERS FOR ALL UNATTENDED OPEN TRENCHES.
4. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS TOOLS AND EQUIPMENT NECESSARY TO ACCOMPLISH THE REQUIRED PROJECT INCLUDING ALL EXCAVATION AND TRENCHING.
5. THE BIDDER SHALL VISIT THE SITE OF THE PROPOSED WORK AND SHALL FULLY INFORM HIMSELF REGARDING THE FACILITIES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK OR MATERIALS OMITTED FROM BIDDER'S CONTRACT PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF BY SUCH INVESTIGATION.
6. ALL WORK SHALL BE NEATLY INSTALLED PARALLEL OR PERPENDICULAR TO THE BUILDING LINES UNLESS NOTED OTHERWISE.
7. EARTHWORK MATERIALS BROUGHT INTO THE SITE AND SOIL PILES CREATED BY EARTHWORK SHALL ONLY BE PLACED OR STORED ON PAVED SURFACES OR OTHER AREAS APPROVED BY THE OWNER REPRESENTATIVE. ANY EXCESS SOIL AND TOPSOIL FROM EARTHWORK OPERATIONS THAT IS NOT NEEDED SHALL BE DISPOSED OF AT AN OFFSITE LOCATION BY THE CONTRACTOR AT CONTRACTORS EXPENSE.
8. TRASH AND DEBRIS SHALL BE REMOVED FROM THE PROPERTY.
9. ALL UNPAVED SURFACES DISTURBED BY CONSTRUCTION SHALL BE GRADED TO MATCH THE EXISTING CONTOURS OF THE AREA.
10. THE SITE WILL REMAIN OPEN TO THE PUBLIC DURING THE COURSE OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT AND SECURE THE CONSTRUCTION AREAS AND EQUIPMENT, AND TO ENSURE THAT ALL CONSTRUCTION ACCESS AND STORAGE IS LIMITED TO THE AREAS AGREED UPON WITH THE DESIGNATED OWNER REPRESENTATIVE.
11. THE CONTRACTOR SHALL PROVIDE THE DESIGNATED OWNER REPRESENTATIVE A 72 HOUR WRITTEN NOTICE, PRIOR TO CLOSING OFF AREAS OF THE BUILDING FOR CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE PROTECTIVE BARRIERS AND SEAL OFF AREAS OF CONSTRUCTION TO PROVIDE PROTECTION TO THE PUBLIC AND SITE STAFF THROUGHOUT THE COURSE OF CONSTRUCTION.
12. THE CONTRACTOR SHALL PROVIDE A UPDATED PLAN AND SCHEDULE FOR EACH STAGE OF CONSTRUCTION FOR REVIEW WITH THE THE DESIGNATED OWNER REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO EACH PHASE OF CONSTRUCTION. THE CONTRACTOR SHALL MINIMIZE DISRUPTIONS TO THE SITES OPERATIONS. THE ELECTRICAL AND WATER BUILDING SHUTDOWNS; SHALL BE PRE-APPROVED IN ADVANCE AND MINIMIZED AS MUCH AS POSSIBLE.
13. PROVIDE CLOSE OUT DOCUMENTS TO INCLUDE ASBUILT DRAWINGS, O&M MANUALS INCLUDING ALL REVIEW SUBMITTALS AND MANUFACTURER WARRANTIES. SUBMIT THE O&M PACKAGE FOR REVIEW. THE FINAL ASBUILT DRAWINGS SHALL REFLECT ALL MODIFICATIONS TO THE EXISTING AND PROPOSED DESIGN, REFER TO CONTRACTORS REQUIRED SUBMITTAL LIST.
14. THE CONTRACTOR SHALL GUARANTEE AGAINST DEFECTS IN ANY OR ALL MATERIALS, EQUIPMENT, OR WORKMANSHIP PROVIDED AND SHALL MAKE GOOD, REPAIR, OR REPLACE, AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL OR PART WHICH MAY BECOME EVIDENT WITHIN A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF THE WORK. NECESSARY SERVICE AND ADJUSTMENT DURING THE EARLY STAGES OF OPERATION AFTER OCCUPANCY SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER, REFER TO SUBMITTAL LIST TO MATERIALS IDENTIFIED FOR THE CONTRACTOR TO SUBMIT FOR REVIEW.
15. THE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. ALL ELECTRICAL SYSTEMS RECEPTACLES, CABINETS, JUNCTION BOXES, MOTOR FRAMES, LIGHTING POLES, MISCELLANEOUS EQUIPMENT, ETC. SHALL BE GROUNDED BY A GREEN-WIRE GROUND CONDUCTOR.
16. PROVIDE NEW LABELS FOR ALL CIRCUITS AND ELECTRICAL DEVICES, AND UPDATE THE PANEL SCHEDULES TO MATCH ASBUILT CONDITIONS.
17. SUBMIT FOR REVIEW FINAL ASBUILT DRAWINGS TO REFLECT ALL MODIFICATIONS TO THE EXISTING AND PROPOSED ELECTRICAL SHEETS.
18. DO NOT SPLICE CONDUCTORS, UNLESS OTHERWISE NOTED.
19. PROVIDE PLASTIC NYLON BUSHING INSULATORS AND BELL ENDS ON ALL CONDUIT ENTRIES AND OPEN ENDED CONDUITS
20. PROVIDE NEW CIRCUIT LABELS FOR EXISTING AND PROPOSED ELECTRICAL PULL BOXES AND CONDUCTORS AT EACH LIGHT FIXTURE.
21. PROVIDE WET LISTED AND WEATHER RATED PULL BOXES AND RGS OR INTERMEDIATE METAL CONDUIT FOR ALL OUTDOOR ABOVE GROUND CONDUIT AND RISERS LOCATIONS.
22. PROVIDE PVC SCHEDULE 40 RIGID-NON METALLIC FOR ALL UNDERGROUND CONDUITS WITH RGS ELBOWS DOUBLE WRAPPED WITH 3M-50 ALL WEATHER PROTECTION TAPE..
23. SUPPORT AND SECURE ALL CONDUIT, CORDS, CABLES AND ALL ENCLOSURES AND PULL BOXES.
24. PROVIDE NEW CIRCUIT LABELS FOR EXISTING AND PROPOSED ELECTRICAL PULL BOXES AND WIRE MARKERS.
25. PROVIDE AND INSTALL PULL BOXES PER N.E.C. FOR ALL ELECTRICAL FEEDERS AND BRANCH CIRCUITS. IN-GRADE PULL BOXES SHALL BE FIBERGLASS REINFORCED CONCRETE BOXES WITH A REMOVABLE LID LABELED "ELECTRIC".
26. ALL RACEWAYS SHALL BE HIDDEN FROM VIEW NOT EXPOSED TO PUBLIC VIEW. CONTRACTOR SHALL COORDINATE TRADES AND ROUTE CONDUIT UNDERSLAB, ON TOP OF BEAMS, AND/OR WITHIN COLUMNS AND WITHIN LIGHT POLE FOUNDATIONS TO PREVENT CONDUIT FROM BEING VISIBLE FROM THE PUBLIC VIEW.
27. REFER TO SHEET NAME ILLUMINATION NB & SB SHEET "D"; DETAILS# 1, 2, 3, AND 4.
28. REFER TO LIGHT SCHEDULE ON THIS SHEET FOR ADDITIONAL CONTRACTOR REQUIREMENTS TO REWORK AND EXTEND EXISTING CONDUITS, CONDUCTORS AND TO PROVIDE ANCHOR BOLT ADAPTORS AND FIXTURE POLE ADAPTORS TO FURNISH AND REPLACE NEW LIGHTS AS SCHEDULED TO PROVIDE A FULLY FUNCTIONAL LED LIGHTING SYSTEM.

WARNING
NOTICE TO BIDDER

THESE PLANS APPLY TO TWO SITES. THE NORTHBOUND AND SOUTHBOUND SITES. BASE BID SHALL INCLUDE EQUIPMENT, MATERIALS AND LABOR FOR BOTH SITES.

811 Know what's below. Call before you dig.

WARNING: CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED PROFESSIONAL ENGINEER
5/31/24

IH 35
ILLUMINATION NB & SB
SHEET "A"

SHEET 1 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		97

PANEL LB 225 MCB

SERVICE 120/208V,3ø,4 WIRE | PHASE | AIC 10,000 RMS | NEMA 1

CONDUIT & WIRE	CRT#	BKR/P	ITEM DESCRIPTION	AMPS	A	B	C	AMPS	ITEM DESCRIPTION	BKR/P	CRT#	CONDUIT & WIRE
1 - 3/4"C w/ 3#8 + 1#10(G)EA	1	40/2	CIRCUITN1 AHU-1	39.0	66.0			20.0	HP-1	30/3	2	1 - 3/4"C w/ 4#10 + 1#12(G)EA
	3			39.0		59.0		20.0			4	
1 - 1"C w/ 3#4 + 1#10(G)EA	5	60/2	CIRCUITN2 AHU-1	52.0			72.0	20.0			6	
	7			52.0	52.0			0.0	SPARE	20/1	8	
1 - 3/4"C w/ 3#12 + 1#12(G)EA	9	15/2	EWH-12	7.2		8.7		1.5	RECEPTACLES	20/1	10	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	11			7.2			17.2	10.0	HD-3	20/2	12	1 - 3/4"C w/ 3#12 + 1#12(G)EA
	13	20/1	SPARE	0.0	10.0			10.0			14	
1 - 3/4"C w/ 3#12 + 1#12(G)EA	15	20/2	HD-1	10.0		20.0		10.0	HD-4	20/2	16	1 - 3/4"C w/ 3#12 + 1#12(G)EA
	17			10.0			20.0	10.0			18	
1 - 3/4"C w/ 3#12 + 1#12(G)EA	19	20/2	HD-2	10.0	11.5			1.5	RECEPTACLES	20/1	20	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	21			10.0		10.0		0.0	SPARE	20/1	22	
1 - 3/4"C w/ 2#12 + 1#12(G)EA	23	20/1	RECEPTACLES	3.0			3.0	0.0	SPARE	20/1	24	
1 - 3/4"C w/ 2#12 + 1#12(G)EA	25	20/1	RECEPTACLES	3.0	3.0			0.0	SPARE	20/1	26	
	27	20/1	SPARE	0.0		12.5		12.5	EUH-1	20/1	28	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	29	20/1	SPARE	0.0			1.5	1.5	RECEPTACLES	20/1	30	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	31	20/1	SPARE	0.0	0.6			0.6	CAM-D-11	20/1	32	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	33	20/1	SPARE	0.0		0.6		0.6	CAM-D-12	20/1	34	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	35	20/1	SPARE	0.0			0.6	0.6	CAM-D-13	20/1	36	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	37	20/1	SPARE	0.0	0.6			0.6	CAM-C-14	20/1	38	1 - 3/4"C w/ 2#10 + 1#12(G)EA
	39	20/1	SPARE	0.0		0.0		0.0	SPARE	20/1	40	
	41	20/1	SPARE	0.0			0.0	0.0	SPARE	20/1	42	
				TOTAL	136.7	110.8	114.3					

EXISTING ELECTRICAL PANELS IN BUILDING

PANEL HL 100 MLO ISOLATED GROUND BAR

SERVICE 277/480V,3ø,4 WIRE | PHASE | AIC 22,000 RMS | NEMA 1

CONDUIT & WIRE	CRT#	BKR/P	ITEM DESCRIPTION	AMPS	A	B	C	AMPS	ITEM DESCRIPTION	BKR/P	CRT#	CONDUIT & WIRE
1 - 3/4"C w/ 2#12 + 1#12(G)EA	1	20/1	ENTRY EXT. LIGHTS	0.4	1.1			0.7	INGRADE EXT. LIGHTS	20/1	2	1 - 3/4"C w/ 2#12 + 1#12(G)EA
1 - 3/4"C w/ 2#12 + 1#12(G)EA	3	20/1	SIDE ENTRY EXT. LIGHTS	2.8		2.8		0.0	SPARE	20/1	4	
1 - 3/4"C w/ 2#12 + 1#12(G)EA	5	20/1	INGRADE EXT. LIGHTS	0.8			0.8	0.0	SPARE	20/1	6	
1 - 3/4"C w/ 2#12 + 1#12(G)EA	7	20/1	SIDE ENTRY EXT. LIGHTS	0.4	0.4			0.0	SPARE	20/1	8	
1 - 3/4"C w/ 2#12 + 1#12(G)EA	9	20/1	ENTRY EXT. LIGHTS	0.4		1.5		1.1	ARBOR LIGHTS	20/1	10	1 - 3/4"C w/ 2#12 + 1#12(G)EA
1 - 3/4"C w/ 2#12 + 1#12(G)EA	11	20/1	SIGN LIGHTS	1.9			2.4	0.5	ARBOR LIGHTS	20/1	12	1 - 3/4"C w/ 2#12 + 1#12(G)EA
1 - 3/4"C w/ 3#8 + 1#10(G)EA	13	20/3	AREA SITE LIGHTS	5.5	14.1			8.6	AREA SITE LIGHTS	20/3	14	1 - 3/4"C w/ 3#8 + 1#10(G)EA
	15			5.5		14.1		8.6			16	
	17			5.5			14.1	8.6			18	
1 - 3/4"C w/ 3#10 + 1#12(G)EA	19	20/3	AREA SITE LIGHTS	5.5	8.5			3.0	AREA SITE LIGHTS	20/3	20	1 - 3/4"C w/ 3#10 + 1#12(G)EA
	21			5.5		8.5		3.0			22	
	23			5.5			8.5	3.0			24	
1 - 3/4"C w/ 3#8 + 1#10(G)EA	25	20/3	AREA SITE LIGHTS	5.5	8.5			3.0	PARKING LIGHTS	20/3	26	1 - 3/4"C w/ 3#12 + 1#12(G)EA
	27			5.5		8.5		3.0			28	
	29			5.5			8.5	3.0			30	
	31	20/3	SPARE	0.0	2.3			2.3	PATHWAY LIGHTS	20/3	32	1 - 3/4"C w/ 3#12 + 1#12(G)EA
	33			0.0		2.3		2.3			34	
	35			0.0			2.3	2.3			36	
1 - 3/4"C w/ 3#12 + 1#12(G)EA	37	20/3	PATHWAY LIGHTS	1.3	3.3			2.0	FLAG POLE LIGHTS	20/1	38	1 - 3/4"C w/ 2#12 + 1#12(G)EA
	39			1.3		1.3		0.0	SPARE	20/1	40	
	41			1.3			1.3	0.0	SPARE	20/1	42	
				TOTAL	38.2	38.8	37.9					

EXISTING ELECTRICAL PANELS IN BUILDING

NORTHBOUND

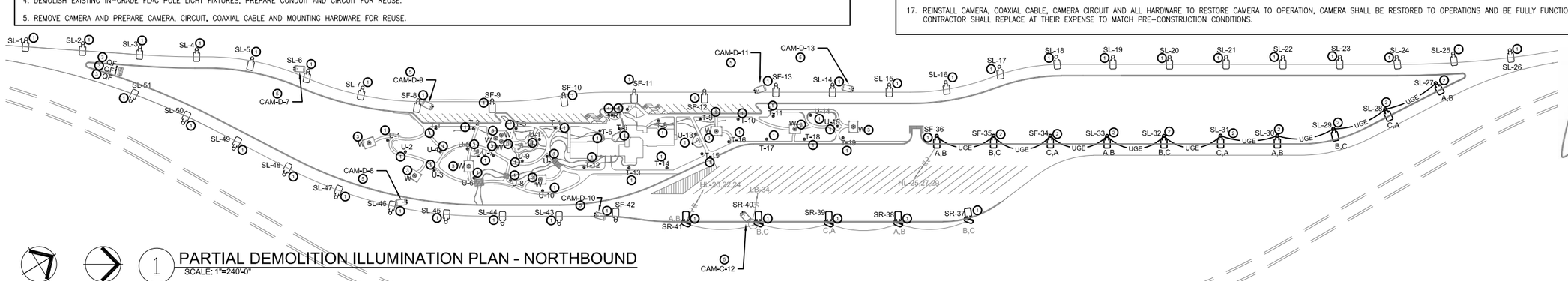
POLE	LAT	LONG
SC-35	30.9029	-97.5585
SC-32	30.9036	-97.558
SC-31	30.904	-97.5579
SC-30	30.9043	-97.5576
SC-29	30.9046	-97.5573
SC-28	30.905	-97.5571
SC-27	30.9053	-97.5568
SB-34	30.9038	-97.5575
SB-33	30.9044	-97.557
SC-52	30.9035	-97.5574
SC-53	30.9038	-97.5571
SC-54	30.9041	-97.5568
SC-55	30.9045	-97.5566
SC-56	30.9049	-97.5566
SC-57	30.9053	-97.5565
SC-58	30.9057	-97.5564

DEMOLITION ILLUMINATION KEYED NOTES - ◯

1. DEMOLISH EXISTING SITE LIGHT FIXTURE AND FIXTURE POLE. PREPARE THE EXISTING LIGHT FIXTURE FOUNDATION, ANCHOR BOLT HARDWARE, GROUNDING ELECTRODE, GROUNDING ELECTRODE CONDUCTOR, EXISTING CONDUITS, EXISTING LIGHTING CIRCUIT FOR REUSE.
2. DEMOLISH EXISTING SITE LIGHT FIXTURE, FIXTURE POLE, LIGHT FIXTURE CONCRETE POLE FOUNDATION, GROUNDING AND EXISTING RACEWAYS AND CIRCUITS, EXCAVATE AND CUT EXISTING RACEWAYS AND CONCRETE BELOW CONSTRUCTION LIMITS AND BELOW GRADE, ABANDON IN PLACE UNUSED CONDUIT AND CONCRETE FOUNDATION.
3. DEMOLISH EXISTING LIGHT FIXTURE PREPARE, RACEWAYS AND CIRCUITS FOR REUSE.
4. DEMOLISH EXISTING IN-GRADE FLAG POLE LIGHT FIXTURES, PREPARE CONDUIT AND CIRCUIT FOR REUSE.
5. REMOVE CAMERA AND PREPARE CAMERA, CIRCUIT, COAXIAL CABLE AND MOUNTING HARDWARE FOR REUSE.

PROPOSED ILLUMINATION KEYED NOTES - ⬡

1. REPLACE AND PROVIDE NEW LIGHT FIXTURES, LIGHT FIXTURE POLES AND POLE FOUNDATIONS MARKED ON THE SITE PLANS. ALL CONDUIT SHALL BE BURIED UNDERGROUND AND EMERGE INSIDE THE FLUSH WITH GRADE PULL BOXES AND EMBEDDED WITHIN THE SITE LIGHT CONCRETE FOUNDATIONS, EXPOSED ABOVE GRADE RACEWAYS AT LIGHT POLE CONCRETE FOUNDATIONS IS PROHIBITED, REFER TO LIGHTING SCHEDULE ON THE ILLUMINATION NB & SB SHEET "A"; FOR GENERAL NOTES AND LIGHTING SCHEDULE. REFER TO ILLUMINATION NB & SB SHEET "D"; DETAILS# 1, 2, 3, 4 AND 5 AND CONTRACTOR REQUIRED SUBMITTALS AND PROJECT SPECIFICATIONS. DO NOT SPLICE FIBER CABLES OR CIRCUITS IN FLUSH-WITH-GRADE PULL BOXES, UNLESS DIRECTED BY THE PLANS. ALL EXISTING CAMERAS ON POLES SCHEDULED TO BE REPLACED, SHALL BE REMOUNTED TO THE NEW POLE, ALL COXIAL CABLES AND CAMERA CIRCUITS SHALL BE RESTORED TO EXISTING CONDITIONS AND IN WORKING ORDER PRIOR TO CONSTRUCTION.
2. PROVIDE A NEW LIGHT FIXTURE, NEW POLE AND POLE FOUNDATION SETBACKS SHALL FOLLOW THE CURB; SET BACK CENTER OF POLES 8FT FROM BACKSIDE EDGE OF CURB TO MATCH EXISTING FOUNDATION SET BACKS.
3. PROVIDE A NEW LIGHT FIXTURE, NEW POLE AND POLE FOUNDATION SHALL FOLLOW THE CURB; SET BACK CENTER OF POLES 3FT FROM BACKSIDE EDGE OF CURB TO MATCH EXISTING FOUNDATION SET BACKS.
4. REPLACE EXISTING LIGHT FIXTURE AND POLE.
5. REPLACE EXISTING LIGHT FIXTURE.
6. CONTRACTOR SHALL FIELD LOCATE THE EXISTING CIRCUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING 120V UNDERGROUND CAMERA CIRCUIT LB-34 PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT, PULL IN 2-#4 AWG, 1#4 GND PULL IN 1"C. EXTEND CIRCUIT TO EACH PROPOSED FUTURE CAMERA CABINET ENCLOSURE LOCATION. SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX, FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO COMMENCING. REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3
7. REFER TO ILLUMINATION NB & SB SHEET "D" DETAIL#5, PROVIDE A CAMERA ENCLOSURE MANUFACTURED BY VIVOTEK AT-CAB-01 CABINET ENCLOSURE PER DETAIL#5 OR EQUAL ON EACH POLE AS INDICATED IN DETAIL#5, EXTEND AND TERMINATE THE EXISTING CIRCUIT TO THE TERMINAL LUGS OF EACH VIVOTEK AT-CAB-01 CABINET ENCLOSURE FOR FUTURE CAMERAS PROVIDED IN A SEPARATE CONTRACT.
8. PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING UNDERGROUND LIGHT CIRCUIT HL-20,22,24 PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT. PULL IN 4-#6 AWG, 1#6 GND PULL IN 1"C. EXTEND CIRCUIT TO ALL NEW LIGHT POLE FIXTURES. SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX TO , FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO COMMENCING, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
9. CONTRACTOR SHALL FIELD LOCATE THE EXISTING CIRCUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING LIGHT CIRCUIT HL-25,27,29 PULL IN 4-#6 AWG, 1#6 GND PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT. PULL IN 1"C. EXTEND CIRCUIT TO NEW FIXTURES.SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX, FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
10. PROVIDE A FLUSH-WITH-GRADE PG SERIES 12X12X12 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3,
11. PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
12. PROVIDE A FLUSH-WITH-GRADE PG SERIES 24X24X36 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
13. CONTRACTOR SHALL FIELD LOCATE THE EXISTING UNDERGROUND 4" CONDUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL ROVIDE A FLUSH-WITH-GRADE PG SERIES 24X36X36 TIER 22 PULL BOX MANUFACTURED BY QUAZITE WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT EXISTING CONDUIT AND EXTEND FIBER THROUGH THE EXISTING 4" UNDERGROUND CONDUIT LEADING TO THE IT RACK WITHIN THE BUILDING. PULL IN FIVE FIBER CABLES MANUFACTURED BY PANDUIT OPTIC-CORE NON-METALLIC INDOOR/OUTDOOR 6-PAIR SINGLE MODE FIBER CABLES OR EQAUL TO FURNISH AND INSTALL A DEDICATED 6-PAIR FIBER CABLE TO EACH PROPOSED FUTURE CAMERA LOCATION INDICATED IN PLAN AND TERMINATE THE FIBER TO THE CONTRACTOR PROVIDED VIVOTEK AT-CAB-ENCLOSURE PER DETAIL#3 & 5. EXTEND FIBER CABLES THROUGH THE EXISTING UNDERGROUND 4" CONDUIT TO EMERGE OUT OF AN OPEN ENDED CONDUIT INSIDE THE EXISTING BUILDING, LOCATED JUST BELOW THE EXISTING WALL MOUNTED IT RACK. TERMINATE FIBER TO CONTRACTOR PROVIDED 19" RACK MOUNTED FIBER PATCH PANEL IN THE EXISTING WALL MOUNTED 19" IT RACK. PROVIDE A 15 FOOT SERVICE LOOP FOR ALL FIVE CABLES BELOW THE IT RACK. CONTRACTOR SHALL TEST ALL FIBER CABLES PULLED AFTER INSTALLATION AND PROVIDE A SUBMITTAL WITH TEST RESULTS. NOTE IF THE ARMORED JACKET IS METAL, CONTRACTOR SHALL BOND BOTH ENDS.
14. PULL IN A FIBER CABLE IN EACH 2" CONDUIT; MANUFACTURED BY PANDUIT OPTI-CORE NON-METALLIC OPTION INDOOR/OUTDOOR 6-PAIR SINGLE MODE FIBER OR EQUAL, EXTEND ONE END OF THE FIBER TO CABLE TO THE PROPOSED FUTURE CAMERA LOCATION INDICATED IN PLAN AND TERMINATE THE FIBER TO THE CONTRACTOR PROVIDED VIVOTEK AT-CAB-01 CABINET ENCLOSURE PER DETAIL#3 & 5. TERMINATE THE OPPOSITE END OF THE FIBER CABLE TO THE CONTRACTOR PROVIDE FIBER PATCH PANEL. NOTE IF THE ARMORED JACKET IS METAL, CONTRACTOR SHALL BOND BOTH ENDS.
15. REWORK EXISTING SIGN LIGHT EXISTING CONDUCTORS, CONDUIT AND PULL BOXES TO LAYOUT NEW LIGHT FIXTURES. PROVIDE FIELD ADJUSTMENTS TO EVENLY ILLUMINATE THE ENTRY SIGN. EACH FIXTURE SHALL HAVE AN INTEGRAL DRIVER AND JUNCTION BOX FOR WIRE SPLICING.
16. REWORK EXISTING FLAG LIGHT EXISTING CONDUCTORS, CONDUIT AND PULL BOXES TO LAYOUT NEW LIGHT FIXTURES TO WORK WITH EXITING CONDITIONS. PROVIDE A IN-GRADE QUAZITE PG SERIES 11X18X18 PULL BOX AND REWORK EXISTING CONDUIT AND CONDUCTORS AS REQUIRED. ADJUST FIXTURES LOCATIONS AND ORIENTATION TO ILLUMINATE THE FLAG. PROVIDE A 2" RGS PLASTI-BOND PVC COATED CONDUIT TO EACH FIXTURE FROM THE PULL BOX. INTERCEPT AND EXTEND THE EXISTING CIRCUIT TO EACH NEW FIXTURE. SUPPORT EACH NEW FIXTURE WITH A 2" RGS PLASTI-BOND PVC COATED CONDUIT RISER. CONTRACTOR SHALL REPAIR ALL VOIDS, HOLIDAYS AND TEARS IN PVC COATING WITH PVC COATING SPRAY TOUCH UP COMPOUND, APPLY PVC THREAD COMPOUND WITH BRUSH TO ALL THREADS.
17. REINSTALL CAMERA, COAXIAL CABLE, CAMERA CIRCUIT AND ALL HARDWARE TO RESTORE CAMERA TO OPERATION, CAMERA SHALL BE RESTORED TO OPERATIONS AND BE FULLY FUNCTIONAL, IF THE CAMERA IS DAMAGED, CONTRACTOR SHALL REPLACE AT THEIR EXPENSE TO MATCH PRE-CONSTRUCTION CONDITIONS.



1 PARTIAL DEMOLITION ILLUMINATION PLAN - NORTHBOUND
SCALE: 1"=240'-0"

ACTUAL NORTH

2 PARTIAL PROPOSED ILLUMINATION PLAN - NORTHBOUND
SCALE: 1"=240'-0"

ACTUAL NORTH | PLAN NORTH

NOTES: REFER CIVIL DRAWINGS FOR STATION MARKS.

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED PROFESSIONAL ENGINEER
5/31/24

IH 35
ILLUMINATION NB
SHEET "B"

SHEET 2 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		98

SOUTHBOUND

POLE	LAT	LONG
SC-27	30.9095	-97.5551
SC-28	30.9099	-97.5548
SC-29	30.9102	-97.5545
SC-30	30.9105	-97.5543
SC-31	30.9108	-97.554
SC-32	30.9112	-97.5539
SC-35	30.9119	-97.5534
SB-33	30.9104	-97.5549
SB-34	30.911	-97.5544
SC-58	30.9093	-97.5554
SC-57	30.9097	-97.5554
SC-56	30.9101	-97.5554
SC-55	30.9105	-97.5553
SC-54	30.9108	-97.555
SC-53	30.9111	-97.5547
SC-52	30.9114	-97.5544

DEMOLITION ILLUMINATION KEYED NOTES - ◯

1. DEMOLISH EXISTING SITE LIGHT FIXTURE AND FIXTURE POLE. PREPARE THE EXISTING LIGHT FIXTURE FOUNDATION, ANCHOR BOLT HARDWARE, GROUNDING ELECTRODE, GROUNDING ELECTRODE CONDUCTOR, EXISTING CONDUITS, EXISTING LIGHTING CIRCUIT FOR REUSE.
2. DEMOLISH EXISTING SITE LIGHT FIXTURE, FIXTURE POLE, LIGHT FIXTURE CONCRETE POLE FOUNDATION, GROUNDING AND EXISTING RACEWAYS AND CIRCUITS, EXCAVATE AND CUT EXISTING RACEWAYS AND CONCRETE BELOW CONSTRUCTION LIMITS AND BELOW GRADE, ABANDON IN PLACE UNUSED CONDUIT AND CONCRETE FOUNDATION.
3. DEMOLISH EXISTING LIGHT FIXTURE PREPARE, RACEWAYS AND CIRCUITS FOR REUSE.
4. DEMOLISH EXISTING IN-GRADE FLAG POLE LIGHT FIXTURES, PREPARE CONDUIT AND CIRCUIT FOR REUSE.
5. REMOVE CAMERA AND PREPARE CAMERA, CIRCUIT, COAXIAL CABLE AND MOUNTING HARDWARE FOR REUSE.

PROPOSED ILLUMINATION KEYED NOTES - ⬡

1. REPLACE AND PROVIDE NEW LIGHT FIXTURES, LIGHT FIXTURE POLES AND POLE FOUNDATIONS MARKED ON THE SITE PLANS. ALL CONDUIT SHALL BE BURIED UNDERGROUND AND EMERGE INSIDE THE FLUSH WITH GRADE PULL BOXES AND EMBEDDED WITHIN THE SITE LIGHT CONCRETE FOUNDATIONS, EXPOSED ABOVE GRADE RACEWAYS AT LIGHT POLE CONCRETE FOUNDATIONS IS PROHIBITED, REFER TO LIGHTING SCHEDULE ON THE ILLUMINATION NB & SB SHEET "A"; FOR GENERAL NOTES AND LIGHTING SCHEDULE. REFER TO ILLUMINATION NB & SB SHEET "D"; DETAILS# 1, 2, 3, 4 AND 5 AND CONTRACTOR REQUIRED SUBMITTALS AND PROJECT SPECIFICATIONS. DO NOT SPLICE FIBER CABLES OR CIRCUITS IN FLUSH-WITH-GRADE PULL BOXES, UNLESS DIRECTED BY THE PLANS. ALL EXISTING CAMERAS ON POLES SCHEDULED TO BE REPLACED, SHALL BE REMOUNTED TO THE NEW POLE, ALL COXIAL CABLES AND CAMERA CIRCUITS SHALL BE RESTORED TO EXISTING CONDITIONS AND IN WORKING ORDER PRIOR TO CONSTRUCTION.
2. PROVIDE A NEW LIGHT FIXTURE, NEW POLE AND POLE FOUNDATION SETBACKS SHALL FOLLOW THE CURB; SET BACK CENTER OF POLES 8FT FROM BACKSIDE EDGE OF CURB TO MATCH EXISTING FOUNDATION SET BACKS.
3. PROVIDE A NEW LIGHT FIXTURE, NEW POLE AND POLE FOUNDATION SHALL FOLLOW THE CURB; SET BACK CENTER OF POLES 3FT FROM BACKSIDE EDGE OF CURB TO MATCH EXISTING FOUNDATION SET BACKS.
4. REPLACE EXISTING LIGHT FIXTURE AND POLE.
5. REPLACE EXISTING LIGHT FIXTURE.
6. CONTRACTOR SHALL FIELD LOCATE THE EXISTING CIRCUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING 120V UNDERGROUND CAMERA CIRCUIT LB-34 PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT, PULL IN 2-#4 AWG, 1#4 GND PULL IN 1"C. EXTEND CIRCUIT TO EACH PROPOSED FUTURE CAMERA CABINET ENCLOSURE LOCATION. SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX, FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO COMMENCING. REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3
7. REFER TO ILLUMINATION NB & SB SHEET "D" DETAIL#5, PROVIDE A CAMERA ENCLOSURE MANUFACTURED BY VIVOTEK AT-CAB-01 CABINET ENCLOSURE PER DETAIL#5 OR EQUAL ON EACH POLE AS INDICATED IN DETAIL#5, EXTEND AND TERMINATE THE EXISTING CIRCUIT TO THE TERMINAL LUGS OF EACH VIVOTEK AT-CAB-01 CABINET ENCLOSURE FOR FUTURE CAMERAS PROVIDED IN A SEPARATE CONTRACT.
8. PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING UNDERGROUND LIGHT CIRCUIT HL-20,22,24 PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT. PULL IN 4-#6 AWG, 1#6 GND PULL IN 1"C. EXTEND CIRCUIT TO ALL NEW LIGHT POLE FIXTURES. SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX TO , FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO COMMENCING, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
9. CONTRACTOR SHALL FIELD LOCATE THE EXISTING CIRCUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT AND EXTEND THE EXISTING LIGHT CIRCUIT HL-25,27,29 PULL IN 4-#6 AWG, 1#6 GND PROVIDE DIRECT BURIAL RATED POLARIS BLOCKS OR EQUAL TO EXTEND CIRCUIT. PULL IN 1"C. EXTEND CIRCUIT TO NEW FIXTURES.SET PULL BOX OVER EXISTING CIRCUIT, CONTRACTOR SHALL REWORK THE EXISTING CONDUIT AND CIRCUIT TO BRING RACEWAY AND CIRCUIT UP INTO THE PULL BOX, FIELD DETERMINE LOCATIONS WITH OWNER PRIOR TO COMMENCING. REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
10. PROVIDE A FLUSH-WITH-GRADE PG SERIES 12X12X12 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3,
11. PROVIDE A FLUSH-WITH-GRADE PG SERIES 11X18X18 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
12. PROVIDE A FLUSH-WITH-GRADE PG SERIES 24X24X36 TIER 22 PULL BOX MANUFACTURED BY QUAZITE, WITH A TIER 22 BOLTED COVER OR EQUAL, REFER TO THE ILLUMINATION NB & SB SHEET "D" DETAIL#3.
13. CONTRACTOR SHALL FIELD LOCATE THE EXISTING UNDERGROUND 4" CONDUIT, THIS LOCATION IS APPROXIMATE. CONTRACTOR SHALL ROVIDE A FLUSH-WITH-GRADE PG SERIES 24X36X36 TIER 22 PULL BOX MANUFACTURED BY QUAZITE WITH A TIER 22 BOLTED COVER OR EQUAL TO INTERSECT EXISTING CONDUIT AND EXTEND FIBER THROUGH THE EXISTING 4" UNDERGROUND CONDUIT LEADING TO THE IT RACK WITHIN THE BUILDING. PULL IN FIVE FIBER CABLES MANUFACTURED BY PANDUIT OPTIC-CORE NON-METALLIC INDOOR/OUTDOOR 6-PAIR SINGLE MODE FIBER CABLES OR EQAUL TO FURNISH AND INSTALL A DEDICATED 6-PAIR FIBER CABLE TO EACH PROPOSED FUTURE CAMERA LOCATION INDICATED IN PLAN AND TERMINATE THE FIBER TO THE CONTRACTOR PROVIDED VIVOTEK AT-CAB-ENCLOSURE PER DETAIL#3 & 5. EXTEND FIBER CABLES THROUGH THE EXISTING UNDERGROUND 4" CONDUIT TO EMERGE OUT OF AN OPEN ENDED CONDUIT INSIDE THE EXISTING BUILDING, LOCATED JUST BELOW THE EXISTING WALL MOUNTED IT RACK. TERMINATE FIBER TO CONTRACTOR PROVIDED 19" RACK MOUNTED FIBER PATCH PANEL IN THE EXISTING WALL MOUNTED 19" IT RACK. PROVIDE A 15 FOOT SERVICE LOOP FOR ALL FIVE CABLES BELOW THE IT RACK. CONTRACTOR SHALL TEST ALL FIBER CABLES PULLED AFTER INSTALLATION AND PROVIDE A SUBMITTAL WITH TEST RESULTS. NOTE IF THE ARMORED JACKET IS METAL, CONTRACTOR SHALL BOND BOTH ENDS.
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15. REWORK EXISTING SIGN LIGHT EXISTING CONDUCTORS, CONDUIT AND PULL BOXES TO LAYOUT NEW LIGHT FIXTURES. PROVIDE FIELD ADJUSTMENTS TO EVENLY ILLUMINATE THE ENTRY SIGN. EACH FIXTURE SHALL HAVE AN INTEGRAL DRIVER AND JUNCTION BOX FOR WIRE SPLICING.
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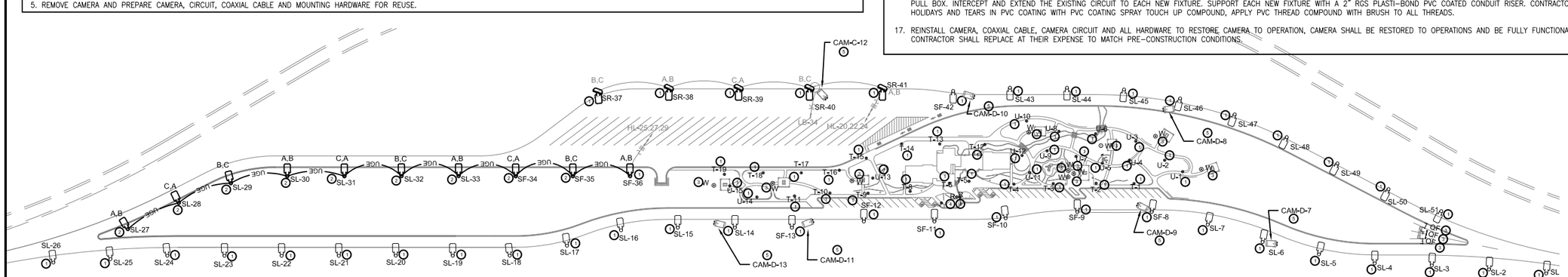
17. REINSTALL CAMERA, COAXIAL CABLE, CAMERA CIRCUIT AND ALL HARDWARE TO RESTORE CAMERA TO OPERATION, CAMERA SHALL BE RESTORED TO OPERATIONS AND BE FULLY FUNCTIONAL, IF THE CAMERA IS DAMAGED, CONTRACTOR SHALL REPLACE AT THEIR EXPENSE TO MATCH PRE-CONSTRUCTION CONDITIONS.



1 PARTIAL DEMOLITION ILLUMINATION PLAN - SOUTHBOUND
SCALE: 1"=240'-0"

2 PARTIAL PROPOSED ILLUMINATION PLAN - SOUTHBOUND
SCALE: 1"=240'-0"

NOTES: REFER CIVIL DRAWINGS FOR STATION MARKS.

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED
PROFESSIONAL ENGINEER
5/31/24

IH 35
ILLUMINATION SB
SHEET "C"

SHEET 3 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		99

DIVISION 26 ELECTRICAL SPECIFICATIONS

SECTION 26 00 00 – BASIC ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 CODES AND STANDARDS:

CODES AND STANDARDS: ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2023 EDITION OF THE NATIONAL ELECTRIC CODE. THE PROJECT ELECTRICAL WORK SHALL BE PERFORMED BY A CONTRACTOR LICENSED WITH TDLR TO PERFORM ELECTRICAL WORK. THE ELECTRICAL WORK SHALL BE PERFORMED UNDER THE DIRECT, ON-SITE SUPERVISION OF A LICENSED, MASTER OR JOURNEYMAN ELECTRICIAN. SUBMIT COPIES OF THE LICENSES FOR ALL OF THE ELECTRICIANS THAT WILL PERFORM THE WORK. SUBMIT THIS INFORMATION AS PART OF THE PROJECT CONSTRUCTION SUBMITTAL REQUIRED INFORMATION.

1.2 MATERIAL SUBMITTALS:

A. SUBMIT ITEMS ALL ITEMS LISTED IN THE CONTRACTORS PROJECT SUBMITTAL LIST, SEE THIS SHEET DETAIL#4.

B. MARK ALL SUBMITTAL LITERATURE TO INDICATE THE PRECISE SELECTION OF MATERIALS, DIMENSIONS AND EQUIPMENT SUBMITTED. NOTE THAT IF THE SPECIFIC MODEL OR MATERIAL IS NOT INDICATED IN THE SUBMITTAL, AND THERE IS MORE THAN ONE CHOICE POSSIBLE, THE SUBMITTAL MAY BE REJECTED AND A RESUBMITTAL WILL BE REQUIRED.

C. PROPOSED SUBMITTAL LIST SHALL INCLUDE ALL EQUIPMENT WITH MANUFACTURER OR MODEL NUMBERS CALLED OUT IN THE DRAWINGS. WHERE THE PLANS AND SPECIFICATIONS CALL OUT A MANUFACTURER OR MODEL NUMBER, CONTRACTOR SHALL PROVIDE AND SUBMIT THE EXACT MANUFACTURER AND MODEL NUMBER OR EQUAL PRODUCT PER THE TERMS AND CONDITIONS. REFERENCE THIS SHEET FOR THE REQUIRED SUBMITTALS INDICATED IN THE CONTRACTOR'S PROJECT SUBMITTAL LIST.

PART 2 – PRODUCTS

2.1 METAL RACEWAYS:

A. PROVIDE RIGID STEEL (RGS), ZINC-COATED, THREADED TYPE CONFORMING TO ANSI C80.1 AND UL 6. PROVIDE ZINC COATING FUSED TO INSIDE AND OUTSIDE WALLS. RIGID METAL CONDUIT FITTINGS: CAST MALLEABLE IRON, GALVANIZED OR CADMIUM PLATED. ALL FITTINGS SHALL BE THREADED TYPE. THE USE OF SPLIT COUPLINGS IS UNACCEPTABLE. REFERENCE PLANS FOR CALLED OUT LOCATIONS.

B. PROVIDE ELECTRICAL METALLIC TUBING (EMT) CONFORMING TO ANSI C80.3 AND UL 6 WITH ZINC GALVANIZED COATING FUSED TO INSIDE AND OUTSIDE WALLS. ALL NEW EMT FITTINGS SHALL BE COMPRESSION TYPE, STEEL OR CAST. CONTRACTOR CAN REUSE EXISTING SET-SCREW TYPE EMT FITTINGS ON EXISTING CONDUITS AND PULL BOXES. REFERENCE PLANS FOR CALLED OUT LOCATIONS.

2.2 NONMETALLIC CONDUIT:

A. PVC HEAVEY WALL CONDUIT: SCHEDULE 40, 90 C, UL RATED, CONSTRUCT OF POLYVINYL CHLORIDE AND CONFORMING TO NEMA TC-2, FOR DIRECT BURIAL USE ONLY, UL-LISTED AND IN CONFORMITY WITH NEC ARTICLE 352. FITTINGS FOR NON-METALLIC CONDUIT SHALL CONFORM TO NEMA TC3 AND SHALL BE SPECIFICALLY MANUFACTURED FOR ELECTRICAL CONDUIT. WATER PIPE FITTINGS WILL NOT BE ACCEPTED. REFERENCE PLANS FOR CALLED OUT LOCATIONS.

B. PVC EXTRA HEAVY WALL CONDUIT: SCHEDULE 80, 90 C, UL RATED, CONSTRUCT OF POLYVINYL CHLORIDE AND CONFORMING TO NEMA TC-2, FOR DIRECT BURIAL, OR NORMAL ABOVE GROUND USE, UL-LISTED AND IN CONFORMITY WITH NEC ARTICLE 352. FITTINGS FOR NON-METALLIC CONDUIT SHALL CONFORM TO NEMA TC3 AND SHALL BE SPECIFICALLY MANUFACTURED FOR ELECTRICAL CONDUIT. WATER PIPE FITTINGS WILL NOT BE ACCEPTED. REFERENCE PLANS FOR CALLED OUT LOCATIONS.

2.3 UNDERGROUND WARNING TAPE:

PROVIDE A DETECTIBLE CAUTION TAPE FOR THE LENGTH OF THE TRENCH. CAUTION TAPE SHALL BE MANUFACTURED BY PRO-LINE'S DETECTABLE MARKING TAPE CONSISTS OF A MINIMUM 5.0 MIL OVERALL THICKNESS. CONSTRUCTION IS 0.8 MIL CLEAR VIRGIN POLYPROPYLENE FILM, REVERSE PRINTED AND LAMINATED TO A 0.35 SOLID ALUMINUM FOIL CORE AND THEN LAMINATED TO A 3.75 MIL CLEAR VIRGIN POLYETHYLENE FILM. TAPE SHALL BE PRINTED WITH APWA RED COLOR-CODED, PATENTED "DIAGONALLY STRIPED" DESIGN WITH BIG, BOLD, BLACK LETTERING TO IDENTIFY THE ELECTRICAL BURIED UTILITY LINE.

2.4 CONDUCTOR MATERIALS AND ACCESSORIES:

A. GENERAL USE SINGLE CONDUCTOR WIRE SHALL BE COPPER, TYPE THHN/THWN-2, UL LISTED FOR GENERAL USE AT A MAXIMUM OF 600 VOLTS AND A MAXIMUM TEMPERATURE OF 75 DEGREES C SUITED FOR DRY AND WET LOCATIONS AND GASOLINE PRESENT LOCATIONS. NUMBER 8 AWG AND LARGER SHALL BE STRANDED. MC CABLE SHALL HAVE AN EQUIPMENT GROUND WIRE AND SHALL BE #12 AWG MINIMUM.

B.

B. WIRE COLOR CODING FOR ALL NEW WIRING:

SYSTEM – 208/120 VAC, SINGLE OR THREE PHASE

PHASE A	PHASE B	PHASE C	NEUTRAL	GROUND
BLACK	RED	BLUE	WHITE	GREEN

SYSTEM – 480/277 VAC, SINGLE OR THREE PHASE

PHASE A	PHASE B	PHASE C	NEUTRAL	GROUND
PURPLE	BROWN	YELLOW	WHITE	GREEN

WIRE COLORS SHALL BE INTEGRAL PIGMENTATION COLOR CODING FOR #8 AWG AND SMALLER WIRES, INCLUDING GROUND WIRES. FOR #6 AWG AND LARGER WIRES, COLORED PHASE TAPE SHALL BE APPLIED TO THE WIRE FOR IDENTIFICATION. TAPE SHALL BE APPLIED IN A SPIRAL, HALF-LAP MANNER OVER EXPOSED CONDUCTOR PORTIONS FOR ALL WIRE PULLED AND TERMINATED IN EXISTING AND NEW SERVICE AND FEEDER WIRING IN ATS SWITCHES, GENERATORS, SERVICE PEDESTALS, JUNCTION BOXES, LOAD CENTERS, PANELBOARDS, AND OTHER ENCLOSURES.

2.5 GROUNDING MATERIAL: SEE GROUND ELECTRODE TESTING IN THIS SPECIFICATION, PART 3.5.

A. NEW GROUND ELECTRODES: 3/4" X 10' LONG COPPER-BONDED GROUND RODS OR OTHER SPECIALLY DESIGNED GROUNDING SYSTEMS AS DESIGNATED BY THE ENGINEER.

B. GROUNDING ELECTRODE CONDUCTOR (GEC) CONNECTIONS: ALL GEC CONNECTIONS TO NEW GROUND ELECTRODES SHALL BE EXOTHERMIC TYPE CONNECTIONS. USING MECHANICAL OR COMPRESSION CLAMPS WILL NOT BE ALLOWED FOR CONNECTIONS TO NEW GROUND ELECTRODES.

PART 3 – EXECUTION

3.1 INSTALLATION OF CONDUITS:

A. MECHANICALLY FASTEN TOGETHER METAL CONDUITS, ENCLOSURES, AND RACEWAYS FOR CONDUCTORS TO FORM A CONTINUOUS ELECTRICAL CONDUCTOR.

B. CONDUITS SHALL HAVE OPENINGS TEMPORARILY PLUGGED TO EXCLUDE FOREIGN MATERIALS AND BE RIGIDLY SUPPORTED SO AS TO PREVENT UNDUE STRESS OR STRAIN ON THE COUPLINGS, CONNECTORS OR FITTINGS.

C. ON ALL METAL CONDUITS, BUSHINGS SHALL BE OF THE INSULATED TYPE. ALL THREADED CONDUIT SHALL BE ATTACHED TO ENCLOSURES WITH DOUBLE LOCKNUTS AND BUSHINGS.

D. ALL CONDUIT SYSTEMS MUST BE INSTALLED COMPLETE BEFORE CONDUCTORS ARE PULLED IN AND BE ELECTRICALLY CONTINUOUS THROUGHOUT.

E. USE SCHEDULE RGS CONDUIT FOR ALL NEW RISERS INTO THE BOTTOM OF THE ENCLOSURES, UNLESS OTHERWISE INDICATED.

F. FOR ALL EXTERIOR WET LOCATIONS; CONDUIT ENTRIES SHALL BE CONSTRUCTED WITH WEATHER-PROOF HUBS OR MALE ADAPTERS FITTINGS WITH SEALING LOCKNUTS.

G. FOR ALL INTERIOR DRY LOCATIONS; CONDUIT ENTRIES SHALL BE CONSTRUCTED WITH MALE ADAPTERS FITTINGS WITH LOCKNUTS.

H. FOR ALL BRANCH FEEDER CIRCUITS AND SERVICE ENTRANCE CONDUIT ENTRIES; PROVIDE GROUNDING BUSHINGS, FOR ALL OTHERS CONDUIT ENTRIES PROVIDE NYLON BUSHINGS.

3.2 UNDERGROUND CONDUIT INSTALLATION:

A. ALL NEW UNDERGROUND CONDUIT AND CONDUIT IN CONTACT WITH EARTH OR CONCRETE SHALL BE SCHEDULE 80 PVC CONDUIT WITH PLASTI-BOND UL-LISTED PVC COATED RGS 90 ELBOWS CONDUIT STUB-UPS AND RISERS OR DOUBLE WRAP RGS WITH 3M 50 ALL WEATHER CORROSION PROTECTION TAPE EXTEND RGS UP TO THE BOTTOM OF EACH ENCLOSURE UNLESS NOTED OTHERWISE. SEAL ALL THREADS AND COUPLINGS ON PVC COATED RGS CONDUIT WITH PLASTI-BOND GRAY SEALANT TOUCH UP COMPOUND DESIGNED TO REPAIR MINOR DAMAGE TO THE PVC FACTORY COATING.

B. FOR UNDERGROUND CONDUIT SEE THE TRENCH DETAIL AND NOTES ON THE DRAWINGS. RUN CONDUIT IN STRAIGHT LINES EXCEPT WHERE A CHANGE OF DIRECTION IS NECESSARY. PROVIDE NOT LESS THAN 3 INCHES CLEARANCE FROM THE CONDUIT TO EACH SIDE OF THE TRENCH. AS EACH CONDUIT RUN IS COMPLETE, ASSURE THAT THE CONDUIT INTERIOR IS FREE FROM DIRT OR DEBRIS. THEN IMMEDIATELY INSTALL CONDUIT PLUGS OR OTHERWISE COVER END OF CONDUIT TO PREVENT ENTRY OF FOREIGN MATERIAL UNTIL WIRE IS PULLED INTO CONDUIT. EXCEPT AT CONDUIT RISERS; ACCOMPLISH CHANGES IN DIRECTION OF RUNS EXCEEDING A TOTAL OF 10 DEGREES, EITHER VERTICAL OR HORIZONTAL, WITH LONG SWEEP BENDS. MANUFACTURED BENDS SHALL HAVE A MINIMUM RADIUS OF 18 INCHES FOR USE WITH CONDUITS OF LESS THAN 3 INCHES IN DIAMETER FOR ALL CONDUITS DEDICATED TO FIBER RADIUS SHALL BE INCREASED TO 36 INCHES.

C. ALL UNDERGROUND ELECTRICAL CONDUITS SHALL BE PERMANENTLY IDENTIFIED WITH A DETECTABLE COLORED, ELECTRICAL IDENTIFICATION TAPE OVER THE CONDUIT SYSTEMS BEFORE BACKFILLING TRENCHES. ALL TAPE SHALL BE INSTALLED WITH THE WRITING FACE UP.

3.3 CONDUCTOR INSTALLATION:

A. SINGLE CONDUCTOR WIRING SHALL BE INSTALLED IN CONDUIT, A RACEWAY, BOX OR OTHER ENCLOSURE. NO CONDUCTORS OR CABLES SHALL BE INSTALLED IN CONDUITS, DUCT, OR RACEWAYS UNTIL THE RACEWAY OR CONDUIT SYSTEM HAS BEEN COMPLETED. WHEN INSTALLING CONDUCTORS, THE CONTRACTOR SHALL USE WIRE-PULLING COMPOUND WHEN INSTALLING ALL WIRING AND SHALL EXERCISE DUE CARE TO PREVENT DAMAGE TO CONDUCTORS AND CABLE OR INSULATION AND REPLACE ALL DAMAGED CABLE. TYPE THWN WIRING WITH THE OUTER NYLON JACKET DAMAGED WILL NOT BE ACCEPTED.

B. NO NEUTRAL WIRE OR GROUND WIRE SHALL BE TRIMMED OR SPLIT TO FIT SMALLER SIZED LUGS. IF OVERSIZED LUGS ARE INSTALLED ON A NEUTRAL OR GROUND BUSS TO ACCOMMODATE THE LARGER WIRE SIZES, WIRE SHALL BE ROUTED INTO THESE LUGS USING THE PROPER BENDING RADIUS AND TERMINATION METHODS.

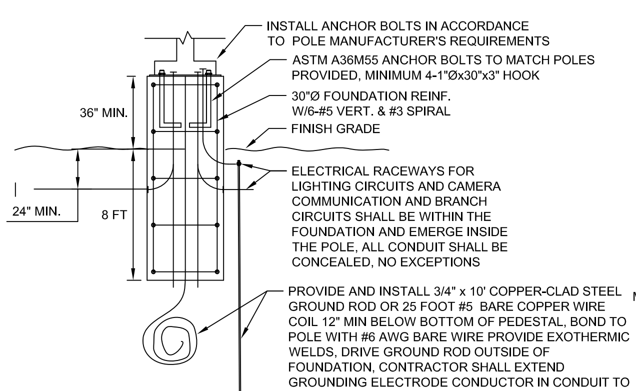
C. ALL WIRING SHALL BE TERMINATED ON MAIN BREAKER LUGS, BRANCH BREAKER LUGS, SWITCH LUGS, NEUTRAL BAR/BUSS, OR GROUND BAR/BUSS. NO NEW CONDUCTOR SPLICES SHALL BE MADE IN AUTOMATIC TRANSFER SWITCHES, GENERATORS, CIRCUIT BREAKER ENCLOSURES, LOAD CENTERS, OR OTHER ELECTRICAL ENCLOSURES UNLESS SPECIFICALLY ALLOWED ON THE DRAWINGS.

3.4 IDENTIFICATION AND MARKINGS:

A. ON THE NEW AUTOMATIC TRANSFER SWITCHES, NEW LOAD CENTERS, EXISTING LOAD CENTERS, AND EXISTING CIRCUIT BREAKER ENCLOSURES INSTALL AN ENGRAVED, PLASTIC NAMEPLATE ON THE FRONT DOOR OF THE ENCLOSURE THAT STATES THE NAME, PHASE AND VOLTAGE OF THE EQUIPMENT. THE NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS WITH A MINIMUM LETTER HEIGHT OF 1/4". THE NAMEPLATES SHALL BE INSTALLED ON THE DOOR WITH CORROSION RESISTANT RIVETS OR SCREWS THAT ARE SHORT ENOUGH TO PREVENT ANY CONTACT WITH LIVE PARTS INSIDE THE ENCLOSURE. FOR EXAMPLE EQUIPMENT NAMES ON THE NAMEPLATES SHOULD BE "LC" FOR LOAD CENTERS.

B. ON THE EXISTING OR NEW LOAD CENTERS AT THE ELECTRIC SERVICE POINTS: INSTALL AN ENGRAVED, PLASTIC NAMEPLATE ON THE INTERIOR COVER OF THE ENCLOSURE NEXT TO EACH LOAD BREAKER THAT STATES WHAT LOAD IS CONTROLLED BY THE BREAKER. THE NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS WITH A MINIMUM LETTER HEIGHT OF 1/4". THE NAMEPLATES SHALL BE INSTALLED ON THE INTERIOR COVER WITH CORROSION RESISTANT RIVETS OR SCREWS THAT ARE SHORT ENOUGH TO PREVENT ANY CONTACT WITH LIVE PARTS INSIDE THE ENCLOSURE.

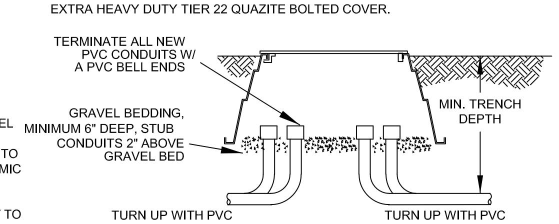
C. EACH NEW CONDUCTOR GROUP IN PANELBOARDS, LOAD CENTERS, CIRCUIT BREAKER ENCLOSURES, AUTOMATIC TRANSFER SWITCHES, GENERATOR ELECTRICAL ENCLOSURE, OR OTHER ENCLOSURES SHALL HAVE A PERMANENT, LEGIBLE WIRE MARKING LABEL WITH SUITABLE NUMBERS TO SHOW THE DESTINATION OF THE WIRING. THIS DESIGNATION SHALL CALL OUT THE DESTINATION OF THE NEW WIRING SUCH AS "TO ATS-1" OR "TO METER" OR "TO GENERATOR" OR "TO PANELBOARD".



2 TYPICAL LIGHT POLE FOUNDATION

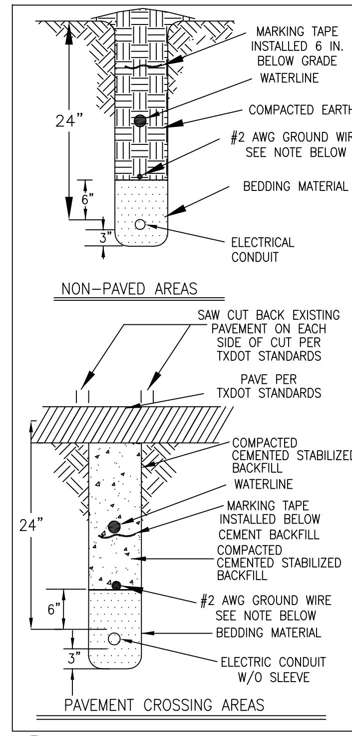
SCALE: NOT TO SCALE

NEW UNDERGROUND PULL BOX FOR BELOW GRADE SERVICE, C/CONCRETE TYPE EQUAL TO QUAZITE #PG SERIES W/ COVER LABEL "LOW VOLTAGE LIGHTING". BOX LOAD DESIGN MINIMUM RATING UL-LISTED TIER 22 WITH EXTRA HEAVY DUTY TIER 22 QUAZITE BOLTED COVER.



3 FLUSH WITH GRADE PULL BOX

SCALE: NOT TO SCALE



TRENCHING NOTES

CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS TOOLS AND EQUIPMENT NECESSARY TO ACCOMPLISH THE REQUIRED TRENCHING. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING EXCAVATION. COSTS OF REPAIRING DAMAGE TO EXISTING UNDERGROUND UTILITIES OR FACILITIES SHALL BE BORNE BY THE CONTRACTOR.

TRENCHES SHALL BE EXCAVATED TO THE DEPTHS AND LINES PLACED AS SHOWN ON THESE DETAILS. THE WIDTH OF ANY TRENCHES SHALL BE BETWEEN SIX AND TWELVE INCHES. WHERE ROOTS OR STUMPS ARE ENCOUNTERED THEY SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. LARGE ROOTS SHALL BE CUT OFF FLUSH WITH THE SIDES OF THE TRENCH USING A PRUNING SAW OR PRUNING LOPERS.

THE CONTRACTOR SHALL STAKE EACH PROPOSED ROUTE FOR APPROVAL BY THE DESIGNATED REPRESENTATIVE PRIOR TO TRENCHING.

BEDDING MATERIAL SHALL BE BEDDED AROUND ALL CONDUITS & WATER LINES. BEDDING MATERIAL SHALL BE SAND OR OTHER SUITABLE BEDDING MATERIAL THAT PASSES A 3/8" SIEVE TEST. THE COMPACTED EARTH FILL MATERIAL SHALL BE FREE OF MUD, CLAY LUMPS, VEGETATION, DEBRIS AND ROCKS EXCEEDING 6" IN IN THEIR GREATEST DIMENSION. THE "FINES" RESULTING FROM THE USE OF A TRENCHING MACHINE MAY ONLY BE USED AS COMPACTED EARTH BACKFILL UNLESS SPECIFICALLY APPROVED BY THE ENGINEER.

A DETECTABLE ELECTRICAL MARKING TAPE SHALL BE BURIED AT THE DEPTHS SHOWN IN TRENCHES CARRYING ELECTRIC CONDUIT, IF A EXCEPTION TO THE 24" EARTH COVER IS WARRANTED, REFER TO THE DESIGNATED OWNER REPRESENTATIVE AND NEC-2023 MINIMUM TRENCH DEPTHS CALLED OUT IN TABLE 300.5 IN ARTICLE 300.5 TO DETERMINE IF THE MINIMUM EARTH COVER REQUIREMENTS BASED ON LOCATIONS AND CONDITIONS. UNLESS AGREED UPON IN WRITING, THE MINIMUM EARTH COVER CALLED OUT IS 24 INCHES OF EARTH COVER.

WHERE MORE THAN ONE CONDUIT IS INSTALLED IN A TRENCH, THE CONDUITS SHALL BE SEPARATED BY A MINIMUM OF 2" OF BEDDING MATERIAL AND THE TRENCH WIDTH SHALL BE ADJUSTED AS NECESSARY TO ACCOMMODATE MULTIPLE CONDUITS.

CONTRACTOR SHALL TRENCH UNDER ALL KNOWN UNDERGROUND UTILITIES CROSSINGS BY HAND WITHOUT DAMAGING EXISTING PIPES AND CONDUITS. CONTRACTOR SHALL INSTALL CONDUITS UNDER THE EXISTING PIPING TO MEET MINIMUM COVER REQUIREMENTS. CONTRACTOR SHALL FIELD INVESTIGATE PRIOR TO PLACING BID.

THE CEMENT STABILIZED BACKFILL FOR UNDER PAVEMENT LOCATIONS SHALL BE COMPOSED OF A 3-PARTS SAND AND 1.5 PARTS OF PORTLAND CEMENT MIXTURE. THIS BACKFILL SHALL BE PROVIDED FROM TOP PIPE BEDDING TO BOTTOM OF PAVEMENT.

1 TYPICAL ILLUMINATION TRENCHING DETAIL ELECTRICAL

SCALE: NOT TO SCALE

DIVISION 27 TELECOMMUNICATION SPECIFICATIONS

PART 1 – GENERAL

1.1 CODES, STANDARDS AND REFERENCES

A. TIA / EIA-455 SERIES (FIBER OPTIC TEST STANDARDS)
B. TIA/EIA-568-B SERIES (CABLING STANDARD)
C. TIA/EIA-569-A SERIES (PATHWAYS AND SPACES STANDARD)
D. TIA/EIA-606 SERIES (ADMINISTRATION STANDARD)
E. ANSI/TIA/EIA-607 SERIES (GROUNDING AND BONDING)
F. ANSI/TIA/EIA-758 (CUSTOMER OWNED OUTSIDE PLANT (OSP)
G. TIA/EIA BULLETIN TSB67
H. LOCAL AREA NETWORK ETHERNET STANDARD, IEEE 802.3 SERIES
I. THE BICSI TELECOMMUNICATIONS DISTRIBUTION METHODS MANUAL

1.2 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: INSTALLATION CONTRACTORS MUST BE MANUFACTURER TRAINED AND CERTIFIED RESELLERS. THE INSTALLATION CONTRACTOR MUST BE ENGAGED IN THE NORMAL BUSINESS OF INSTALLING TELECOMMUNICATIONS CABLING SYSTEMS AND LICENSED TO OPERATE IN THE STATE OF TEXAS. ALL INSTALLATION TECHNICIANS MUST BE FAMILIAR WITH THE CODES, STANDARDS AND PROCEDURES REQUIRED BY THIS DOCUMENT AND MUST BE TRAINED AND CERTIFIED FOR INSTALLATIONS. THE INSTALLING CONTRACTOR MUST BE A PANDUIT-CERTIFIED OR CERTIFIED BY THE FIBER MANUFACTURER PROVIDED AS A INSTALLATION CONTRACTOR.

B. FIBER CABLES AND ALL STRUCTURED CABLING SYSTEM WARRANTY AND CERTIFICATION: TXDOT REQUIRES A WARRANTY ON THE INSTALLATION OF STRUCTURED CABLING SYSTEM OF AT LEAST ONE YEAR FROM BUILDING ACCEPTANCE. IN ADDITION, TXDOT REQUIRES THAT 100% OF THE CABLES AND TERMINATION EQUIPMENT INSTALLED BE TESTED AND CERTIFIED AT THE DESIGNED AND INTENDED PERFORMANCE LEVEL AND THAT SUCH TEST RESULTS BE DELIVERED TO TXDOT AS A SUBMITTAL PRIOR TO ACCEPTANCE OF THE WORK PERFORMED.

C. CABLE TESTING AND CERTIFICATION: COMPLETE END TO END TEST RESULTS MUST BE SUBMITTED FOR REVIEW AS PART OF THE INSTALLATION INSPECTION. THESE TEST RESULTS MUST BE THE ACTUAL NATIVE MACHINE TEST RESULTS DOWNLOADED FROM THE TEST SET, ONTO CD OR FLASHDRIVE, AND ALSO PROVIDED IN PAPER FORM. TEST RESULTS MUST CONTAIN THE NAMES AND SIGNATURES OF THE TECHNICIANS PERFORMING THE TESTS AND A PASS OR FAIL RATING.

D. ALL SPICES ARE PROHIBITED UNLESS TERMINATION IS REQUIRED AT THE FIBER PATCH PANEL OR OUTDOOR SURVEILLANCE CABINET ENCLOSURE.

PART 2 – PRODUCTS AND EXECUTION

2.1 UNDERGROUND CONDUIT

A. ALL CONDUIT SHALL BE SCH 40 RIGID NONMETALLIC CONDUIT, PVC AND MUST MEET THE REQUIREMENTS OF NEMA TC 6. ALL CONDUIT SECTIONS SHALL BE GLUED WITH PVC PIPD GLUE TO FORM A WATERTIGHT JOINT.
B. ALL CONDUIT SHALL BE INSTALLED WITH A SLIGHT DRAIN SLOPE (.125" / FT) AWAY FROM BUILDINGS TO PREVENT THE ACCUMULATION OF WATER IN THE CONDUIT OR INGRESS TO THE BUILDINGS.
C. ANSI/TIA/EIA569-A BEND RADIUS REQUIREMENTS SHALL BE USED FOR ALL TELECOMMUNICATIONS CONDUIT. THE BEND RADIUS OF THE SWEEPS MUST BE A MINIMUM OF 10 TIMES THE INTERNAL CONDUIT DIAMETER. BENDING CONDUIT IN THE FIELD USING MANUAL OR MECHANICAL METHODS IS NOT ACCEPTABLE. STANDARD ELECTRICAL ELBOWS SHALL NOT BE USED.
D. ALL CONDUIT SHALL BE PLUGGED WITH WATERTIGHT PLUGS AT BOTH ENDS TO PREVENT THE INTRUSION OF WATER, GASSES AND RODENTS THROUGHOUT THE CONSTRUCTION PROJECT.
E. ALL CONDUITS SHALL HAVE ¼" POLYPROPYLENE PULL ROPES INSTALLED. THE PULL ROPES MUST BE RE-PULLED EACH TIME AN ADDITIONAL CABLE IS INSTALLED.
F. ALL CONDUITS MUST BE TESTED WITH A MANDREL TO PROVE COMPLIANCE WITH THE BEND RADIUS REQUIREMENTS THROUGHOUT THE CONDUIT RUN. WITHIN 5 DAYS OF RELEASING THE CONDUIT FOR THE INSTALLATION OF CABLE, THE CONDUIT INSTALLATION CONTRACTOR SHALL PROVE ALL CONDUITS TO BE CLEAN AND DRY.

2.2 FIBER OPTIC CABLING

A. SINGLE MODE FIBER MANUFACTURED BY PANDUIT OPTI-CORE NON-METALLIC OPTION INDOOR/OUTDOOR 6-PAIR SINGLE MODE FIBER CABLE OR EQUAL
B. FIBER-OPTIC CABLES SHALL HAVE A MINIMUM 20 FOOT SERVICE LOOP AT THE TERMINATING ENDS AND ALL APPROVED SPLICE POINTS.
C. ALL STRANDS OF FIBER-OPTIC CABLE MUST BE TERMINATED IN A FIBER PATCH PANEL WITH ST TYPE CONNECTORS AND TESTED PER 1.1A.

2.4 LABELING

A. EACH PATCH PANEL IN A RACK WILL BE LABELED SEQUENTIALLY WITH A LETTER OF THE ALPHABET, STARTING AT A.
B. EACH PORT IN A PATCH PANEL SHALL BE LABELED SEQUENTIALLY FROM 1, STARTING WITH THE TOP AND LEFT MOST PORT. IF LABELS ARE NOT ALREADY PART OF THE PATCH PANEL, LABELS SHALL BE AFFIXED ABOVE EACH PORT.
C. CABLES SHALL BE LABELED AT EACH END, CLEARLY MARKING THE CONNECTION THE CABLE ESTABLISHES.
D. LABELS APPLIED DIRECTLY TO A CABLE SHALL HAVE A CLEAR VINYL WRAPPING APPLIED OVER THE LABEL AND AROUND THE CABLE TO PERMANENTLY AFFIX THE LABEL.
E. ALL LABELS SHALL BE MACHINE PRINTED.
F. LABELS FOR TELLECOMMUNICATIONS CABLES SHALL USE THE FOLLOWING FORM: Tcc-pjj WHERE cc IS THE ORIGINATING TELECOMMUNICATIONS CLOSET NUMBER, p IS THE PATCH PANEL IDENTIFIER, AND jj IS THE JACK NUMBER IN THE PATCH PANEL (INCLUDING LEADING ZEROES IF NECESSARY)

ELECTRICAL SYMBOLS AND LEGEND

THE DRAWING PLAN SET USES THE ELECTRICAL SYMBOLS AND LEGEND TO DEFINE QUALITY CONTROL, TERMINATIONS, SWITCHES, RECEPTACLES, LIGHTING CONTROLS, LOAD CENTERS, ELECTRICAL EQUIPMENT, ABBREVIATIONS AND LINE TYPES THAT MAY BE CALLED OUT IN THE DRAWING PLAN SET. REFER TO ALL ELECTRICAL SHEETS TO IDENTIFY ALL REQUIREMENTS.

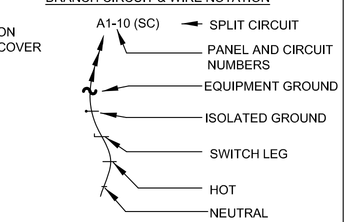
LISTED ABBREVIATIONS

BOF	BOTTOM OF FIXTURE
GFCI	DEVICE WITH GROUND FAULT INTERRUPTER PROTECTION
WP	WEATHER RATED DEVICE; IN-USE DIE CAST ALUMINUM COVER
RGS	RIGID GALVANIZED STEEL OR RIGID METAL CONDUIT
PVC	POLY VINYL CLORIDE CONDUIT
EMT	ELECTRICAL METALIC TUBING CONDUIT
AFR	ABOVE FINISHED ROOF
AFF	ABOVE FINISHED FLOOR
BFG	BELOW FINSIHED GRADE
AFG	ABOVE FINISHED GRADE
SCH.	SCHEDULE
TYP.	TYPICAL

—— UGE —— UNDERGROUND ELECTRICAL

—— E/T —— UNDERGROUND CCTV MULTIMODE FIBER

BRANCH CIRCUIT & WIRE NOTATION



CONTRACTOR'S PROJECT SUBMITTAL LIST:

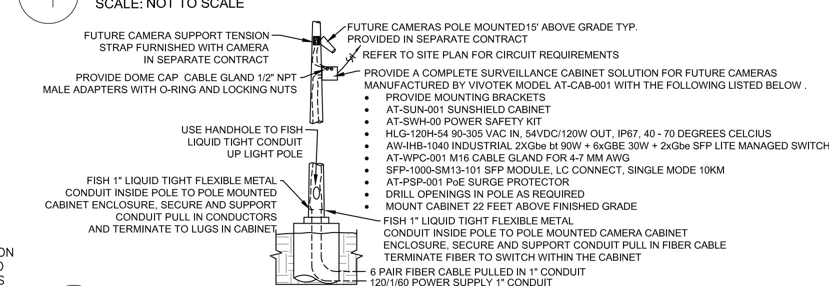
CONTRACTOR'S LIST OF MATERIALS AND PRODUCTS REQUIRING A SUBMITTAL FOR REVIEW PRIOR TO INSTALLATION	MANUFACTURER'S PRODUCT INFO	INSTALLATION INSTRUCTIONS	MANUFACTURER MODEL NUMBER AND DESCRIPTION	LEGIBLE PHOTO	LEGIBLE PHOTO OF COLOR SELECTED	METHOD DESCRIPTION	SCREEN PHOTO AND/OR PRINTED TEST RESULTS
TDLR LICENSES FOR EACH TRADE				YES			
GROUNDING ELECTRODES	YES	YES	YES	YES			
CONDUIT CONDUCTORS CABLES AND FIBER	YES		YES	YES			
ELECTRICAL DEVICES, PULL BOXES AND CONDUIT BODIES	YES		YES	YES			
LIGHT FIXTURES AND POLES	YES		YES	YES	YES		
TEST RESULTS			YES		YES	YES	YES
O&M WITH SUBMITTALS, MANUFACTURER WARRANTIES AND ASBUILT DRAWINGS	YES	YES	YES				

YES --MEANS YOU MUST SUBMIT THIS

O&M, SUBMITTALS, WARRANTY ASBUILTS (SUBMITTED AT CLOSE OUT.)
A. CONTRACTOR'S ONE YEAR LABOR AND MATERIAL WARRANTY CERTIFICATE WITH INSTRUCTIONS AND CONTACT INFORMATION OR WARRANTY WORK.
B. MANUFACTURER'S EXTENDED WARRANTIES.

4 CONTRACTORS ILLUMINATION PROJECT SUBMITTAL LIST

SCALE: NOT TO SCALE



5 CCTV CAMERA INSTALLATION DETAIL

SCALE: NOT TO SCALE

IH 35
ILLUMINATION NB & SB
SHEET "D"

SHEET 4 OF 4

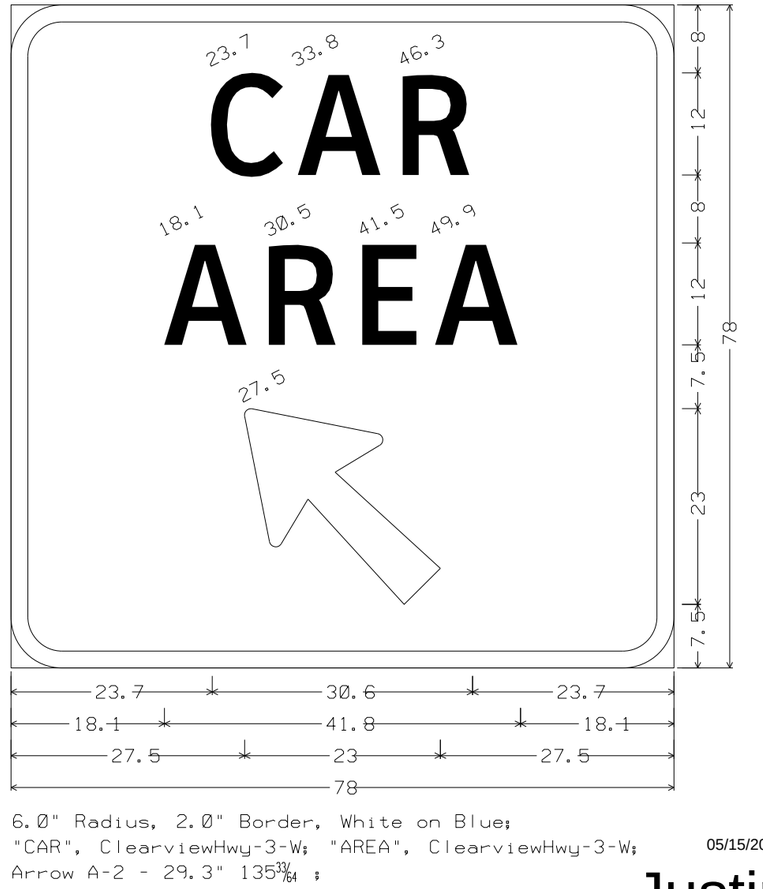
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35

DIST	COUNTY	SHEET NO.
WAC	BELL	100

PROPOSED SMALL SIGN DATA SHEET

SHEET	SIGN	STATION (FOR CONTRACTOR INFO ONLY)		ID	LEGEND OR TYPE	SIGN WIDTH (IN)	SIGN HEIGHT (IN)	SIGN AREA (SF)	SIGN AREA (TOTAL) (SF)	PANEL	POST SIZE	NO. OF POST	ANCHOR TYPE	SIGN MOUNT
PMD NB	01	133+50		R1-2	YIELD	48	41.6	6.9	6.9	TY A	10 BWG	1	SA	T
PMD NB	02	114+50		R5-1	DO NOT ENTER	48	48	16.0	16.0	TY A	10 BWG	1	SA	T
PMD NB	03	114+50		R5-1	DO NOT ENTER	48	48	16.0	16.0	TY A	10 BWG	1	SA	T
PMD NB	04	39+00		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD NB	05	39+40		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD NB	06	40+40		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD NB	07	40+65		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD NB	08	133+45		W13-2	EXIT 30 MPH	48	60	20.0	20.0	TY A	S 80	1	SA	T
PMD NB	09	25+00		R13-1TP	ALL TRUCKS NEXT RIGHT	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD NB	10	34+50		*	VIDEO MONITORING	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD NB	11	113+50		*	VIDEO MONITORING	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD NB	12	25+00		*	CAR AREA	78	78	42.3	42.3	TY A	S 80	2	SA	P
PMD SB	13	102+50		R1-2	YIELD	48	41.6	6.9	6.9	TY A	10 BWG	1	SA	T
PMD SB	14	122+00		R5-1	DO NOT ENTER	48	48	16.0	16.0	TY A	10 BWG	1	SA	T
PMD SB	15	122+00		R5-1	DO NOT ENTER	48	48	16.0	16.0	TY A	10 BWG	1	SA	T
PMD SB	16	47+35		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD SB	17	47+55		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD SB	18	48+55		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD SB	19	48+80		R7-8T/R7-8P	RESERVED PARKING, VAN ACCESSIBLE	12	24	2.0	2.0	TY A	TWT	1	WS	P
PMD SB	20	102+50		W13-2	EXIT 30 MPH	48	60	20.0	20.0	TY A	S 80	1	SA	T
PMD SB	21	134+00		R13-1TP	ALL TRUCKS NEXT RIGHT	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD SB	22	53+50		*	VIDEO MONITORING	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD SB	23	123+00		*	VIDEO MONITORING	72	30	15.0	15.0	TY A	10 BWG	1	SA	T
PMD SB	24	134+00		*	CAR AREA	78	78	42.3	42.3	TY A	S 80	2	SA	P



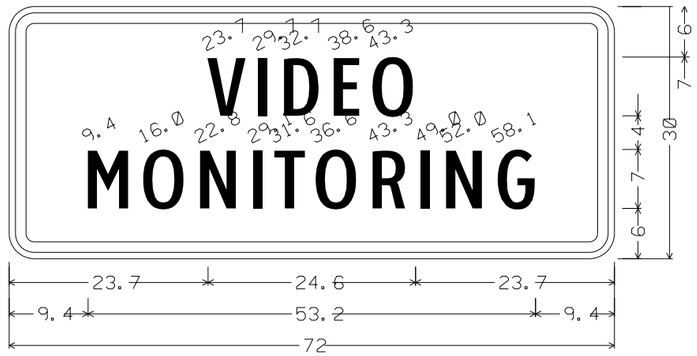
6.0" Radius, 2.0" Border, White on Blue;
"CAR", ClearviewHwy-3-W; "AREA", ClearviewHwy-3-W;
Arrow A-2 - 29.3" $135\frac{33}{64}$;

SIGN NO. 12, 24

NOTES:

1. CONTRACTOR SHALL STAKE THE PROPOSED LOCATION OF ALL SIGNS AND RECEIVE APPROVAL FROM THE ENGINEER PRIOR TO INSTALLING SIGN BASES.

LOCATION	644 6004	644 6030	644 6050	644 6060	644 6076
	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1) SA(T)	IN SM RD SN SUP&AM TYS80(2) SA(P)	IN SM RD SN SUP&AM TYTWT(1) WS(P)	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA
Northbound	6	1	1	4	11
Southbound	6	1	1	4	11



3.0" Radius, 1.3" Border, 0.8" Indent, Black on White;
"VIDEO", ClearviewHwy-2-W; "MONITORING", ClearviewHwy-2-W;

SIGN NO. 10, 11, 22, 23

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

05/15/2024

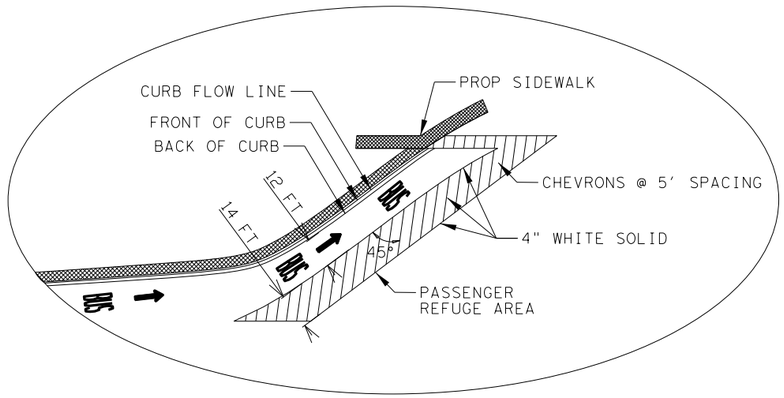
Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.15 13:19:31 -05'00'

IH 35
SMALL SIGN SUMMARY
NORTHBOUND AND SOUTHBOUND

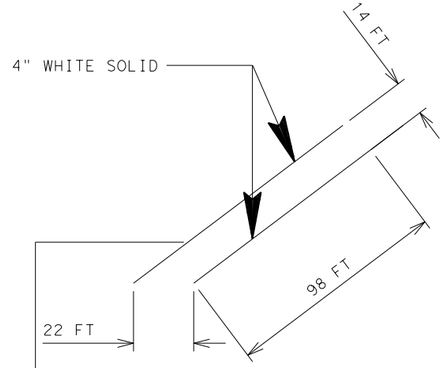
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		120

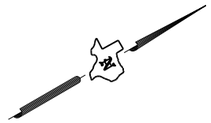


BUS PARKING DETAIL

NTS



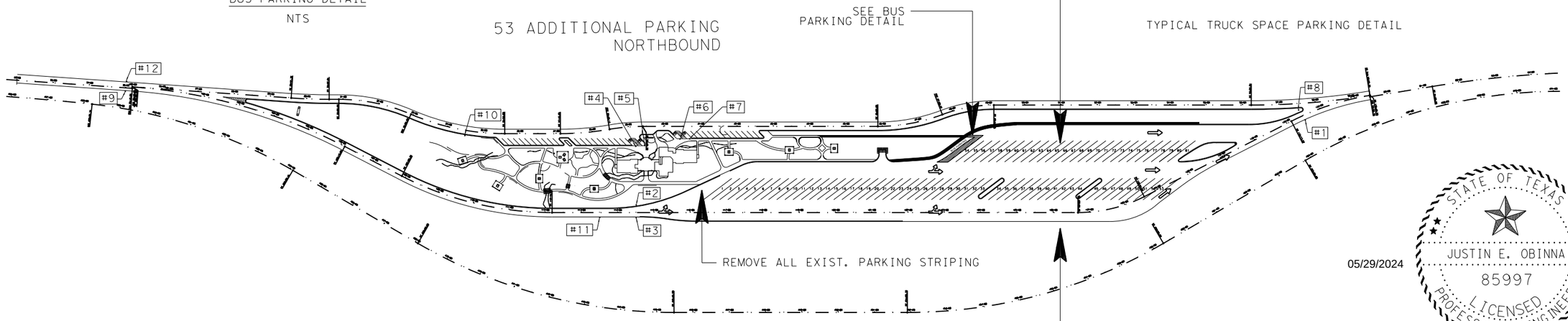
TYPICAL TRUCK SPACE PARKING DETAIL



LEGEND

[#1] SIGN NUMBER

NOTE: SEE SMALL SIGN SHEET FOR SIGN QUANTITIES AND BID ITEMS



LOCATION	666 6170	* 666 6225	666 6303	* 666 6356	* 666 6357	668 6077	668 6078	668 6085	668 6092	677 6001	677 6008	677 6012	678 6001	678 6021
	REFL PAV MRK TY II (W) 4" (SLD)	PAVEMENT SEALER 6"	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	REFL PAV MRK TY II(RED)(SYMBOL)(100MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (DBL ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (SYMBOL)
	LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	EA	EA	LF	EA
Northbound	6795	750	6795	1500	48	3	6	3	6	4247	2	3	5390	48

*SEE FIRE LANE STRIPING LAYOUT

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED
PROFESSIONAL ENGINEER

05/29/2024

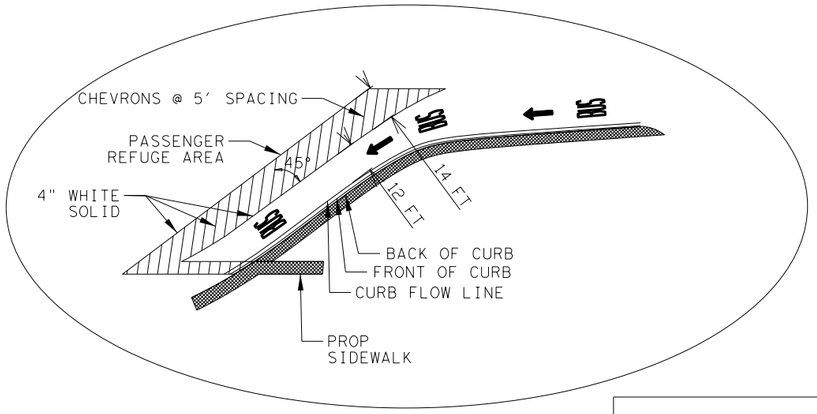
Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.29 17:25:11 -05'00'

IH 35
PAVEMENT MARKINGS
NORTHBOUND

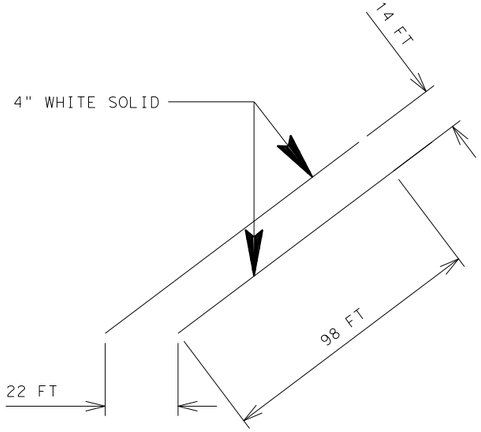
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		133



BUS PARKING DETAIL

NTS



TYPICAL TRUCK SPACE PARKING DETAIL

LEGEND

[#1] SIGN NUMBER

NOTE: SEE SMALL SIGN SHEET FOR SIGN QUANTITIES AND BID ITEMS

05/29/2024

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.29 17:12:51 -05'00'

53 ADDITIONAL PARKING
SOUTHBOUND

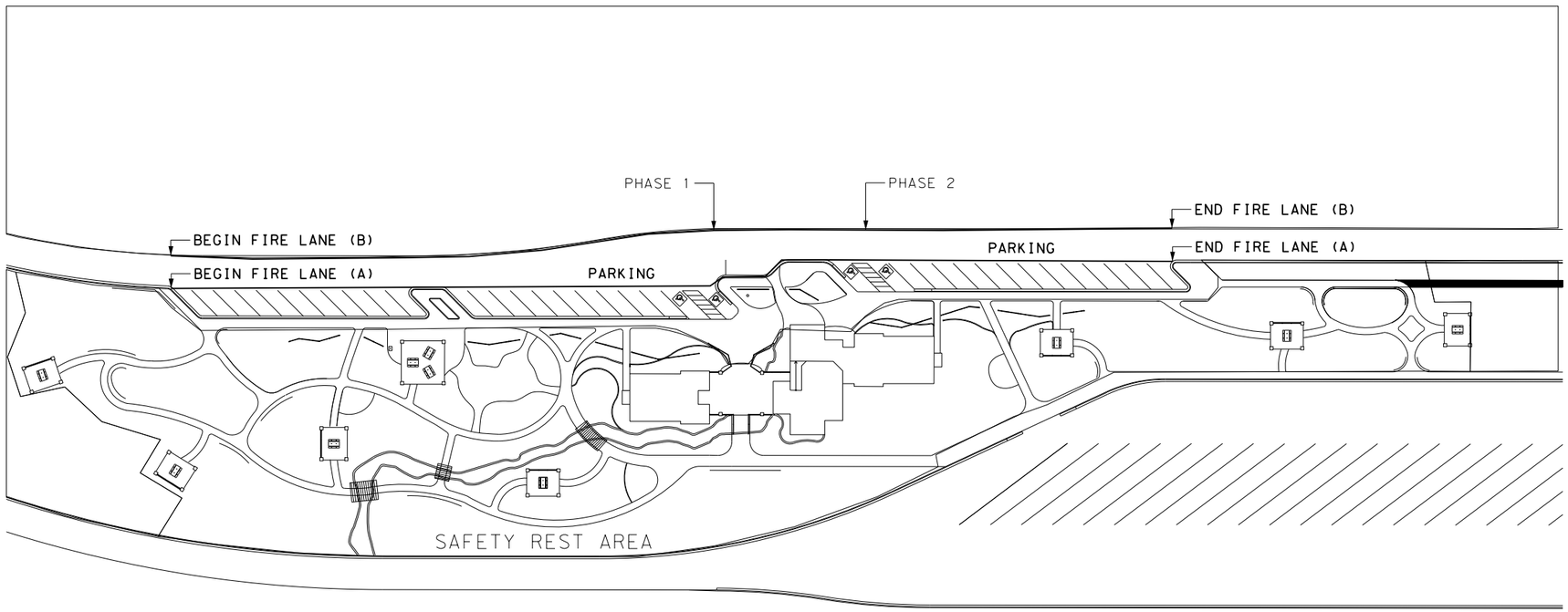
LOCATION	666 6170	666 6180	* 666 6225	666 6303	* 666 6356	* 666 6357	666 6363	668 6077	668 6078	668 6085	668 6092	677 6001	677 6008	677 6012	678 6001	678 6021
	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 12" (SLD)	PAVEMENT SEALER 6"	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	REFL PAV MRK TY II(RED)(SYMBOL)(100MIL)	REFL PAV MRK TY I (W)12"(SLD)(100MIL)1X	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (DBL ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (SYMBOL)
	LF	LF	LF	LF	LF	EA	LF	EA	EA	EA	EA	LF	EA	EA	LF	EA
Southbound	6893	234	750	6893	1500	48	234	3	6	3	6	4247	2	3	5488	48

*SEE FIRE LANE STRIPING LAYOUT

IH 35
PAVEMENT MARKINGS
SOUTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		134



0 50 100
SCALE IN FEET

STATE OF TEXAS
JUSTIN E. OBINNA
85997
LICENSED PROFESSIONAL ENGINEER

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.29 17:12:51 -05'00'

QUANTITIES (THIS SHEET)

6" RED LINE

PHASE 1 = 895 LF
PHASE 2 = 566 LF
TOTAL = 1461 LF

QUANTITIES (THIS SHEET)

4" FIRE LANE STENCIL

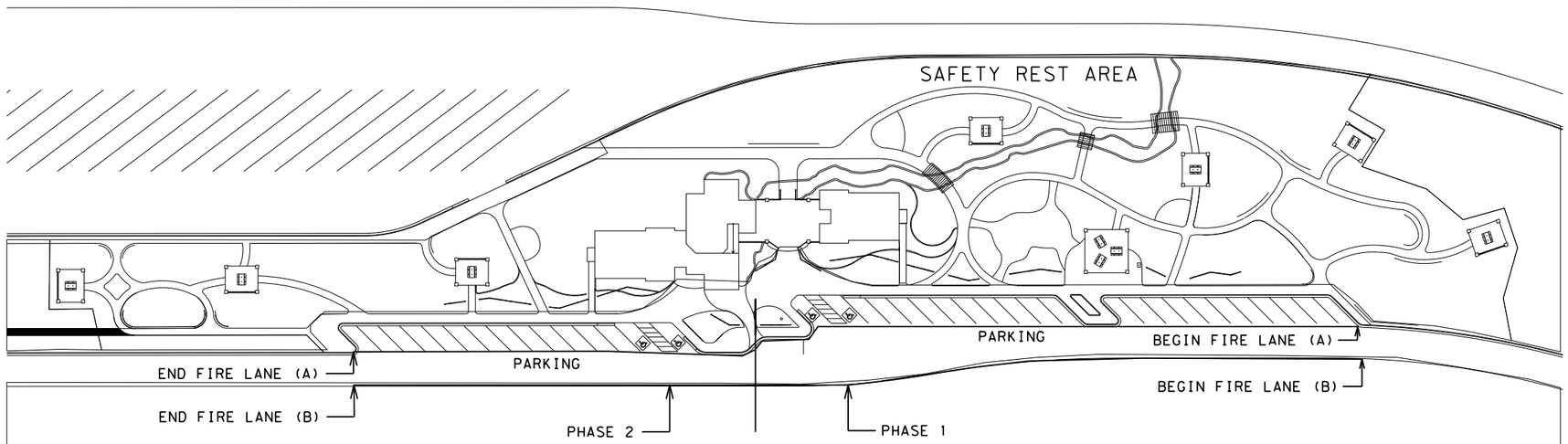
PHASE 1A = 15 EA
PHASE 1B = 15 EA
PHASE 2A = 9 EA
PHASE 2B = 9 EA
TOTAL = 48

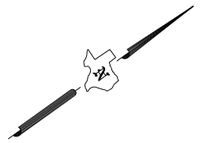
FIRE LANE STRIPING				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
666	6225	PAVEMENT SEALER 6"	LF	750
666	6356	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	LF	1500
666	6357	REFL PAV MRK TY II (RED)(SYMBOL)(100MIL)1X	EA	48
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	750

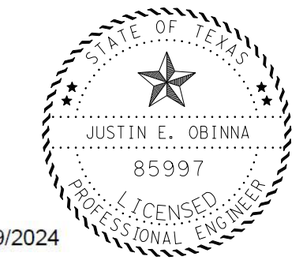
IH 35
FIRE LANE STRIPING LAYOUT
NORTHBOUND

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		135







05/29/2024

Justin E. Obinna

Digitally signed by Justin E. Obinna
Date: 2024.05.29 17:12:51 -05'00'

QUANTITIES (THIS SHEET)

6" RED LINE
PHASE 1 = 880 LF
PHASE 2 = 587 LF
TOTAL = 1467 LF

QUANTITIES (THIS SHEET)

4" FIRE LANE STENCIL
PHASE 1A = 14 EA
PHASE 1B = 14 EA
PHASE 2A = 10 EA
PHASE 2B = 10 EA
TOTAL = 48

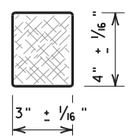
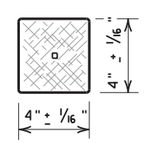
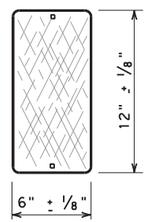
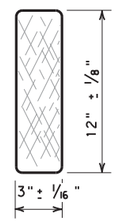
FIRE LANE STRIPING				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
666	6225	PAVEMENT SEALER 6"	LF	750
666	6356	REFL PAV MRK TY II (R&W)6"(FIRE LANE)	LF	1500
666	6357	REFL PAV MRK TY II (RED)(SYMBOL)(100MIL)1X	EA	48
677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	750

IH 35
FIRE LANE STRIPING LAYOUT
SOUTHBOUND

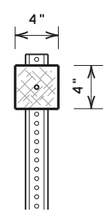
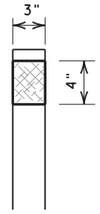
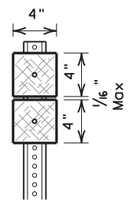
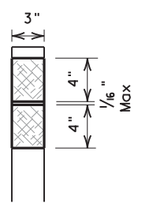
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		136

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

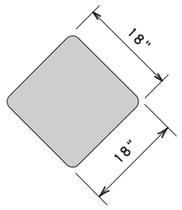
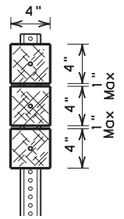
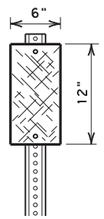
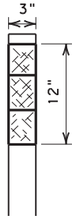
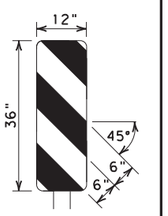
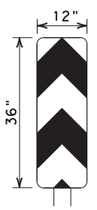
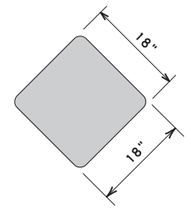
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

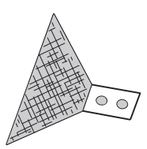
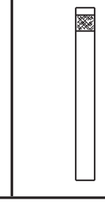
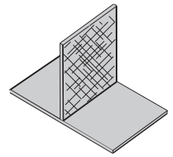
DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

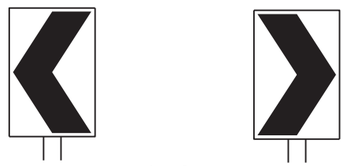
DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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).

ONE DIRECTION LARGE ARROW

DEVICE

W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

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

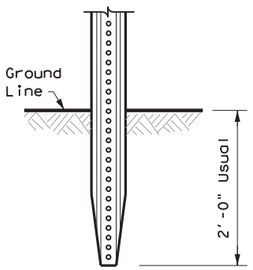
FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	BELL		137

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

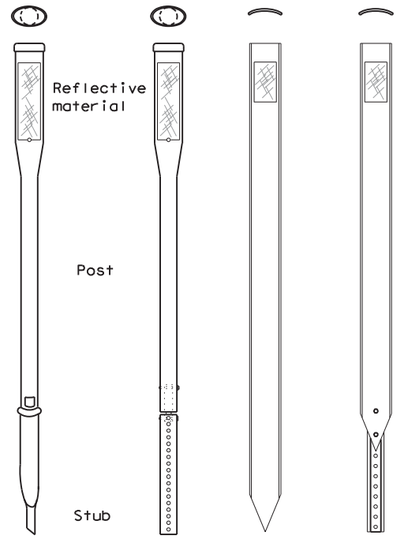


NOTES

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.

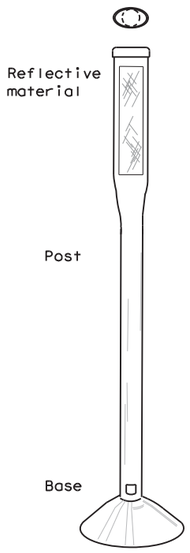
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



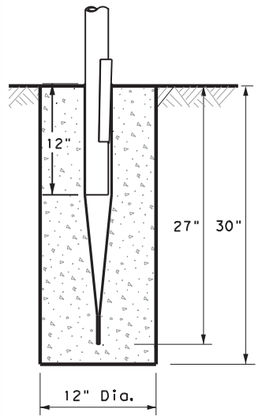
SURFACE MOUNT

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.

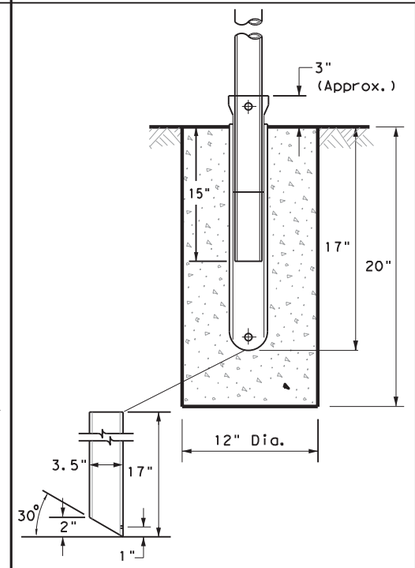
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

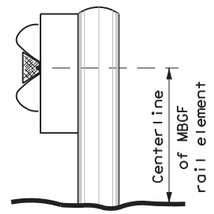
NOTE

1. Install per manufacturer's recommendations.

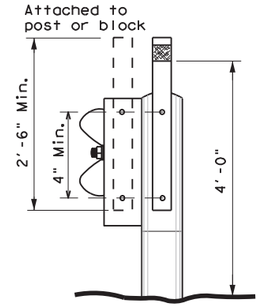
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

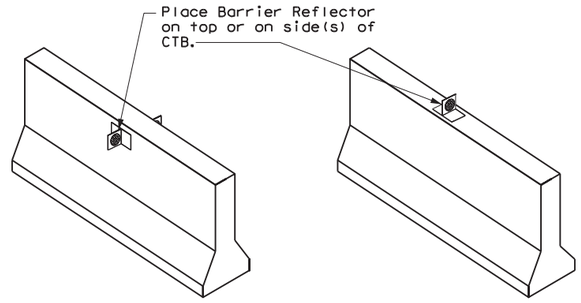
GF1



GF2



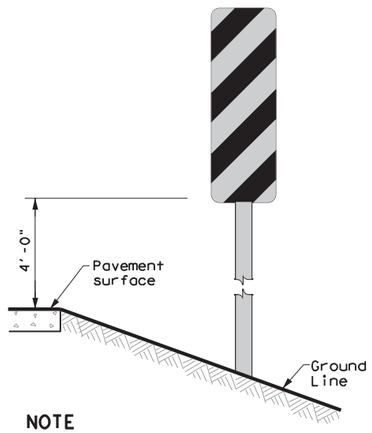
CONCRETE TRAFFIC BARRIER (CTB)



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.

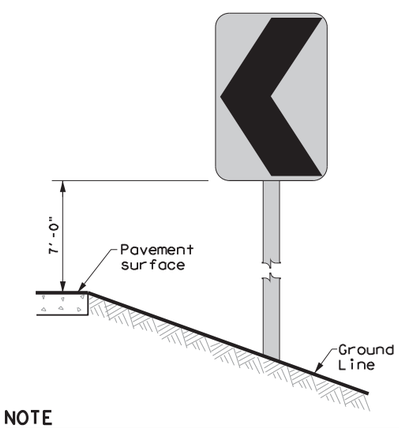
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

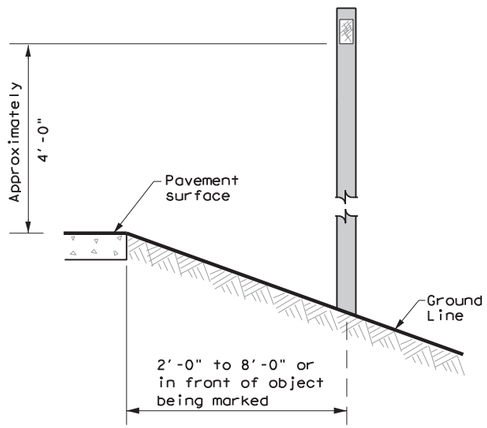
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0015	07	087	IH 35
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WAC	BELL		138

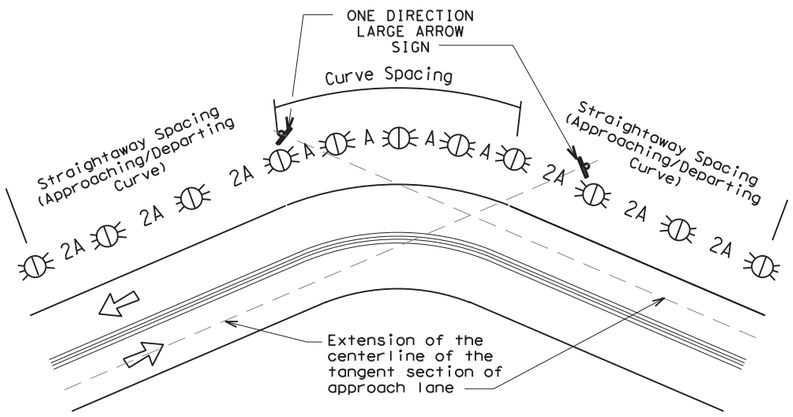
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

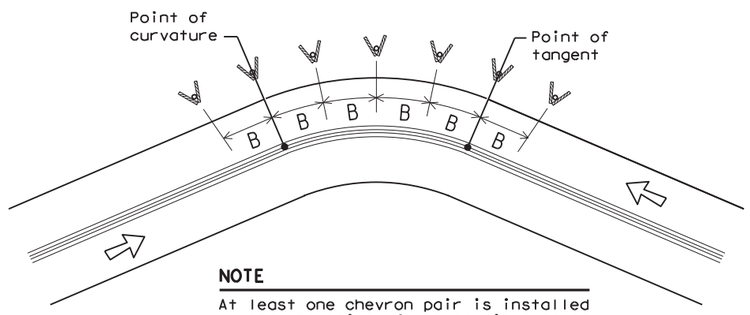
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

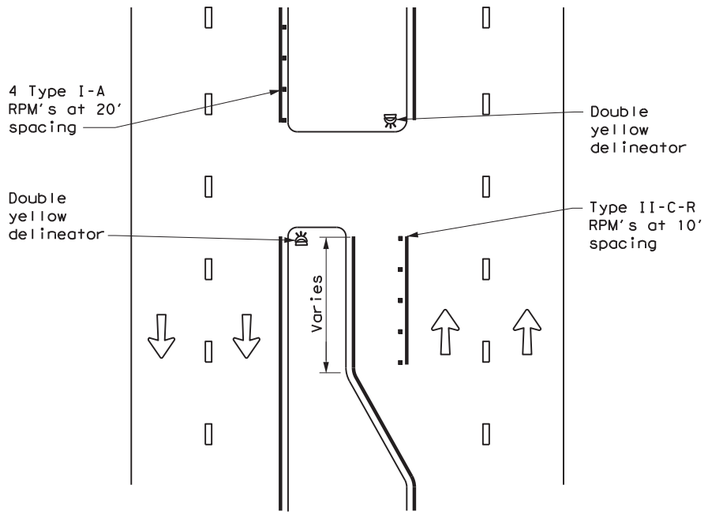
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WAC	BELL		139

20C

DATE:
FILE:

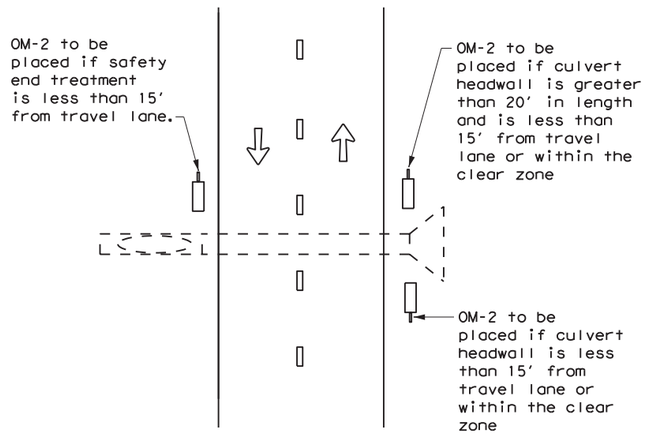
DATE:
FILE:

CROSSOVERS



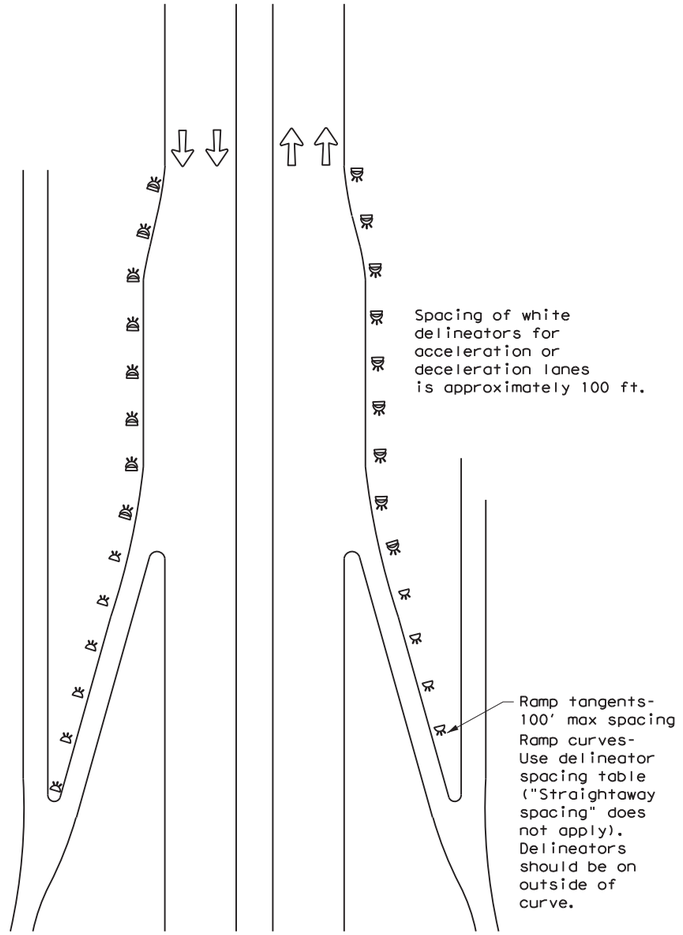
DETAIL 1

FOR CULVERTS WITHOUT MBGF



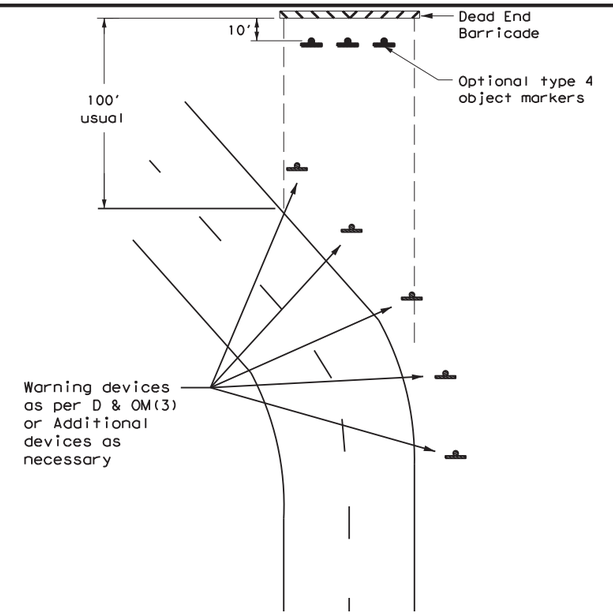
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



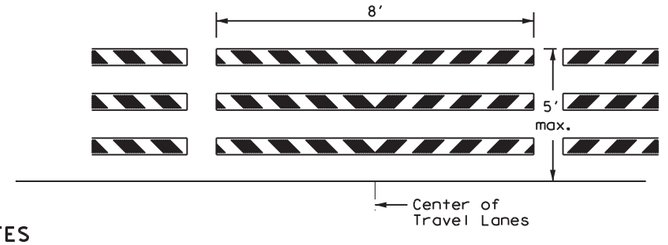
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

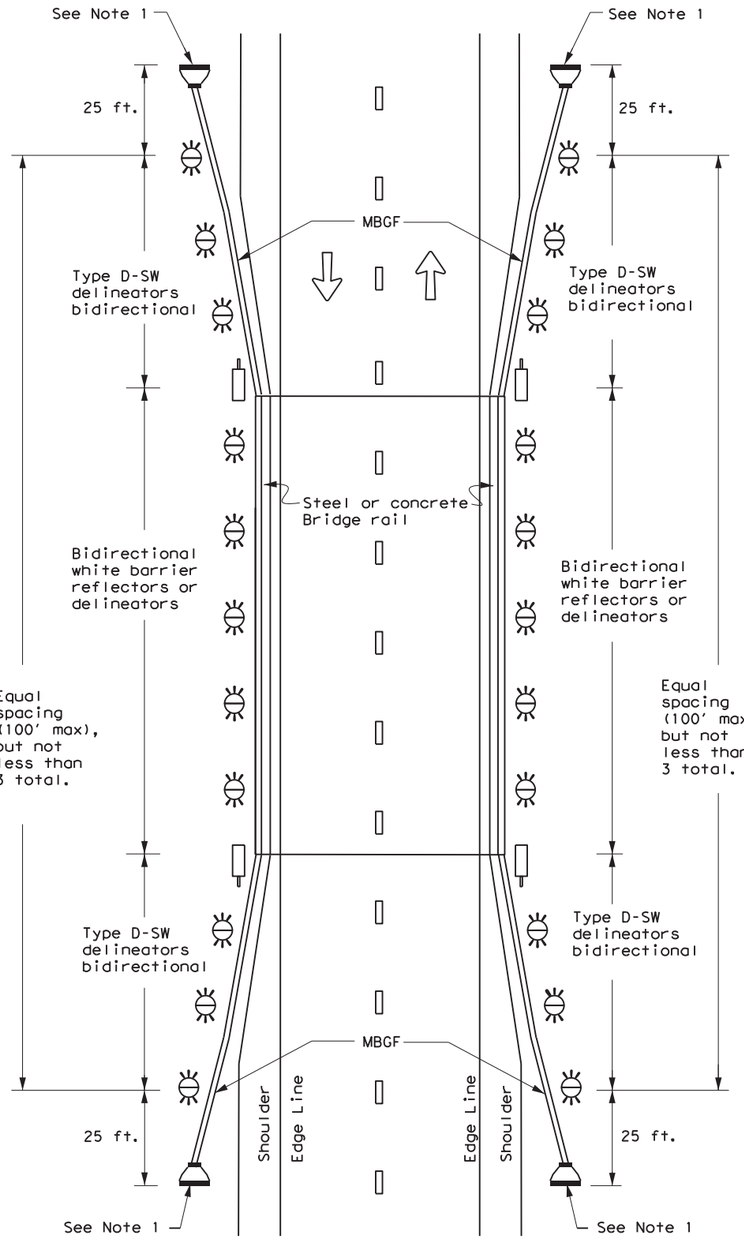
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
3-15 7-20	DIST	COUNTY		SHEET NO.
	WAC	BELL		140

20D

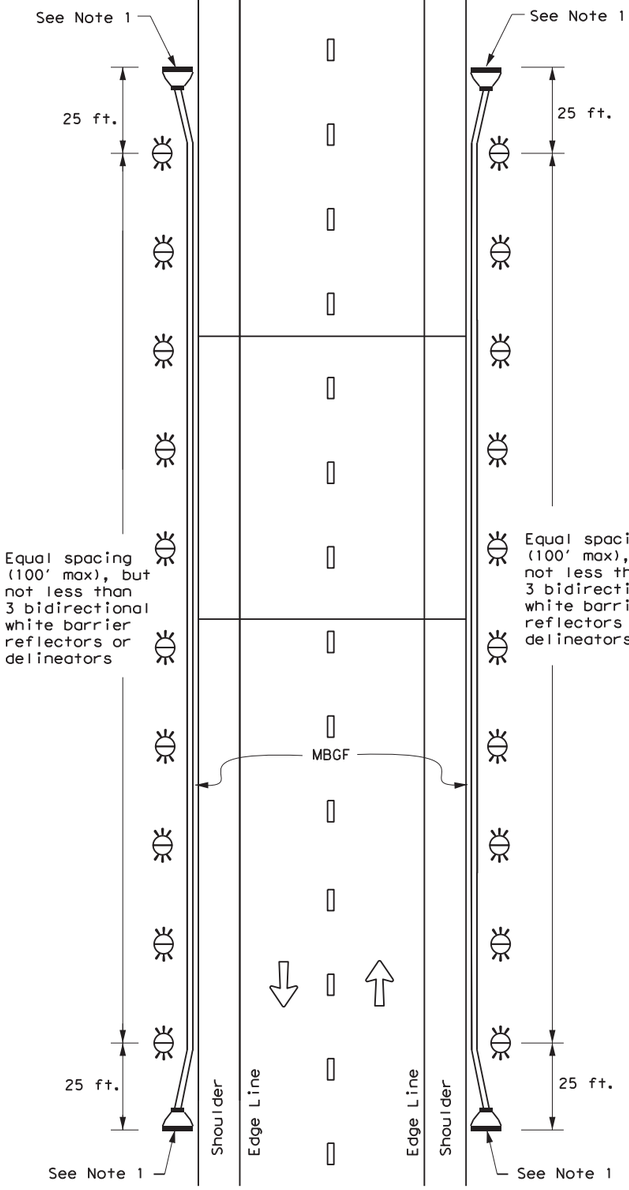
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. 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.

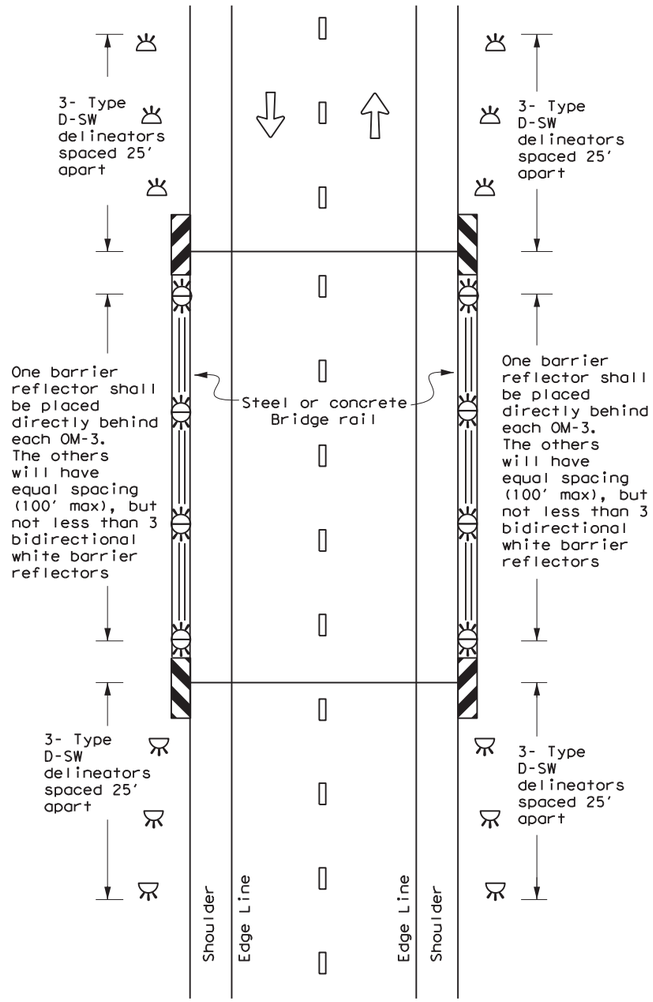
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. 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.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



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(5)-20

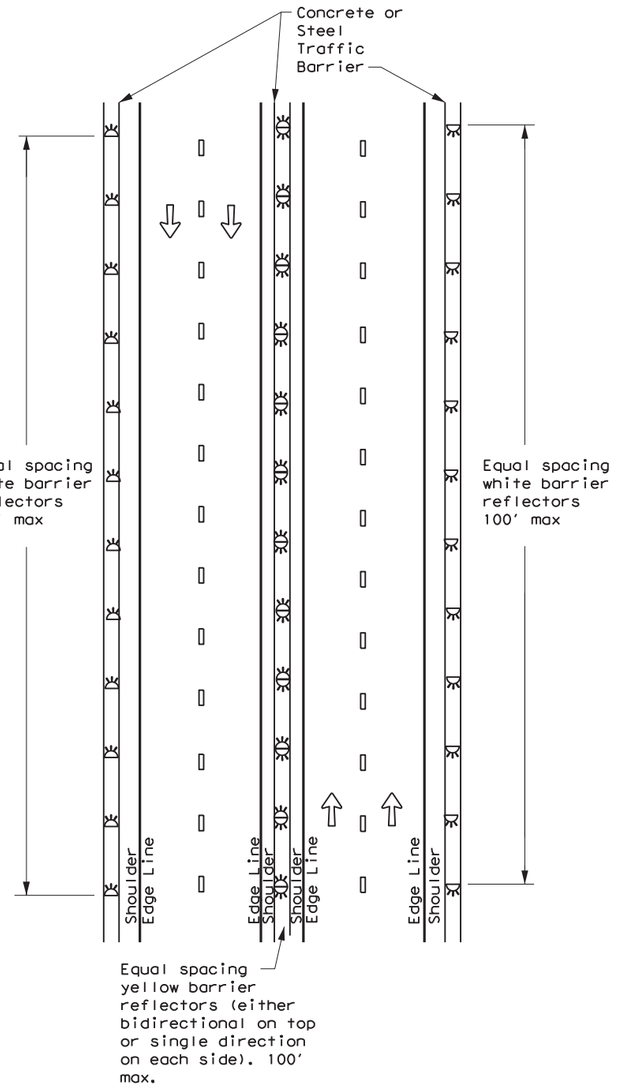
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
7-20	DIST	COUNTY		SHEET NO.
	WAC	BELL		141

DATE:
FILE:

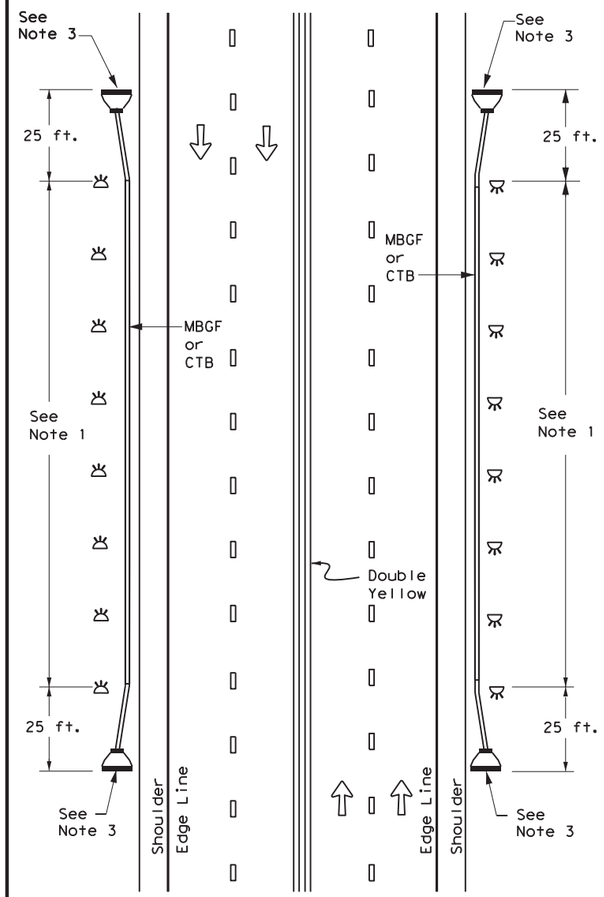
20E

DATE:
FILE:

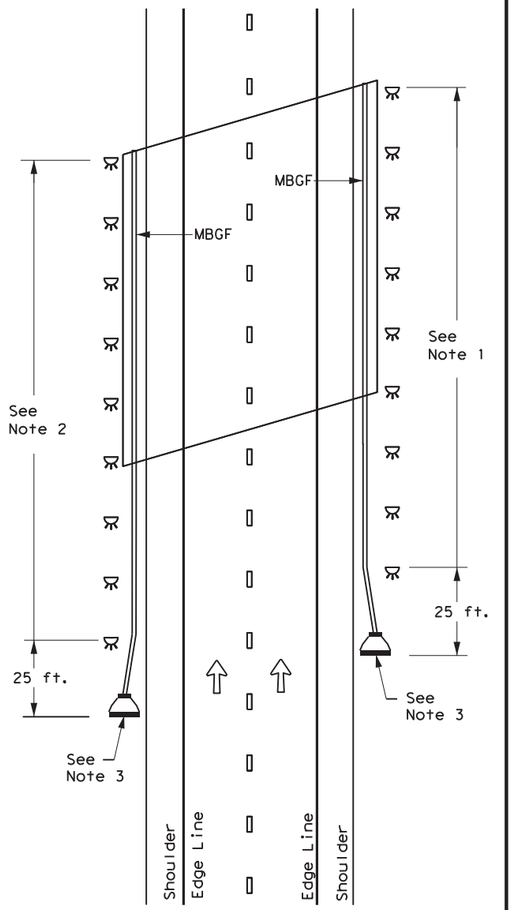
CONTINUOUS CONCRETE OR STEEL BARRIER



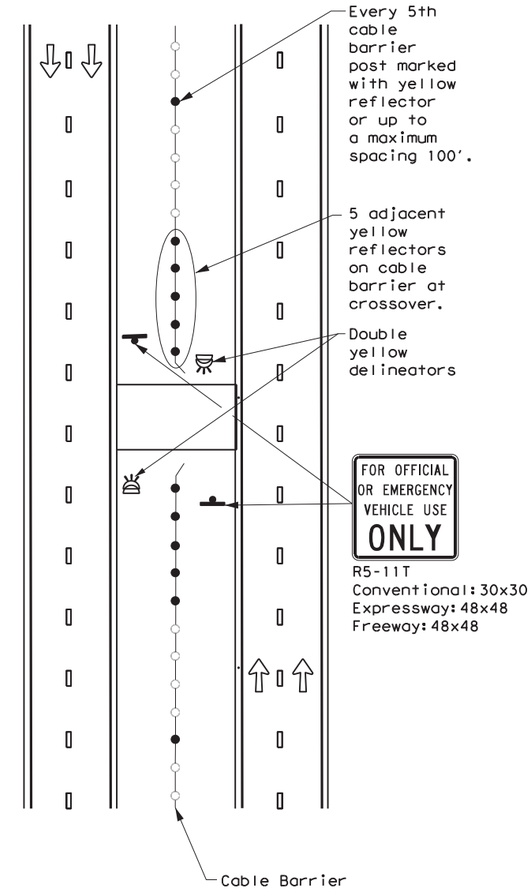
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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
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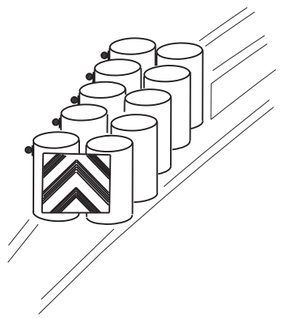
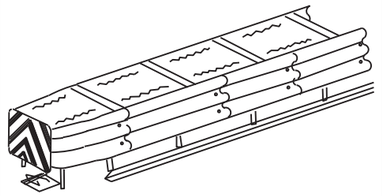
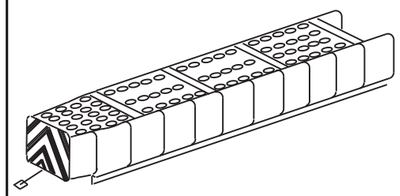
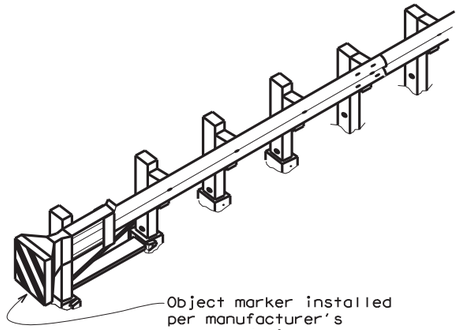
REVISIONS	0015	07	087	IH 35
7-20	DIST	COUNTY		SHEET NO.
	WAC	BELL		142

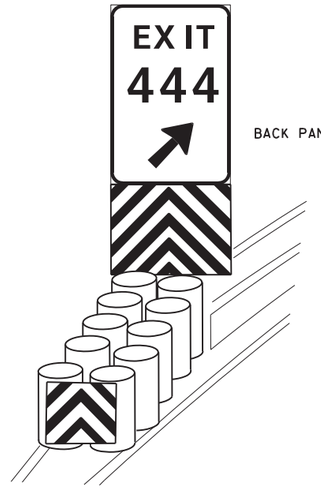




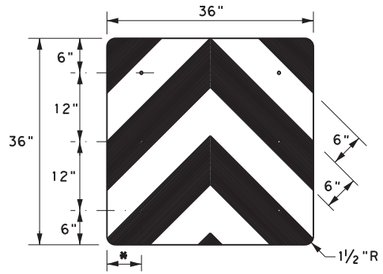


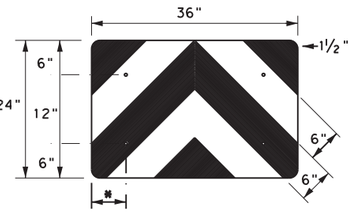


Object marker installed per manufacturer's recommendations.

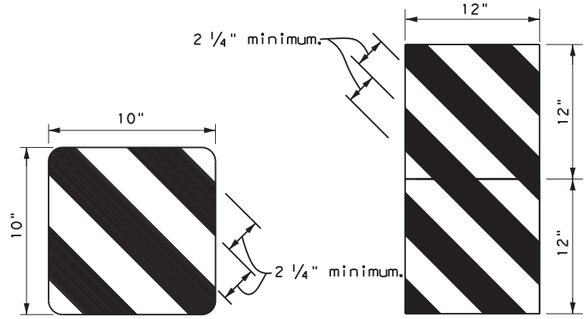


BACK PANEL (OPTIONAL)

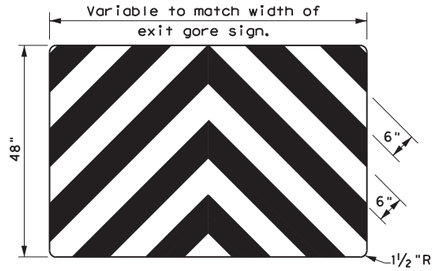


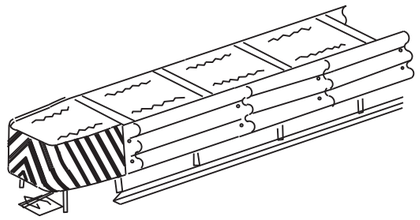


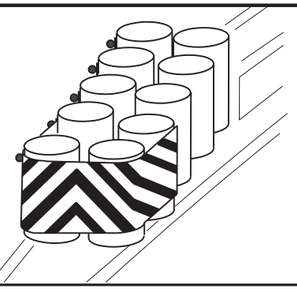
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

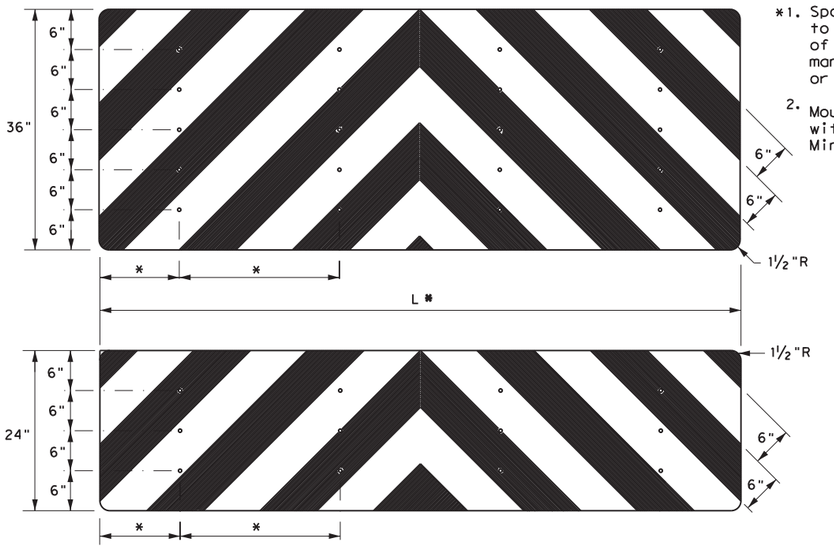


OBJECT MARKERS SMALLER THAN 3 FT^2









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	0015	07	087	IH 35
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	WAC	BELL		143
4-98 7-20				

20G

DATE:
FILE:

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0015-07-087

1.2 PROJECT LIMITS:
From: IH 35
To: IH 35

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 30.8984755 ,(Long) -97.5636757
END: (Lat) 30.9074026 ,(Long) -97.5558697

1.4 TOTAL PROJECT AREA (Acres): 75

1.5 TOTAL AREA TO BE DISTURBED (Acres): 9.47

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Expand Northbound and Southbound
safety rest area truck parking

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Heiden clay	1 to 3 percent slopes
Houston Black clay	0 to 1 percent slopes
Denton silty clay	1 to 3 percent slopes
Lewisville silty clay	3 to 5 percent slopes, eroded

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:
X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)
X Mobilization
X Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
X Grading operations, excavation, and embankment
X Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
X Place flex base
X Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
X Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:
X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
X Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
X Long-term stockpiles of material and waste
☐
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Willis Creek (Segment ID 1247A)	Unclassified Freshwater Stream
Granger Lake (Segment ID 1247)	Classified Reservoir

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT
X Development of plans and specifications
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR
X Day To Day Operational Control
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

Justin E. Obinna

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Date: 2024.05.29 17:27:02 -05'00'

STATE OF TEXAS
JUSTIN E. OBINNA
85997
PROFESSIONAL ENGINEER

05/29/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
9	SEE TITLE SHEET		144
STATE	STATE DIST.	COUNTY	
TEXAS	WAC	BELL	
CONT.	SECT.	JOB	HIGHWAY NO.
0015	07	087	IH 35

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☒ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☒ ☐ Inlet Protection
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☒ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
N/A	N/A	N/A

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
N/A	N/A	N/A

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

Justin E. Obinna

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STATE OF TEXAS
JUSTIN E. OBINNA
85997
PROFESSIONAL ENGINEER

05/29/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
9	SEE TITLE SHEET		145
STATE	STATE DIST.	COUNTY	
TEXAS	WAC	BELL	
CONT.	SECT.	JOB	HIGHWAY NO.
0015	07	087	IH 35

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☒ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☒ Required Action

Action No.

1. Preserve native vegetation to extent practical.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1. Monitoring well located in southbound proposed truck parking. See 'PROJECT LAYOUT SOUTHBOUND DETAIL SHEETS' for location.
2.
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0015	07	087	IH 35	
	DIST	COUNTY		SHEET NO.	
	WAC	BELL			

CK$
DW$
CK$
DN$

SOUTHBOUND

EROSION CONTROL QUANTITIES SB				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
160	6005	TOPSOIL	CY	95
168	6001	VEGETATIVE WATERING	MG	418.28
162	6008	ROLL SODDING	SY	1134
164	6010	BROADCAST SEED (TEMP) (WARM)	AC	0.5
164	6010	BROADCAST SEED (TEMP) (COOL)	AC	4.0
506	6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	128
506	6011	ROCK FILTER DAMS (REMOVE)	LF	128

EROSION CONTROL QUANTITIES SB				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4217
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4217

LEGEND:

- RFD3 — TYPE 3 ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- EROSION CONTROL LOG

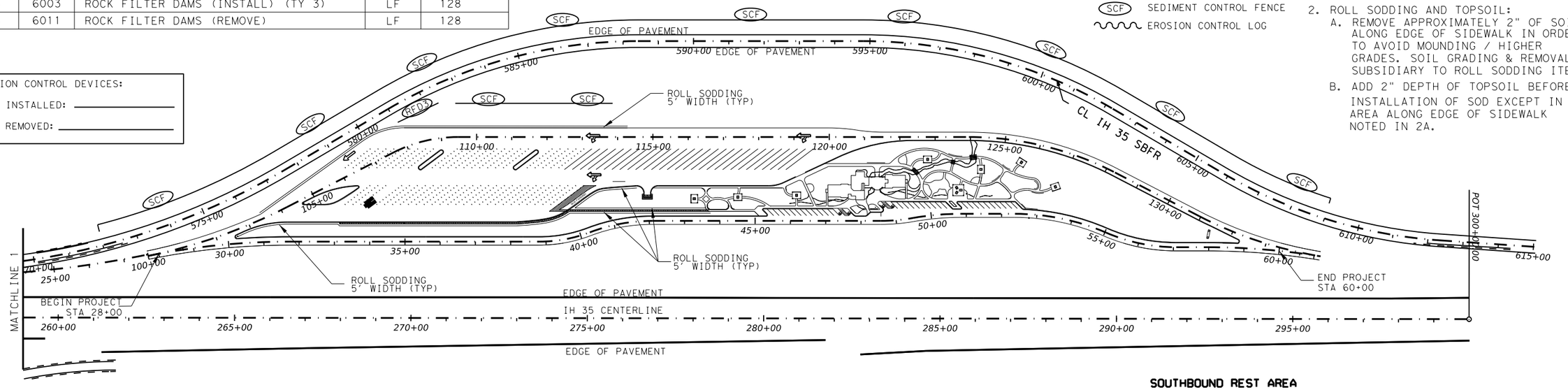
NOTES:

1. BROADCAST SEED (TEMP) (WARM) AND BROADCAST SEED (TEMP) (COOL) ITEMS TO BE SPREAD OVER DISTURBED AREAS ONLY.
3. ROLL SODDING ITEM TO BE PLACED ONLY AT BACK OF PROPOSED CURB OR SIDEWALK IN DISTURBED AREAS ONLY.
2. ROLL SODDING AND TOPSOIL:
   A. REMOVE APPROXIMATELY 2" OF SOIL ALONG EDGE OF SIDEWALK IN ORDER TO AVOID MOUNDING / HIGHER GRADES. SOIL GRADING & REMOVAL IS SUBSIDIARY TO ROLL SODDING ITEM.
   B. ADD 2" DEPTH OF TOPSOIL BEFORE INSTALLATION OF SOD EXCEPT IN AREA ALONG EDGE OF SIDEWALK NOTED IN 2A.

EROSION CONTROL DEVICES:

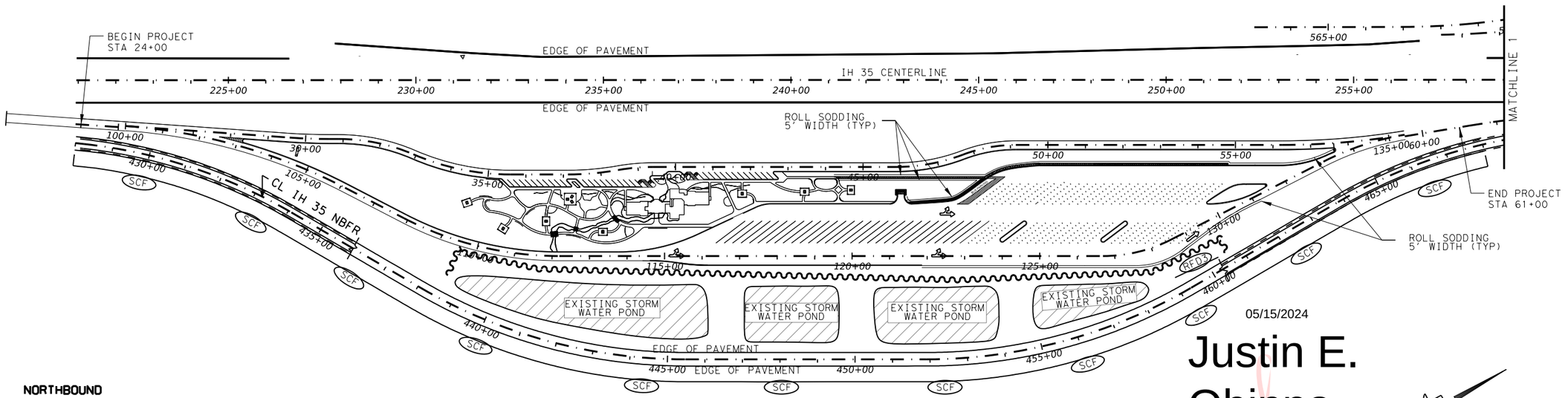
DATE INSTALLED: _____

DATE REMOVED: _____



SOUTHBOUND REST AREA

NORTHTHBOUND REST AREA



STATE OF TEXAS
JUSTIN E. OBINNA
85997
PROFESSIONAL ENGINEER

05/15/2024

Justin E. Obinna

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0 100 200 300
SCALE IN FEET

NORTHBOUND

EROSION CONTROL QUANTITIES NB				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
160	6005	TOPSOIL	CY	90
168	6001	VEGETATIVE WATERING	MG	418.28
162	6008	ROLL SODDING	SY	1162
164	6010	BROADCAST SEED (TEMP) (WARM)	AC	0.5
164	6010	BROADCAST SEED (TEMP) (COOL)	AC	4.0

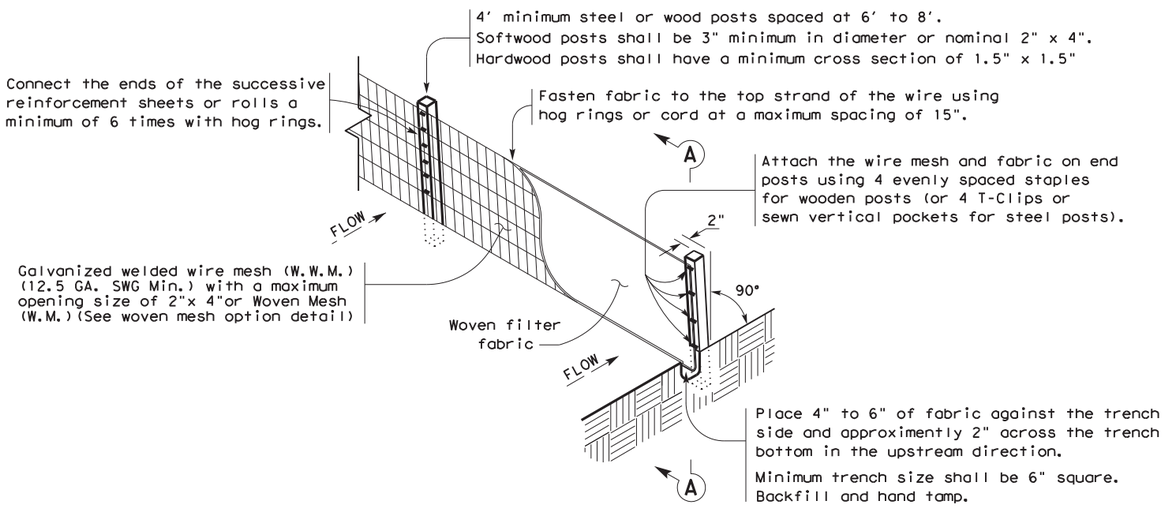
EROSION CONTROL QUANTITIES NB				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
506	6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	128
506	6011	ROCK FILTER DAMS (REMOVE)	LF	128
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4080
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4080
506	6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	2170
506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	2170

IH 35
OVERALL LAYOUT FOR EROSION CONTROL MEASURES

Texas Department of Transportation

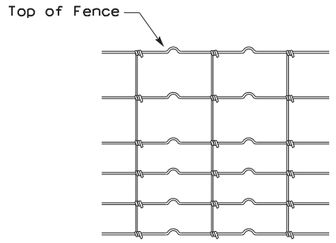
CONT	SECT	JOB	HIGHWAY
0015	07	087	IH 35
DIST	COUNTY		SHEET NO.
WAC	BELL		146A

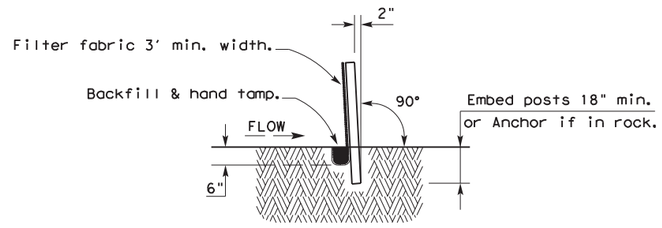
DATE: $DATE$ $TIME$
FILE: $FILE$



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.

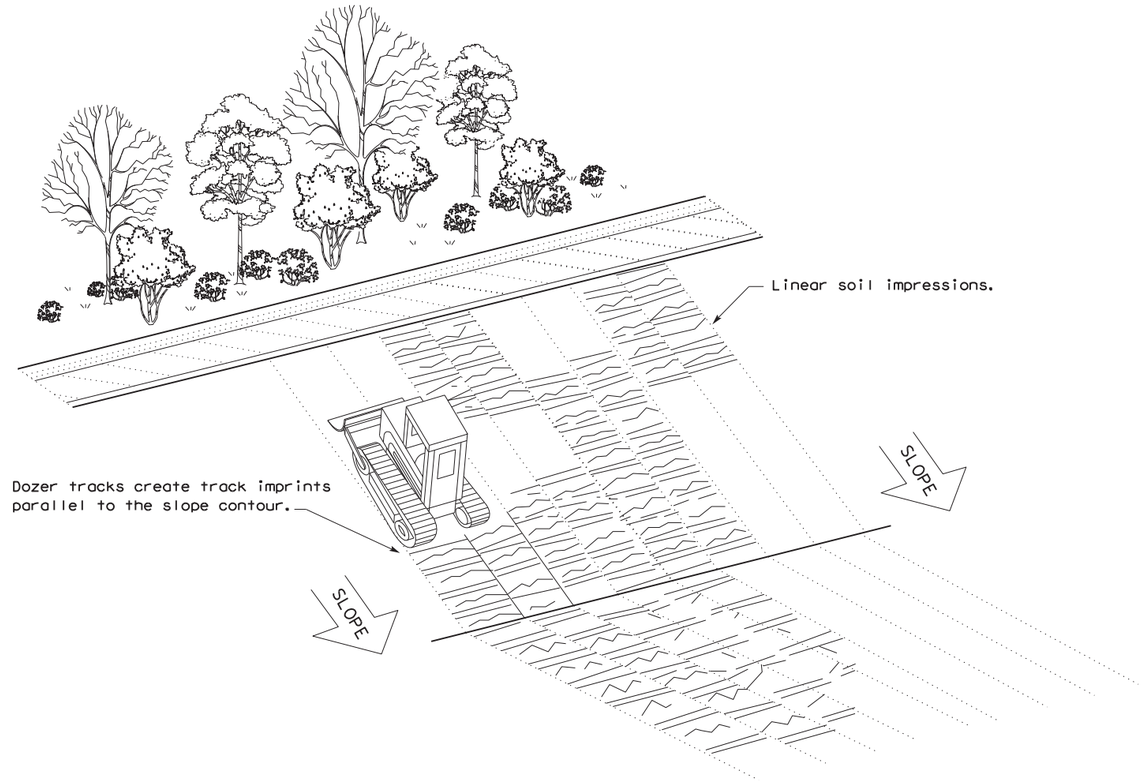
LEGEND

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

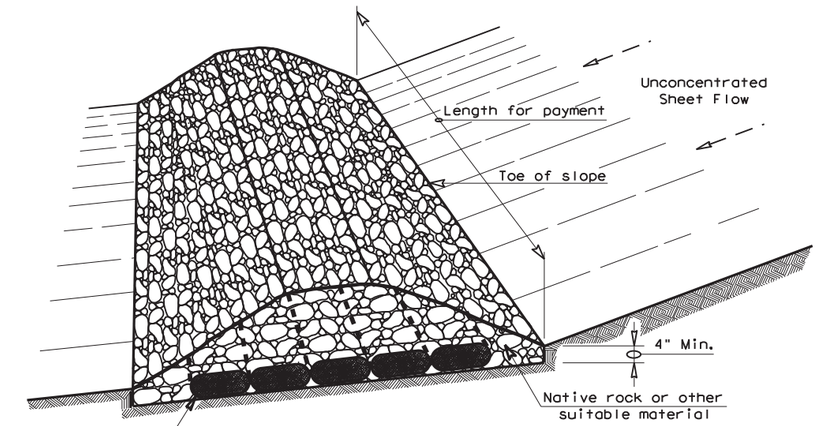
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0015	07	087		IH 35	
	DIST	COUNTY				SHEET NO.
	WAC	BELL				147

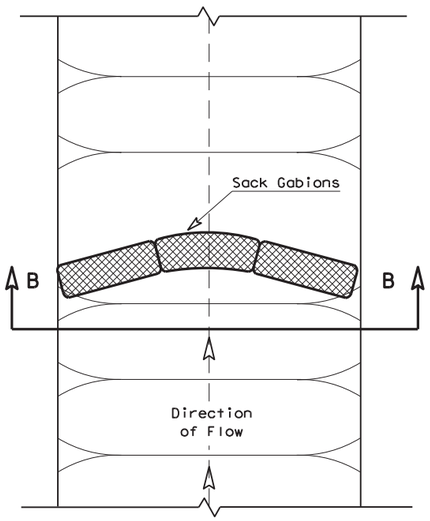
$DATE$
$FILE$

DATE: $DATE$
FILE: $FILE$

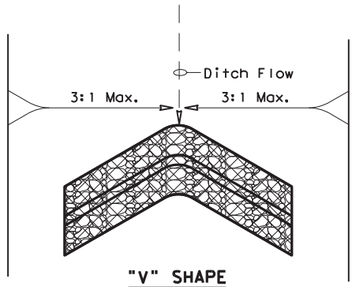


FILTER DAM AT TOE OF SLOPE

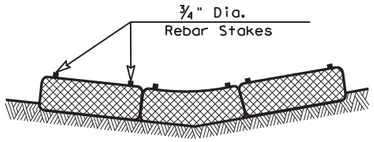
RFD1



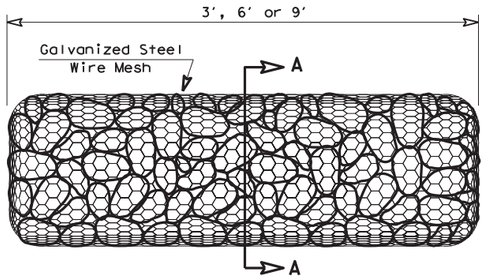
PLAN VIEW



"V" SHAPE PLAN VIEW

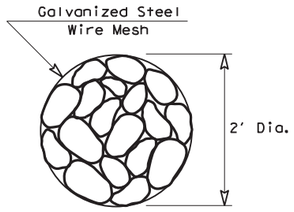


SECTION B-B

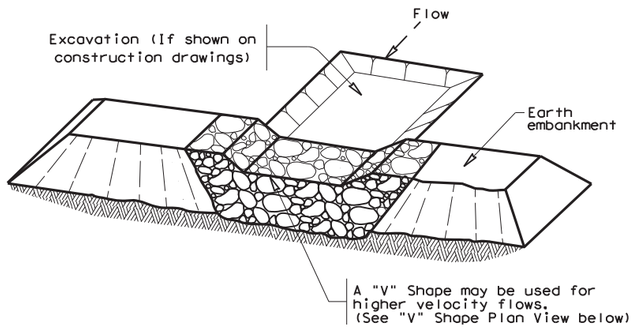


TYPE 4 (SACK GABIONS)

RFD4

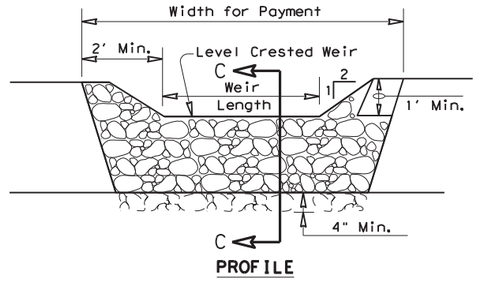


SECTION A-A

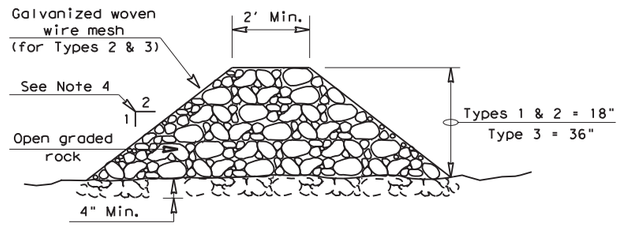


FILTER DAM AT SEDIMENT TRAP

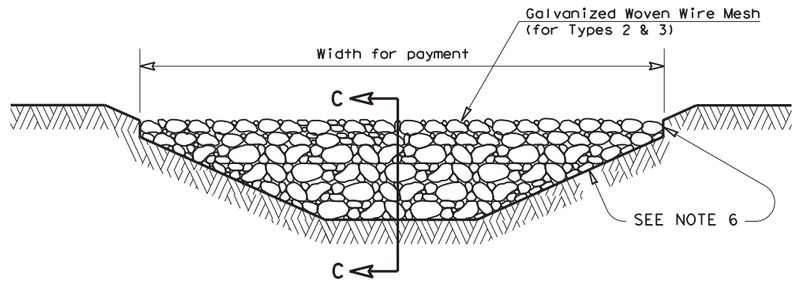
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

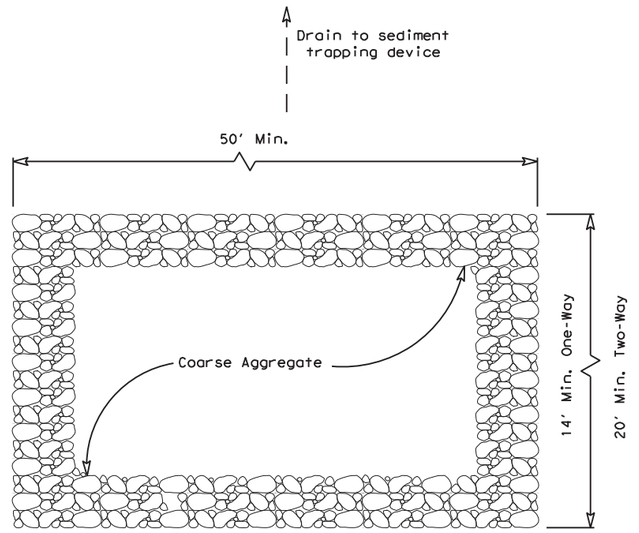
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

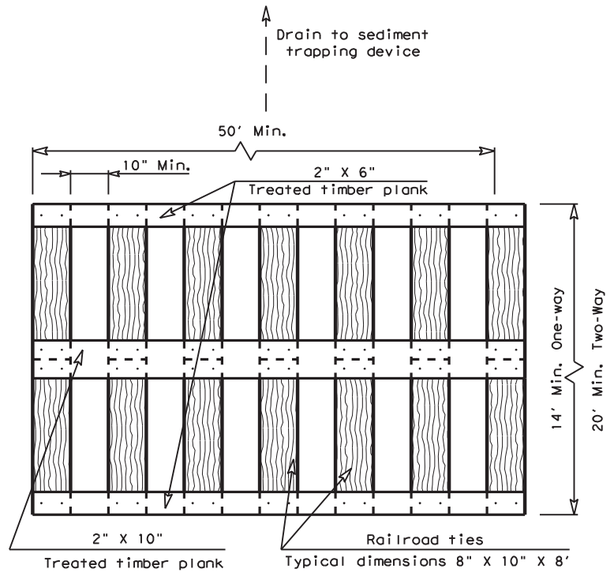
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		148

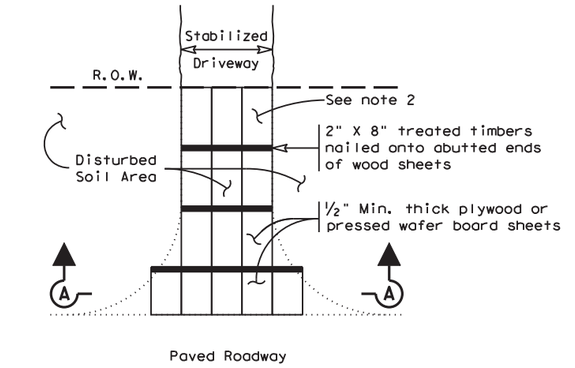
DATE:
FILE:



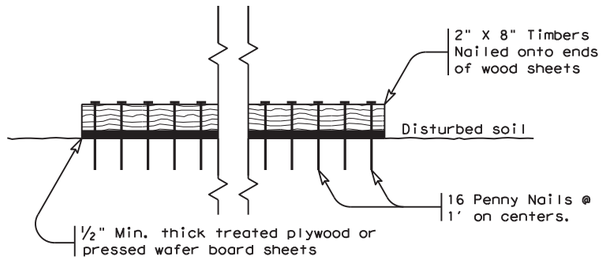
PLAN VIEW



PLAN VIEW



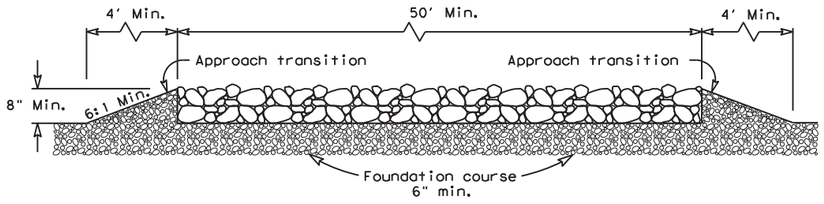
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

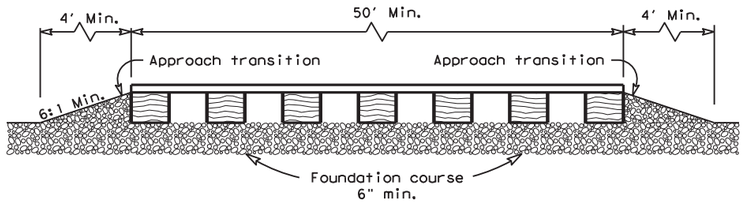
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
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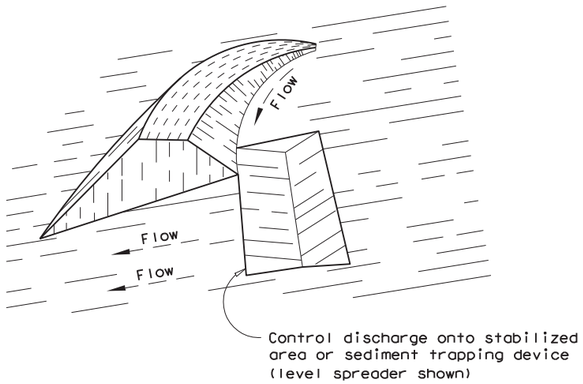
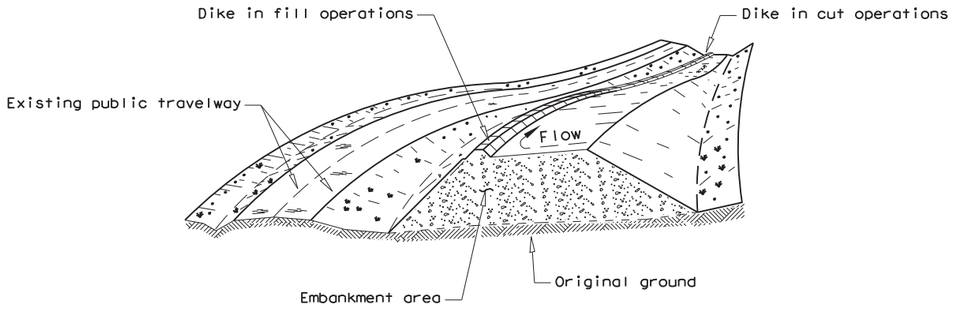
	WAC	Bell		149



PERIMETER DIKE

→(D)→

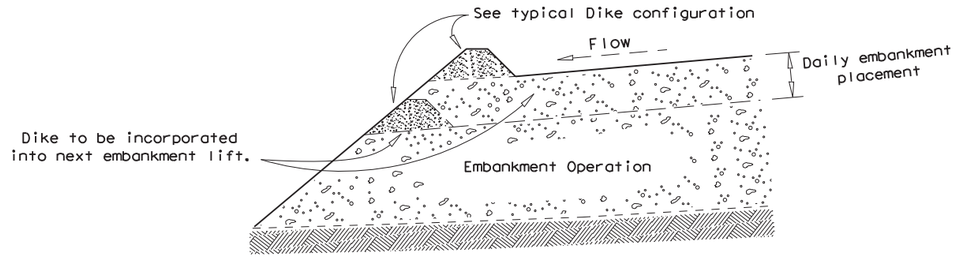


DIVERSION DIKE

→(D)→

GENERAL NOTE

1. Soil used in dike construction shall be machine compacted.
2. Top width and height of dike may be modified with prior approval of the Engineer.
3. Side slopes within the safety clear zone of a roadway shall be 6:1 or flatter.
4. Grading shall be shown elsewhere in the plans or as directed by the Engineer.
5. The Engineer reserves the right to modify the dimensions shown for the dike dependent on runoff volume characteristics.
6. Dikes that are in place for more than 14 calendar days should be stabilized to prevent sediment runoff.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Remove sediment and debris when accumulation affects the performance of the devices, after a rain and when directed by the engineer.



EMBANKMENT SECTION - DIVERSION DIKE

→(D)→

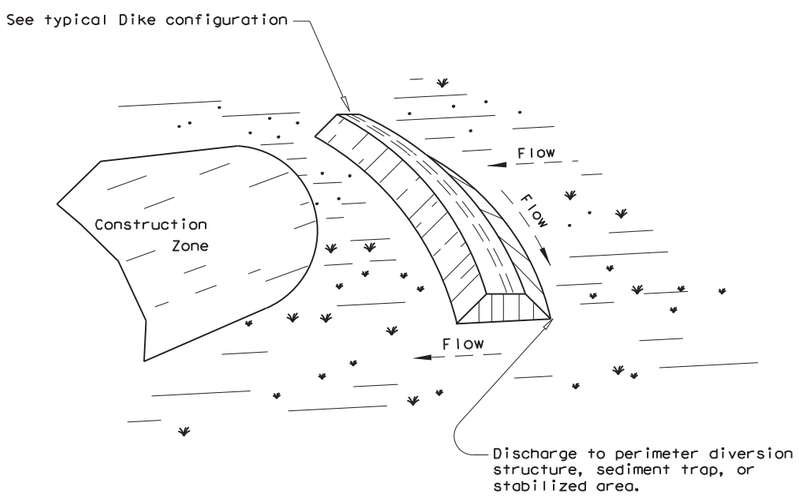
DIKE USAGE GUIDELINES

A Dike may be used to intercept runoff and divert it around unstabilized areas or to divert sediment laden runoff to an erosion control device (sediment basin or trap, rock filter dam, etc.).

The drainage area contributing runoff to a dike should not exceed 5 acres. The spacing of dikes should be as follows:

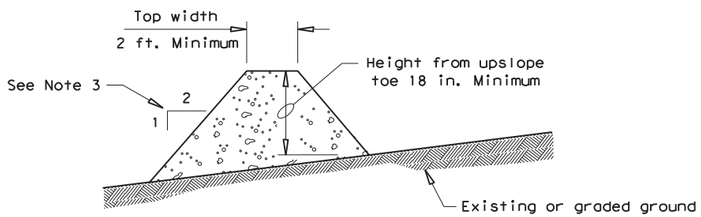
Slope of disturbed areas above dike	greater than 10%	5 - 10%	less than 5%
Maximum distance between dikes	100′	200′	300′

Intercepted runoff flowing along a dike should outlet to a stabilized area (vegetation, rock, etc.).



INTERCEPTOR DIKE

→(D)→



TYPICAL DIKE CONFIGURATION

→(D)→

PLANS SHEET LEGEND

DIKE →(D)→

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES DIKES (EARTHWORK FOR EROSION CONTROL)

EC(4)-16

FILE: ec416	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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	WAC	BELL		150

DATE: $DATE$
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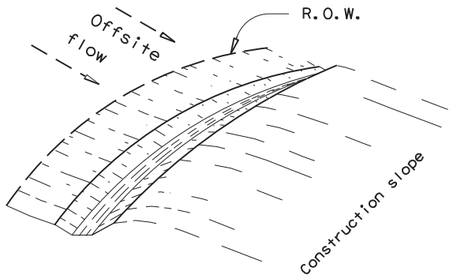
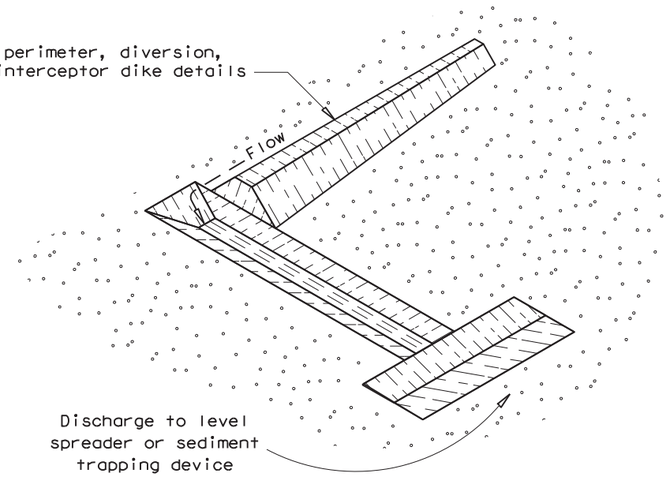


PERIMETER SWALE

→(S)→



DIVERSION SWALE

→(S)→

GENERAL NOTE

1. Dimensions of swale may be modified with prior approval of the Engineer.
2. Side slopes within the safety clear zone of a roadway shall be 6:1 or flatter.
3. Grading shall be shown elsewhere on the plans or as directed by the Engineer.
4. The Engineer reserves the right to modify the dimensions shown for the swale dependent on runoff volume characteristics.
5. Swales that are in place for more than 14 calender days should be stabilized through seeding or other measures to control sediment runoff.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Remove sediment and debris when accumulation affects the performance of the devices, after a rain and when directed by the Engineer.

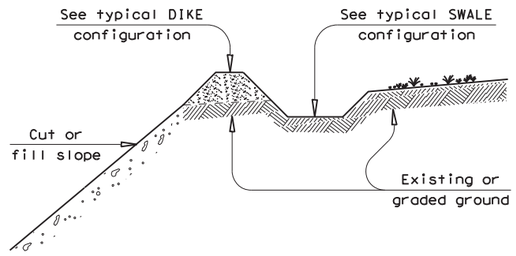
SWALE AND DIKE/SWALE USAGE GUIDELINES

A swale or dike/swale may be used to intercept runoff and divert it around unstabilized areas or to divert sediment laden runoff to an erosion control device (sediment basin or trap, rock filter dam, etc.).

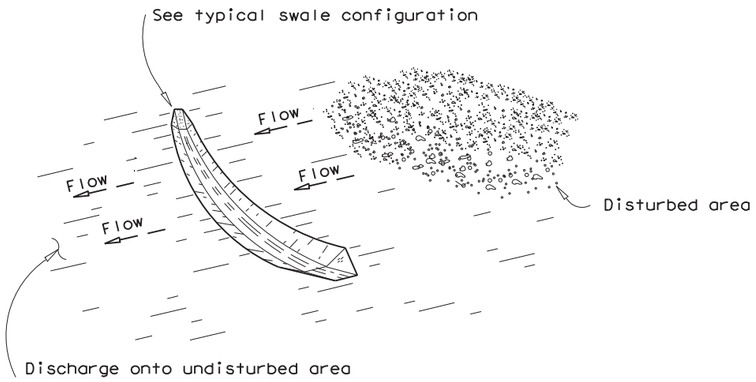
The drainage area contributing runoff to a swale or dike/swale should not exceed 5 acres. The spacing of swales and dike/swales should be as follows:

Slope of disturbed areas above dike	greater than 10%	5 - 10%	less than 5%
Maximum distance between dikes	100′	200′	300′

Intercepted runoff flowing in a swale or dike/swale should outlet to a stabilized area (vegetation, rock, etc.).

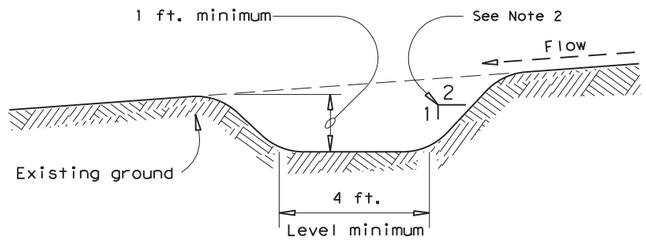


DIVERSION DIKE WITH SWALE



INTERCEPTOR SWALE

→(S)→



TYPICAL SWALE CONFIGURATION

PLAN SHEET LEGEND

SWALE →(S)→

DIKE →(D)→

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
SWALES
(EARTHWORK FOR EROSION CONTROL)

EC(5)-16

FILE: ec516	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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	WAC	BELL		151

DATE: $DATE$
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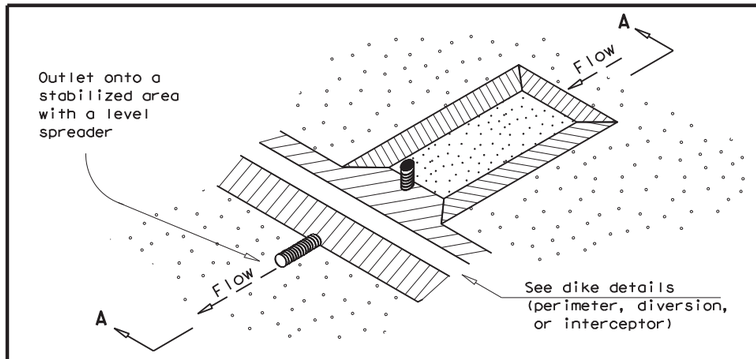
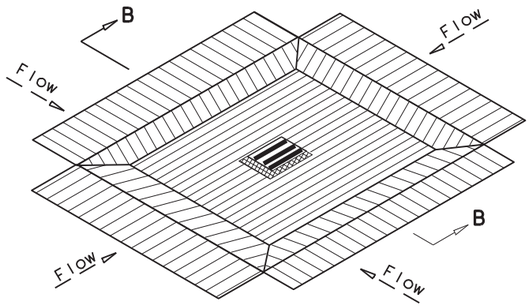


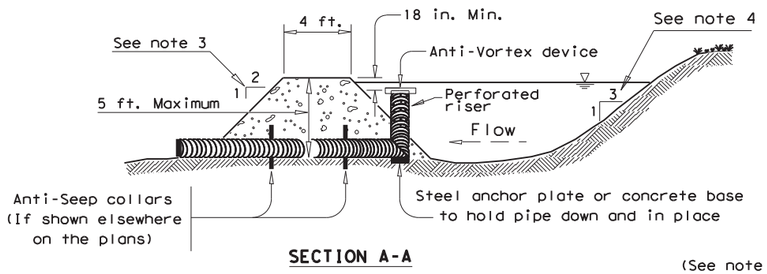
SEDIMENT BASIN AND/OR TRAP WITH PIPE OUTLET

ST/PO

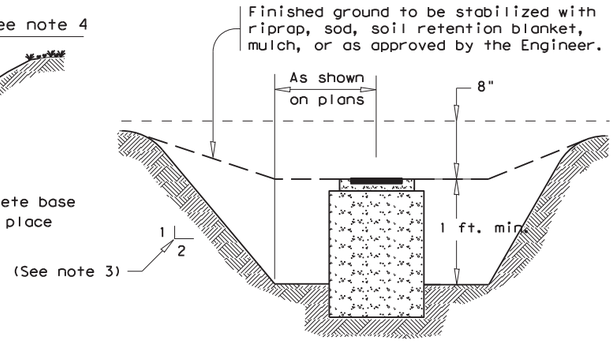


DROP INLET SEDIMENT TRAP

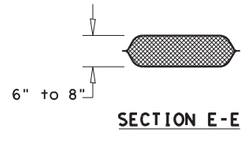
ST-DI



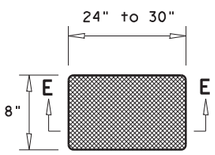
SECTION A-A



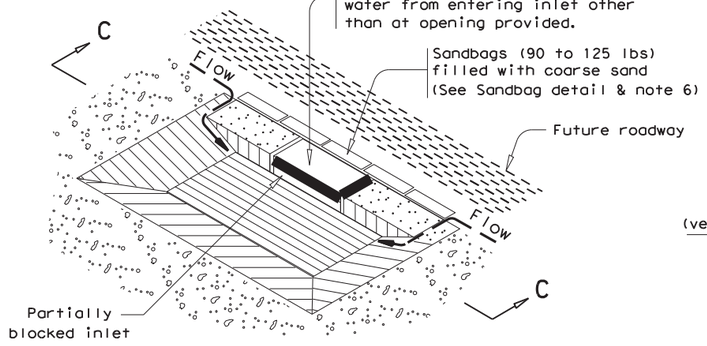
SECTION B-B



SECTION E-E

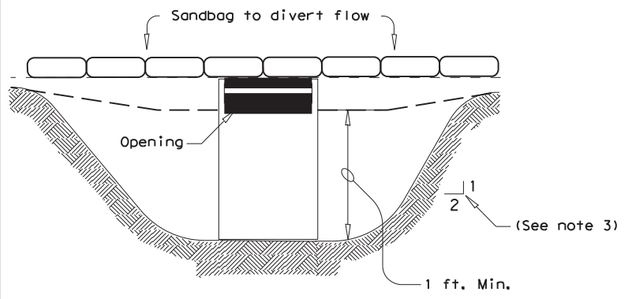


SANDBAG DETAIL

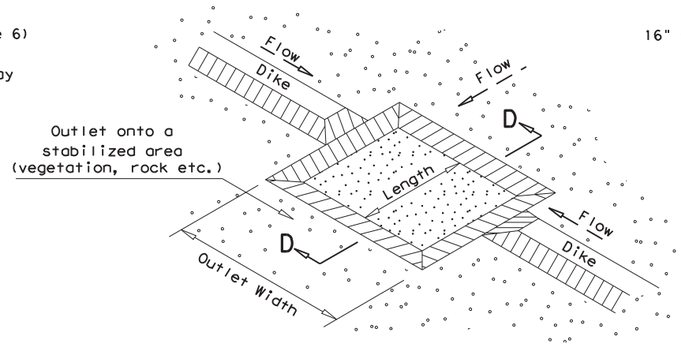


CURB INLET SEDIMENT TRAP

ST-CI

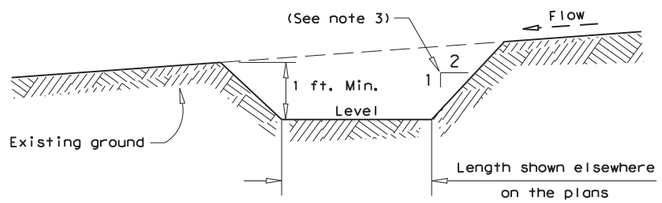


SECTION C-C



SEDIMENT TRAP WITH LEVEL STABILIZED OUTLET

ST



SECTION D-D

GENERAL NOTES

1. Pipe outlet material shall conform to the Item "Pipe Underdrains" or as accepted by the Engineer.
2. All pipe connections shall be watertight.
3. Side slopes within the safety clear zone of a roadway shall be 6:1 or flatter. Protect the traveling public from inlet stacks within the clear zone.
4. Sediment basins shall have side slopes of 3:1 or flatter.
5. The dimensions and limits of excavation for sediment basins and traps will be as shown elsewhere on the plans.
6. The sandbag material shall be made of polypropylene, polyethylene or polyamide woven fabric, min. unit weight 4 ounces /SY, Mullen burst strength exeeding 300 psi and ultraviolet stability exeeding 70%.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

A sediment basin and/or trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

Basins: The drainage area for a sediment basin should not exceed 100 acres. The basin capacity shall be at least 1800 CF/Acre of drainage area (0.5" over the drainage area). If the disturbed area draining to the basin is larger than 10 acres, the basin capacity should be 3600 CF/Acre (1.0" over the drainage area).

The basin should have a 40 hour draw-down time with an emergency spillway. The spillway may be designed to pass the peak rate of runoff from a 25 year frequency storm. The 100 year storm should be investigated to consider possible flooding impacts.

The entrance into the basin should be protected from erosion. The basin should be cleaned when the capacity has been reduced by 1/3.

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).

Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced @ 500'± on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

The trap outlet may either be through a perforated riser and pipe assembly designed to achieve a 40 hour draw-down time or over a level stabilized area (vegetation, rock, etc.).

The trap should be cleaned when the capacity has been reduced by ½ or the sediment has accumulated to a depth of 1', whichever is less.

PLANS SHEET LEGEND

ST/PO — Sediment Basin and / or Trap with Pipe Outlet

ST-DI — Drop Inlet Sediment Trap

ST-CI — Curb Inlet Sediment Trap

ST — Sediment Trap with Level Stabilized Outlet

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

SEDIMENT BASINS AND TRAPS (EARTHWORK FOR EROSION CONTROL)

EC(6)-16

FILE: ec616	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		152

DATE: $DATE$
FILE: $FILE$

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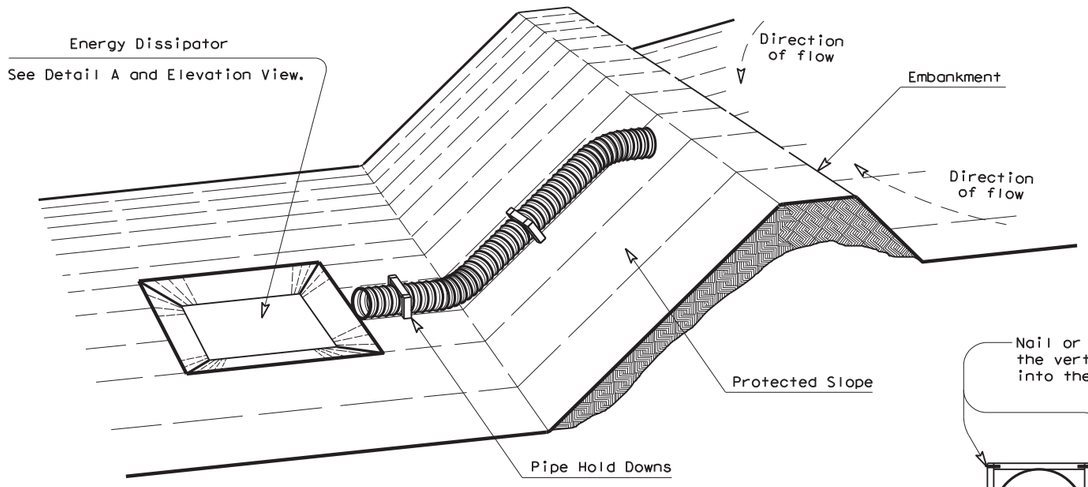
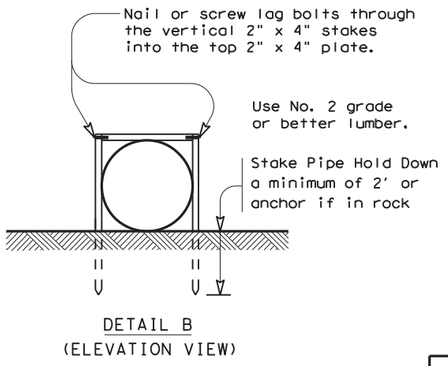
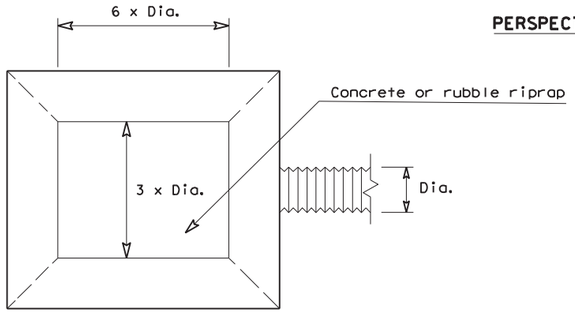


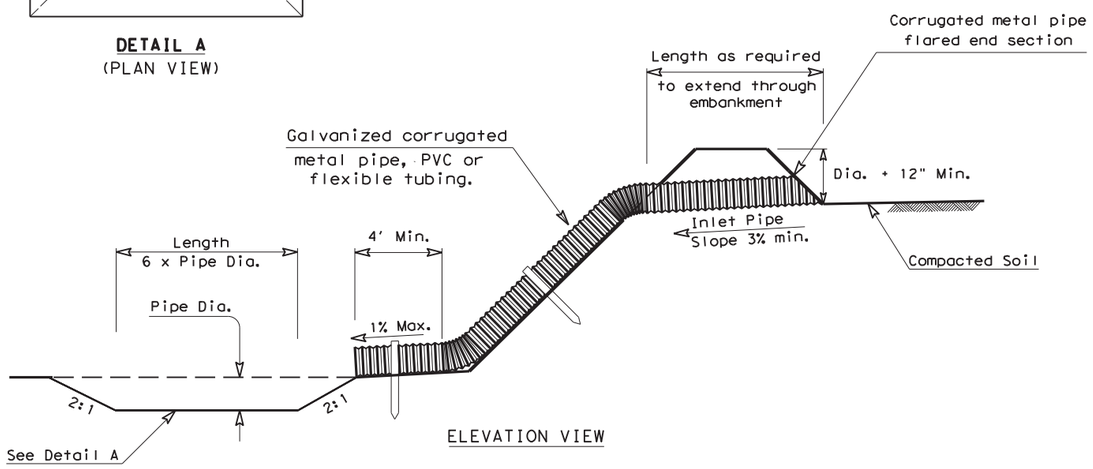
PERSPECTIVE VIEW



DETAIL B
(ELEVATION VIEW)



DETAIL A
(PLAN VIEW)



ELEVATION VIEW

PIPE SLOPE DRAIN WITH ENERGY DISSIPATOR

PSD

GENERAL NOTES

1. The inlet pipe shall have a slope of 3 percent or greater. Pipe diameter shall be as indicated on the construction drawings.
2. The top of embankment shall be at least 12" higher than the top of the inlet pipe at all points.
3. The pipe shall be galvanized corrugated metal pipe, PVC, or flexible tubing with watertight connection bands.
4. Pipe shall be secured with hold-down grommets spaced a maximum of 10' on centers or with pipe hold downs as shown in Detail B.
5. Construct embankment for the drainage system in 8" lifts to the required elevations. Hand tamp the soil around and under the entrance section to the top of the embankment as shown on the plans or as directed by the engineer.
6. The sediment trap shall be constructed to the dimensions as shown and in accordance with Special Specification, "Earthwork for Erosion Control". As otherwise detailed on the plans, the sediment trap may be stabilized using concrete or rubble riprap as per Item, "Riprap".
7. A standard corrugated metal pipe flared end section shall be used at the entrance of the pipe slope drain.
8. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PIPE SLOPE DRAIN
DESIGN CRITERIA

PIPE/TUBING SIZE	DIAMETER	MAXIMUM DRAINAGE AREA
PSD 12	12"	0.5 Acre
PSD 18	18"	1.5 Acres
PSD 21	21"	2.5 Acres
PSD 24	24"	3.5 Acres
PSD 30	30"	5.0 Acres

PIPE SLOPE DRAIN USAGE GUIDELINES

A Pipe Slope Drain (PSD) should be constructed to drain concentrated surface runoff safely down slopes without causing erosion. The drainage area contributing runoff to a PSD should not exceed 5 acres. The PSD should be sized to drain the peak rate of runoff without over-topping at the earth dike entrance. A 25 year storm frequency may be used to calculate the flow rate.

PLAN SHEET LEGEND

Pipe Slope Drain — PSD

Texas Department of Transportation

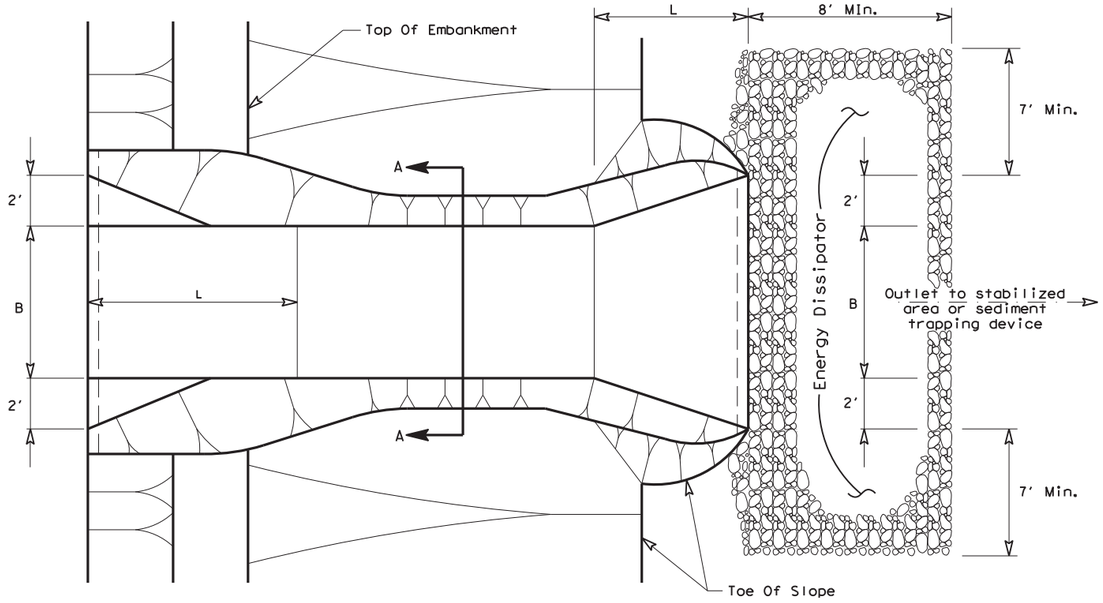
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

TEMPORARY PIPE SLOPE DRAINS

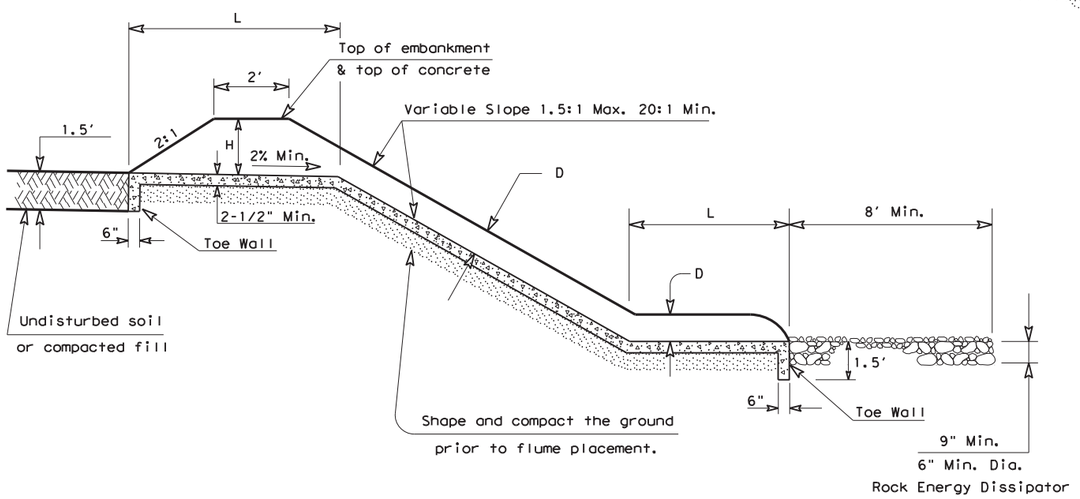
EC(7)-16

FILE: ec716.dgn	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	Bell		153



PLAN VIEW

SECTION A-A



ELEVATION VIEW

PAVED FLUME

PF

GENERAL NOTES

1. The group / size is a designator for the dimensions of the paved flume. The group / size is designated by a letter (A or B) and the bottom (B) dimension. The appropriate size shall be indicated on the construction plans.
2. Provide rock or rubble with a minimum diameter of 6" and a maximum volume of 1/2 cubic feet for construction of energy dissipaters.
3. For high velocity flows, the aggregate of the energy dissipator should be secured with 20-gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggegrate should be placed on the mesh to the dimensions specified. The mesh shall be folded at the upstream side over the aggegrate and tightly secured to itself on the downstream side using wire ties or hog rings.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PAVED FLUME USAGE GUIDELINES

A Paved Flume should be constructed to drain concentrated surface runoff safely down slopes without causing erosion. The drainage area contributing runoff to a paved flume should not exceed that given in the Design Criteria above. The paved flume should be sized to drain the peak rate of runoff without overtopping the embankment at the earth dike entrance. A 25 year storm frequency may be used to calculate the flow rate.

DESIGN CRITERIA					
Group/Size	B Bottom Width	H Min.	D Min.	L Min.	Maximum Drainage Area
A-2	2'	1.5'	8"	5'	5 Acres
A-4	4'	1.5'	8"	5'	8 Acres
A-6	6'	1.5'	8"	5'	11 Acres
A-8	8'	1.5'	8"	5'	14 Acres
A-10	10'	1.5'	8"	5'	18 Acres
B-4	4'	2'	10"	6'	14 Acres
B-6	6'	2'	10"	6'	20 Acres
B-8	8'	2'	10"	6'	25 Acres
B-10	10'	2'	10"	6'	31 Acres
B-12	12'	2'	10"	6'	36 Acres

PLANS SHEET LEGEND

Paved Flume — PF

Texas Department of Transportation

Design Division Standard

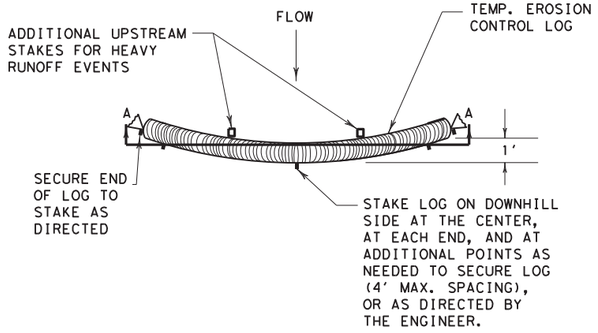
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

TEMPORARY PAVED FLUMES

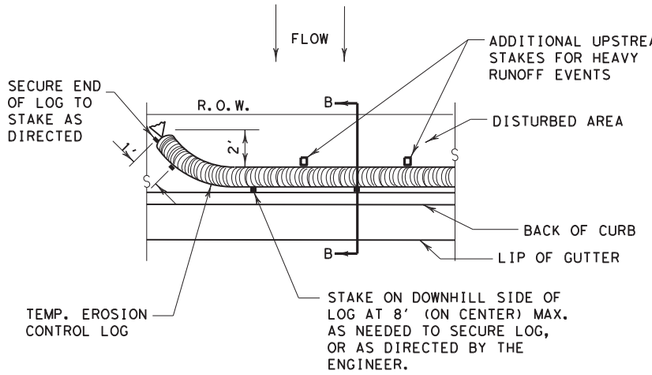
EC(8)-16

FILE: ec816	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		154

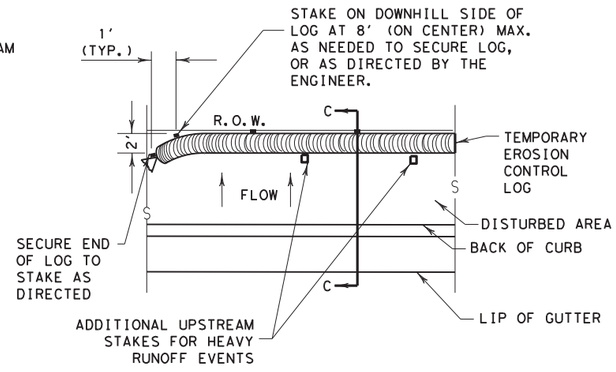
DATE: $DATE$
FILE: $FILE$



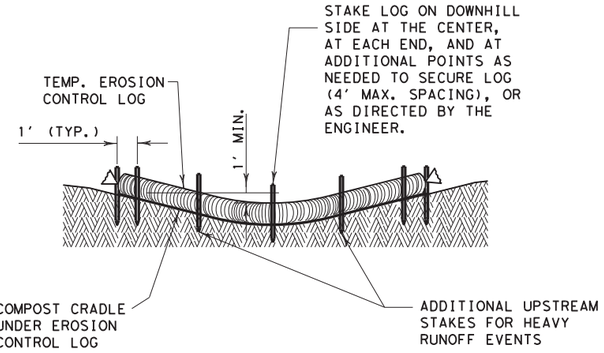
PLAN VIEW



PLAN VIEW



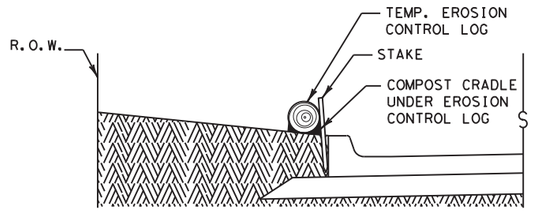
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

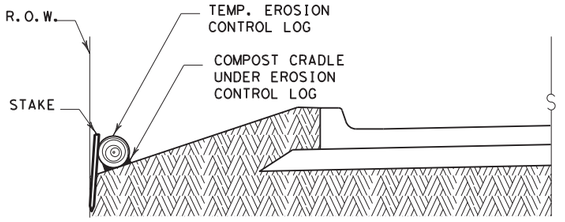
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

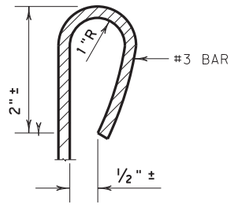
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



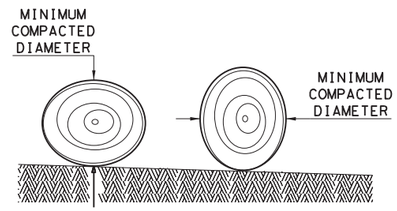
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0015	07	087		IH 35		
	DIST		COUNTY				SHEET NO.
	WAC		BELL				155

DATE: $DATE$
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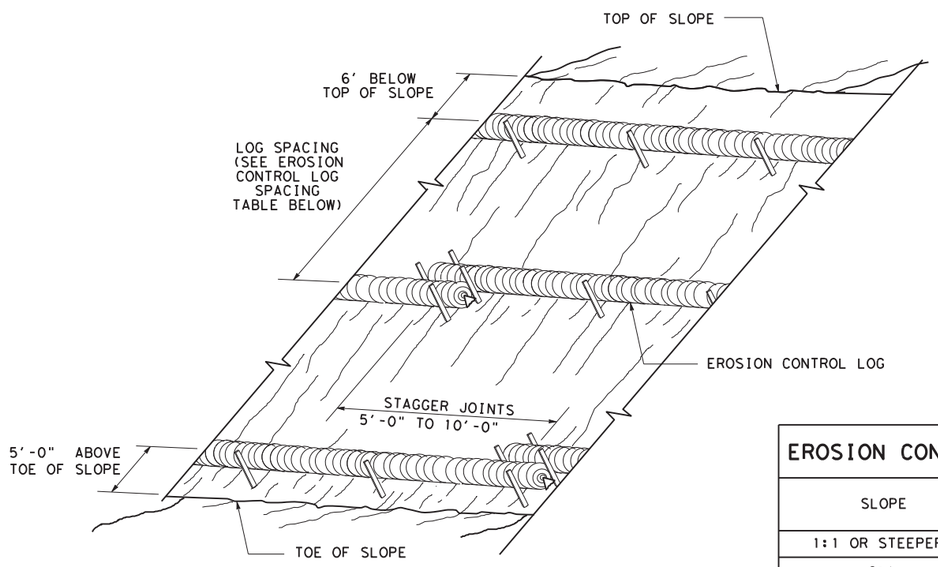
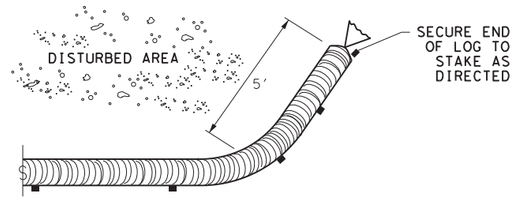


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

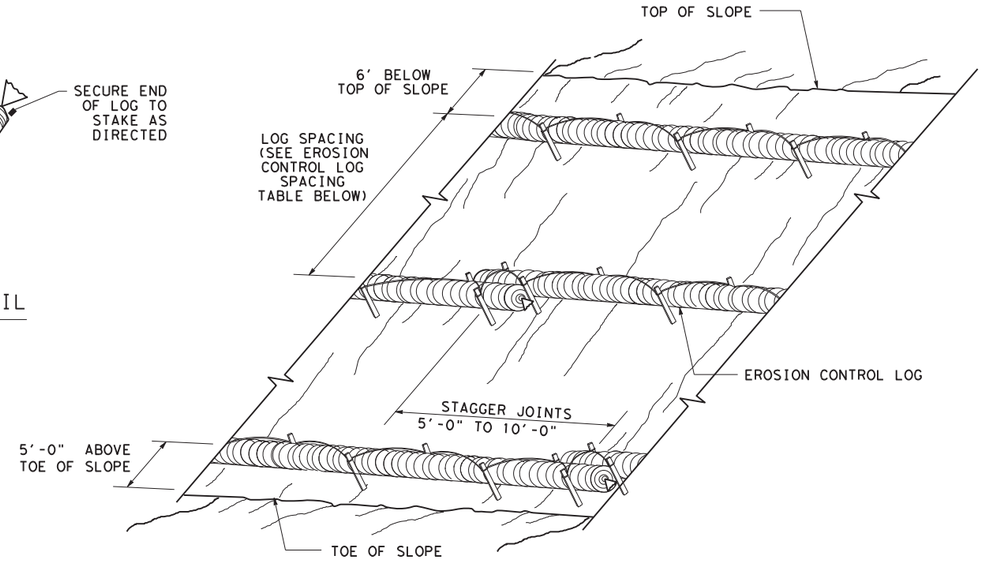
CL-SST



END SECTION RAP DETAIL

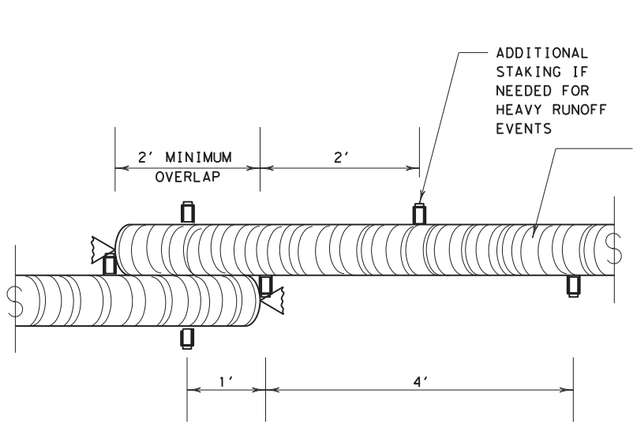
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

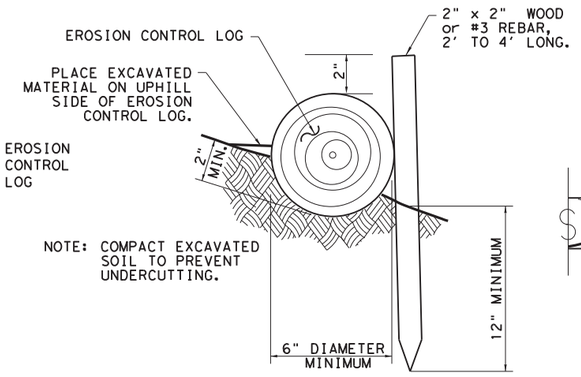
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

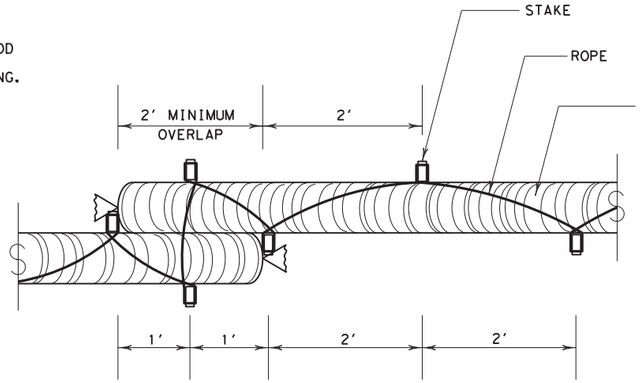


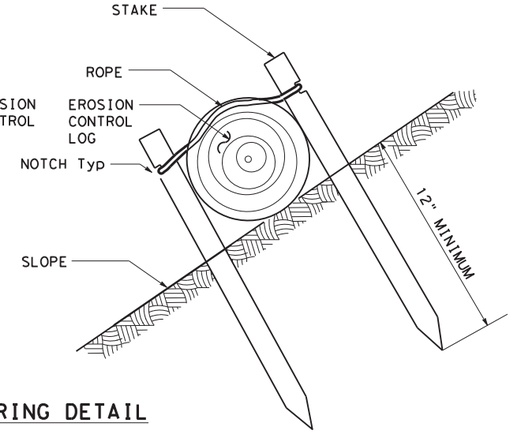


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

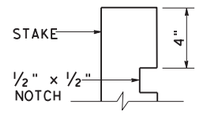
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





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
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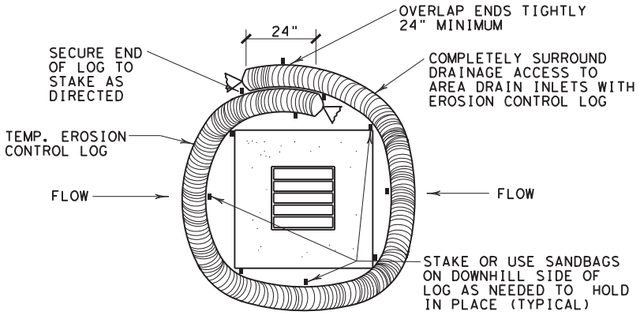
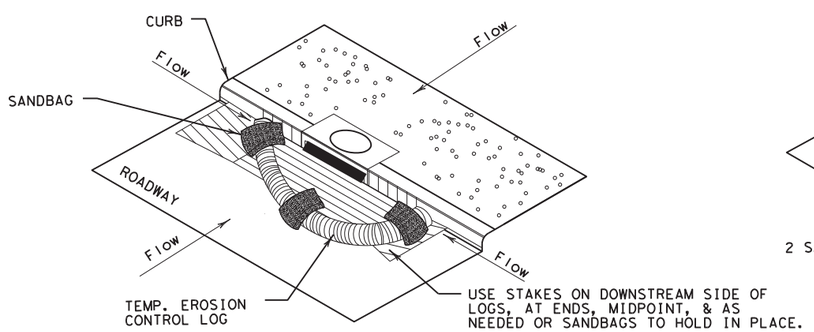
REVISIONS	0015	07	087		IH 35	
	DIST	COUNTY			SHEET NO.	
	WAC	BELL			156	



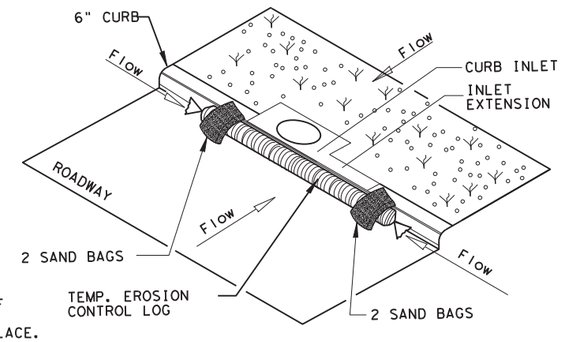
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

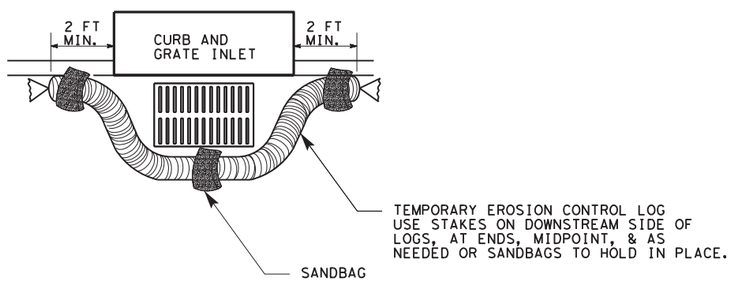
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

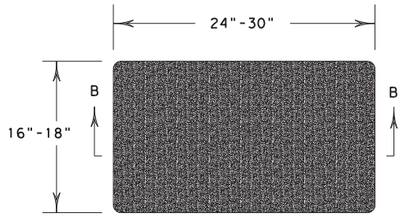
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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REVISIONS	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WAC	BELL		157

DATE: $DATE$
FILE: $FILE$

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note "3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE - NTS SHEET 1 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN:		CK:	DW:		CK:
© TxDOT 2009	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0015	07	087		IH 35	
DEC 2013 FEB 2015	DIST	COUNTY			SHEET NO.	
	WACO	BELL			158	

BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls: on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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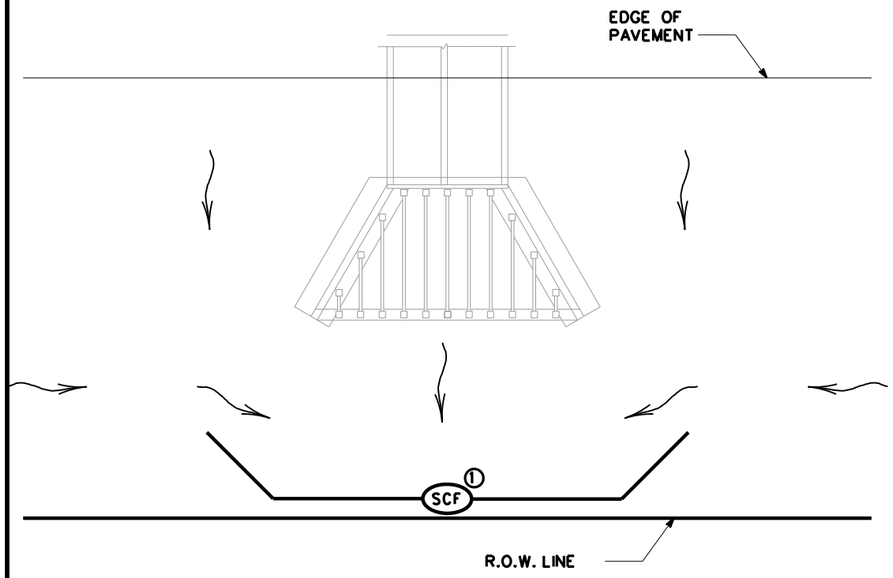
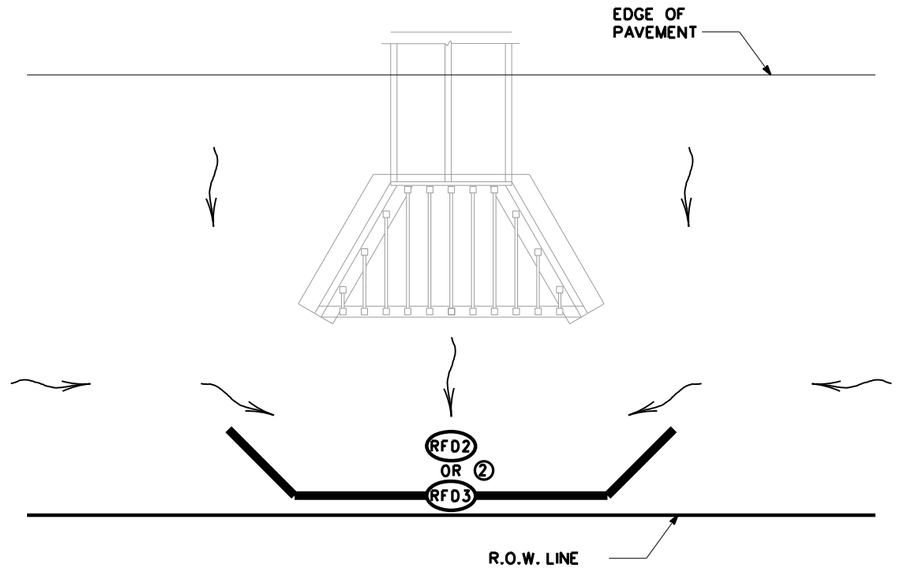


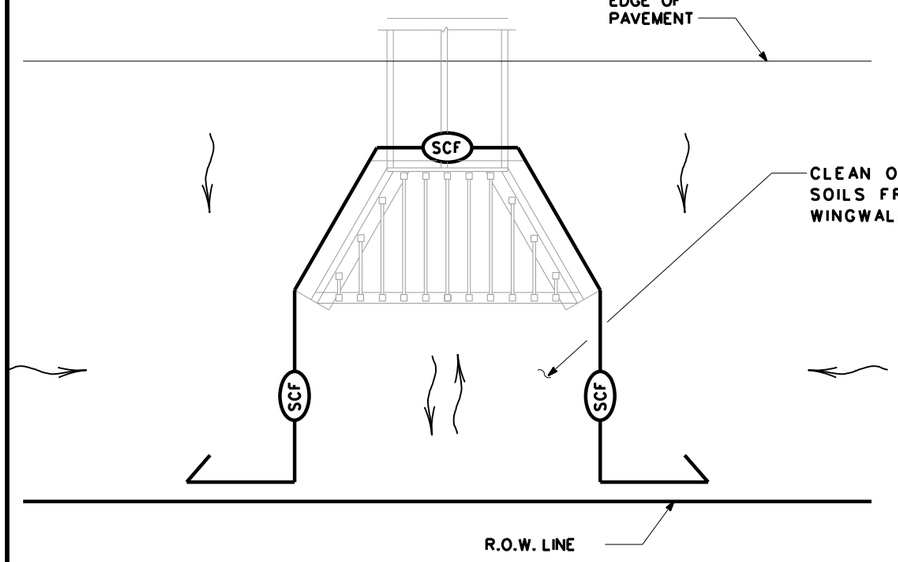
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



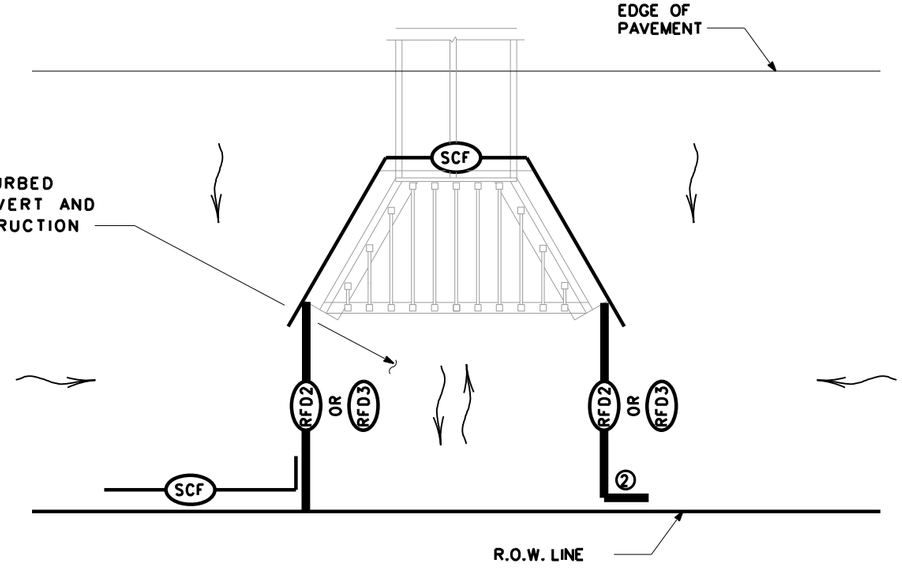
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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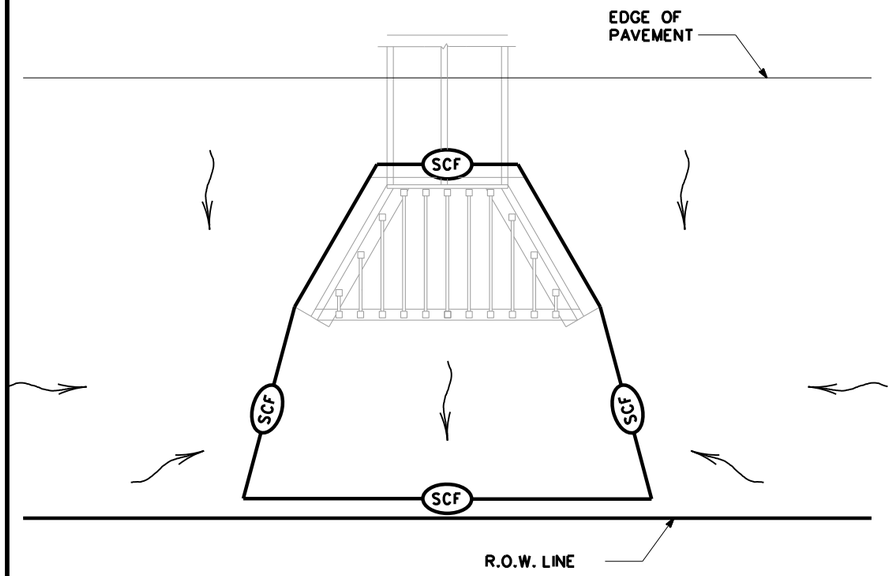
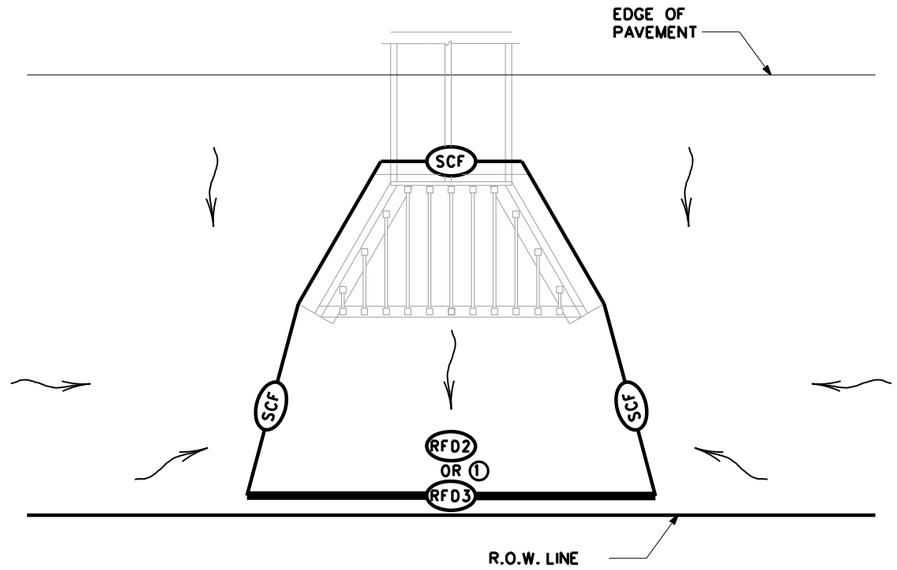


BEST MANAGEMENT PRACTICE (BMP) •5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) •6

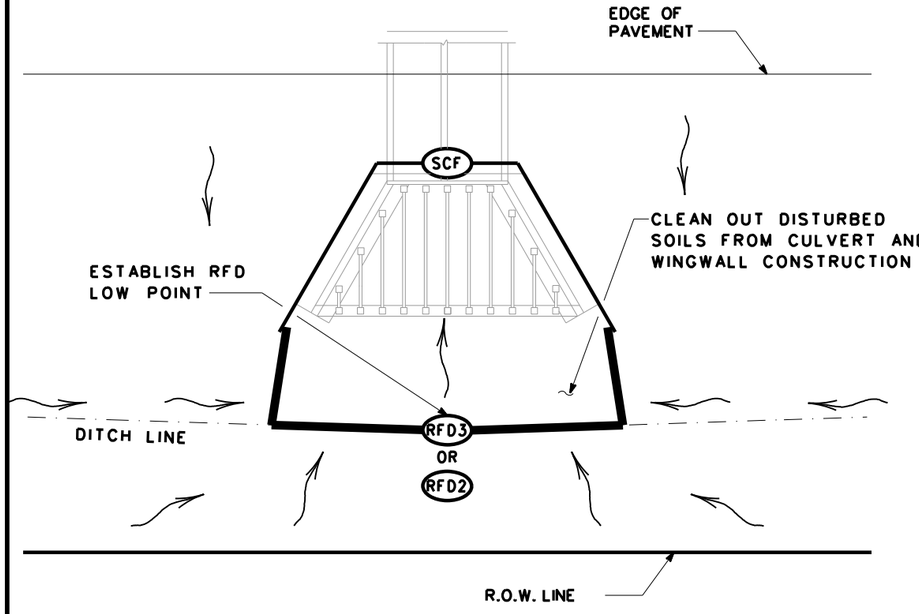
FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

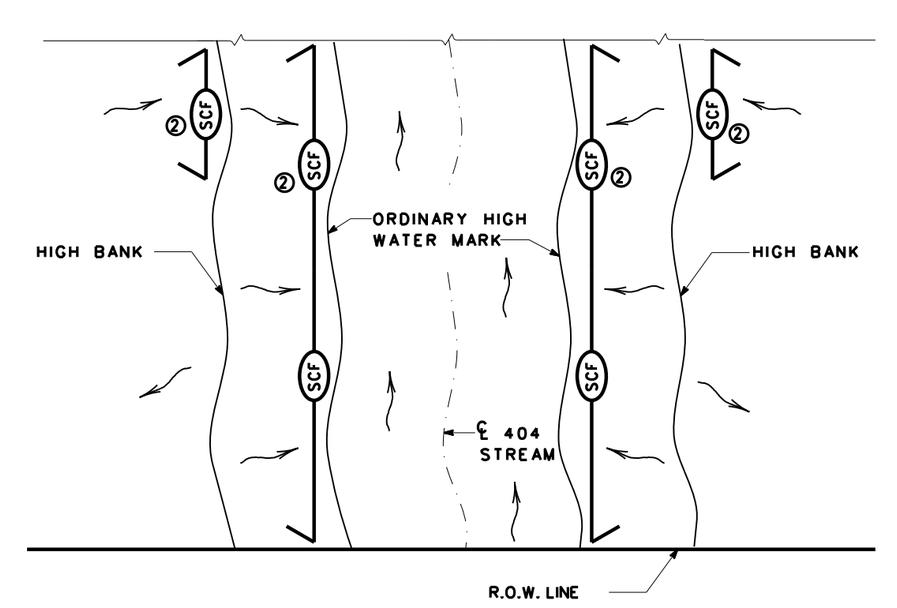
① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT



BEST MANAGEMENT PRACTICE (BMP) •7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) •8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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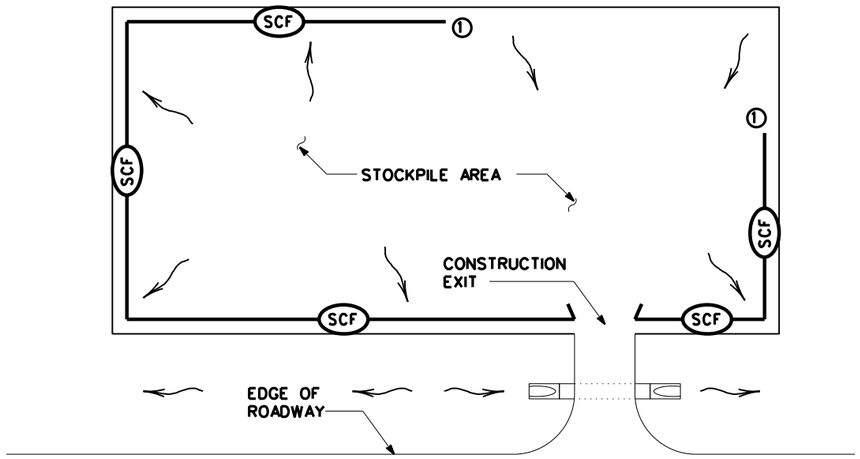
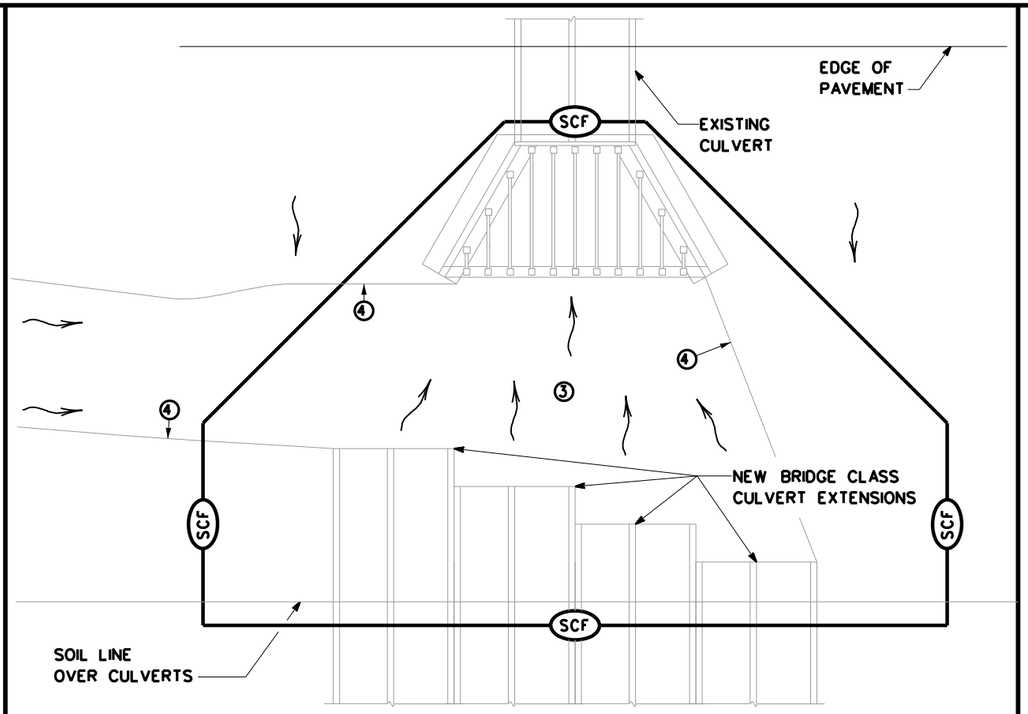


BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY -
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

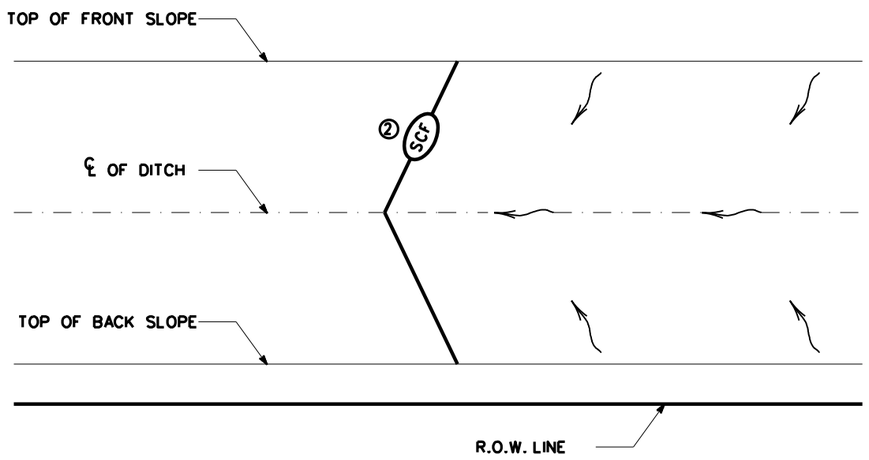
NOTES:

① START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED

② ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.

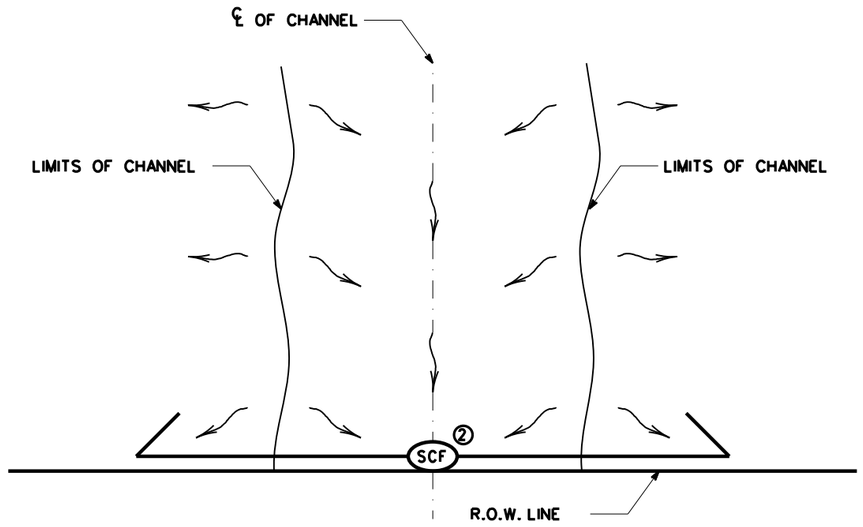
③ PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.

④ PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL - BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL - BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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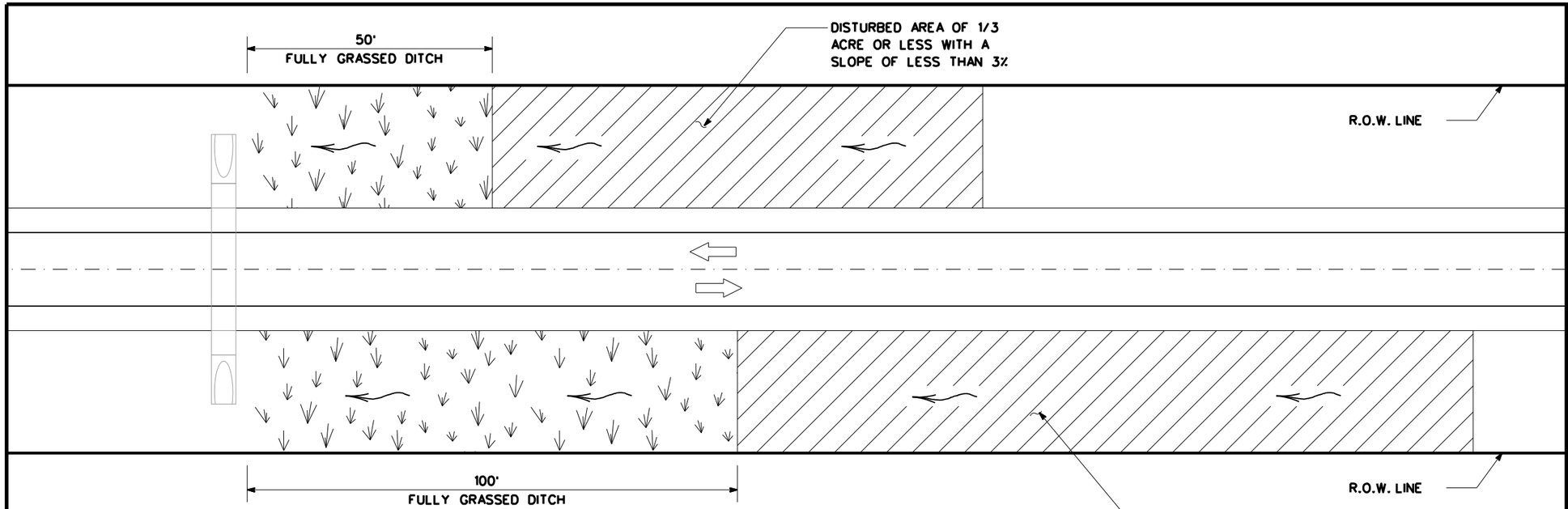


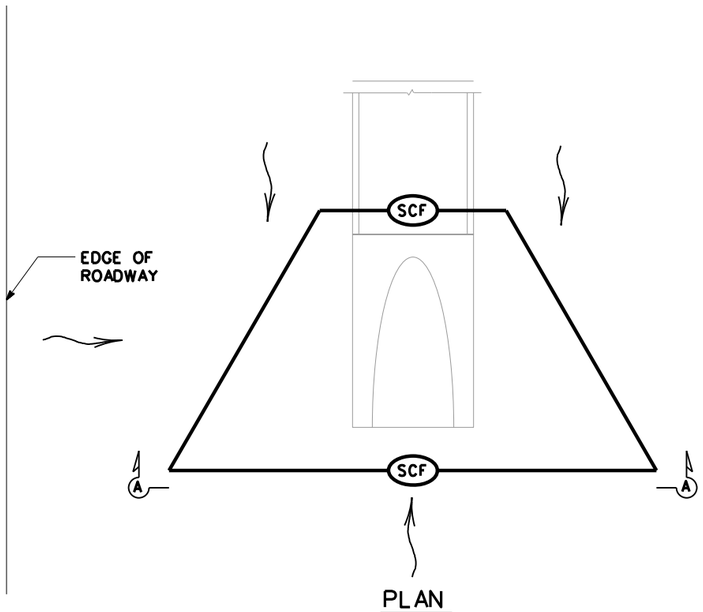
BEST MANAGEMENT PRACTICE (BMP) #13

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS

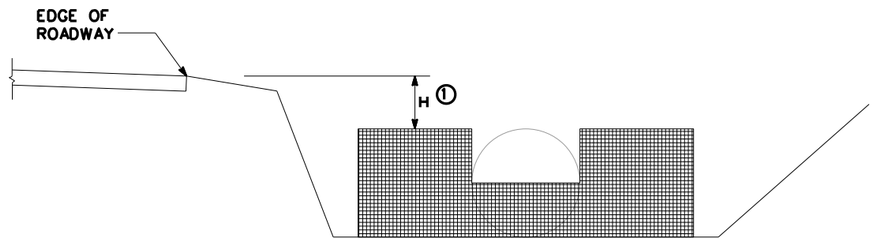
	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE

① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY - SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

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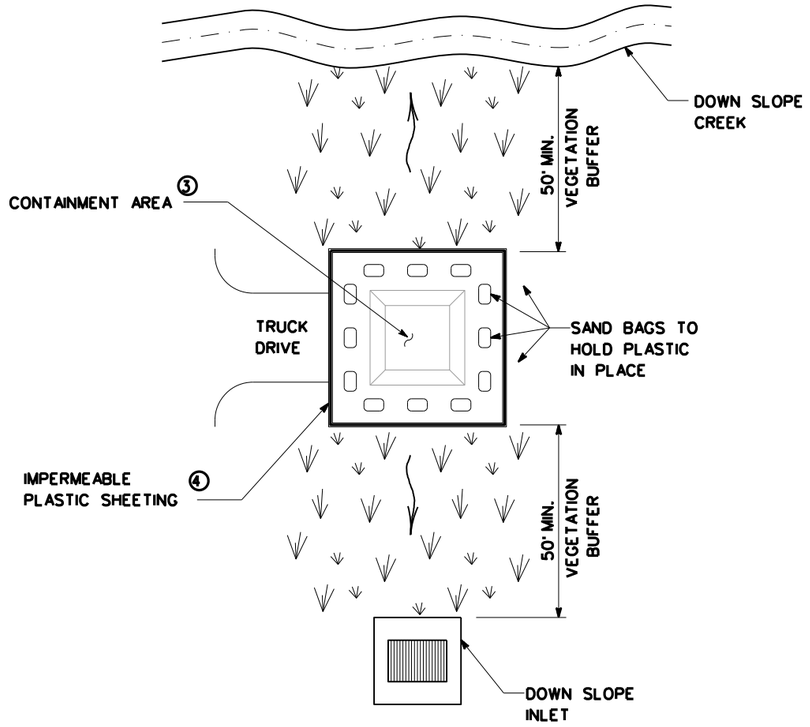
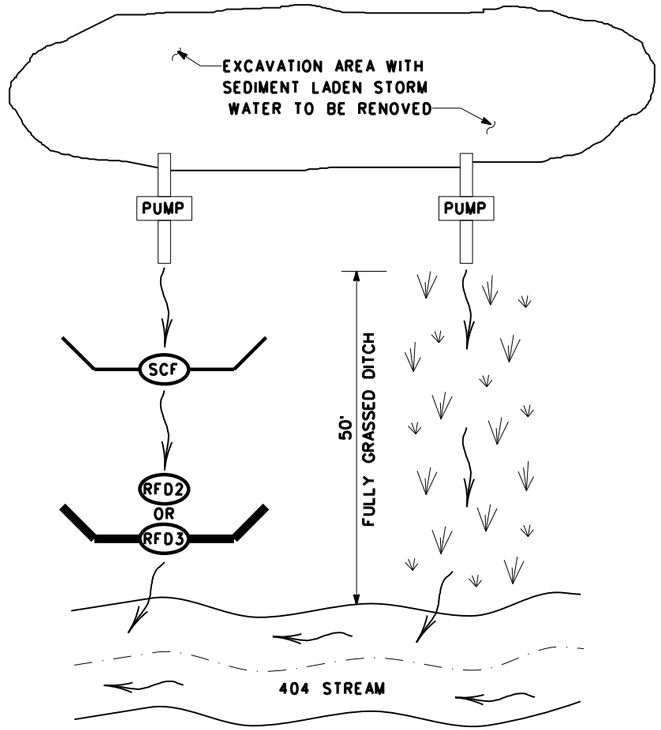


BEST MANAGEMENT PRACTICE (BMP) •15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) •16

PUMPED STORM WATER SEDIMENT CONTROLS ①

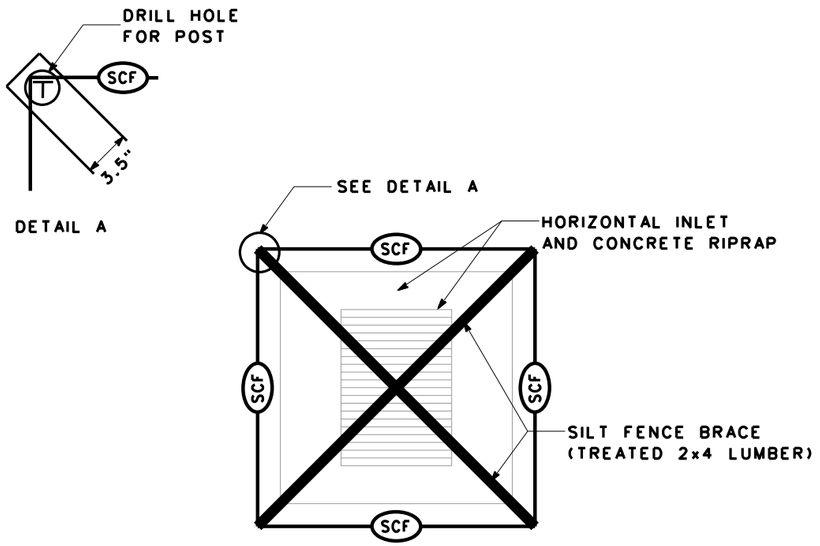
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

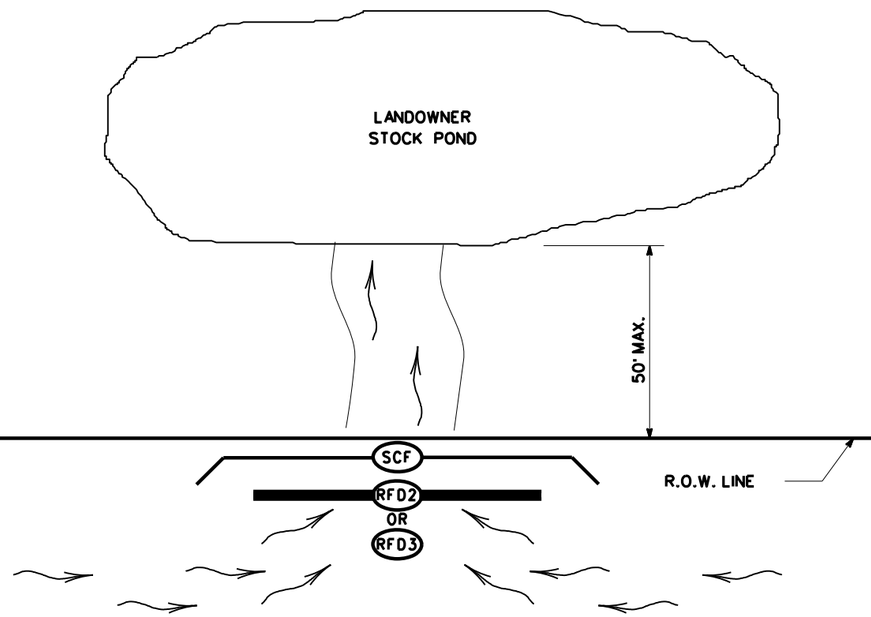
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) •17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) •18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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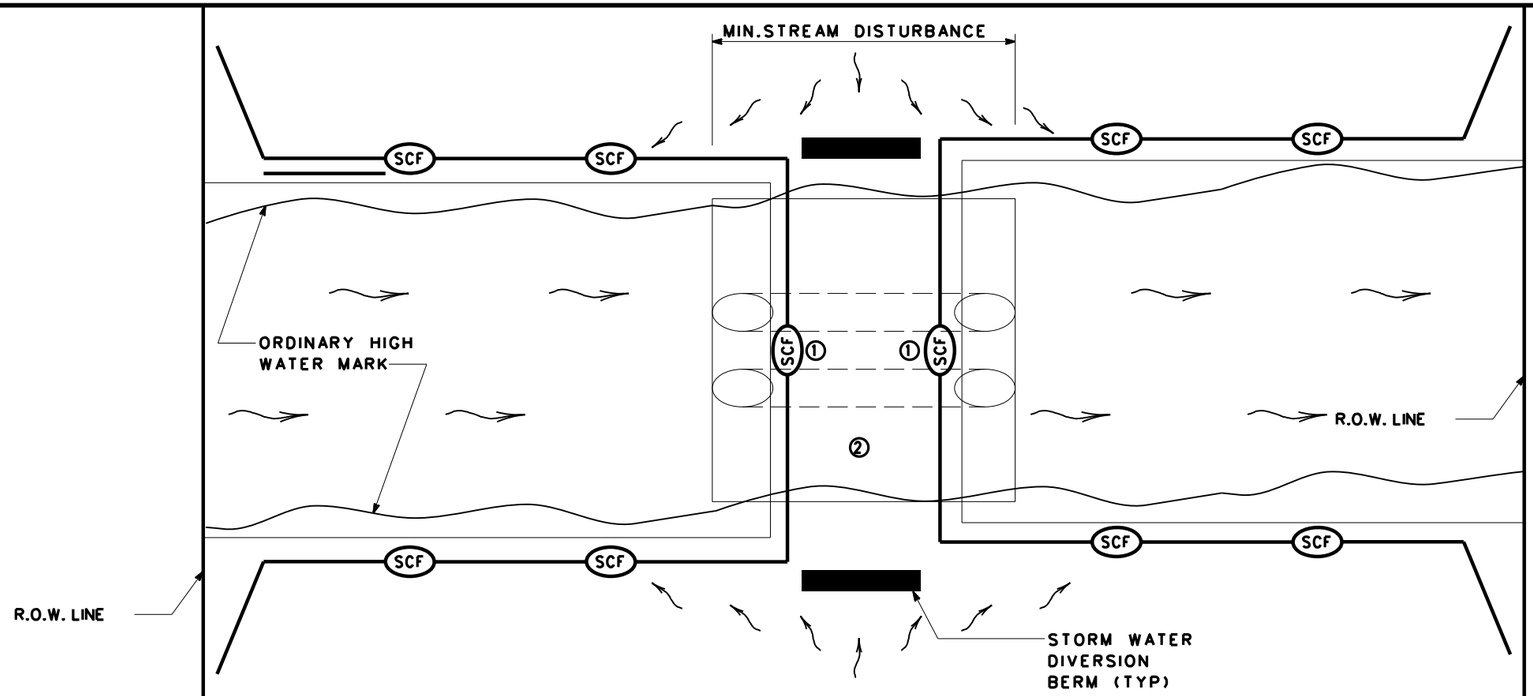


BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
	SECURITY FENCING

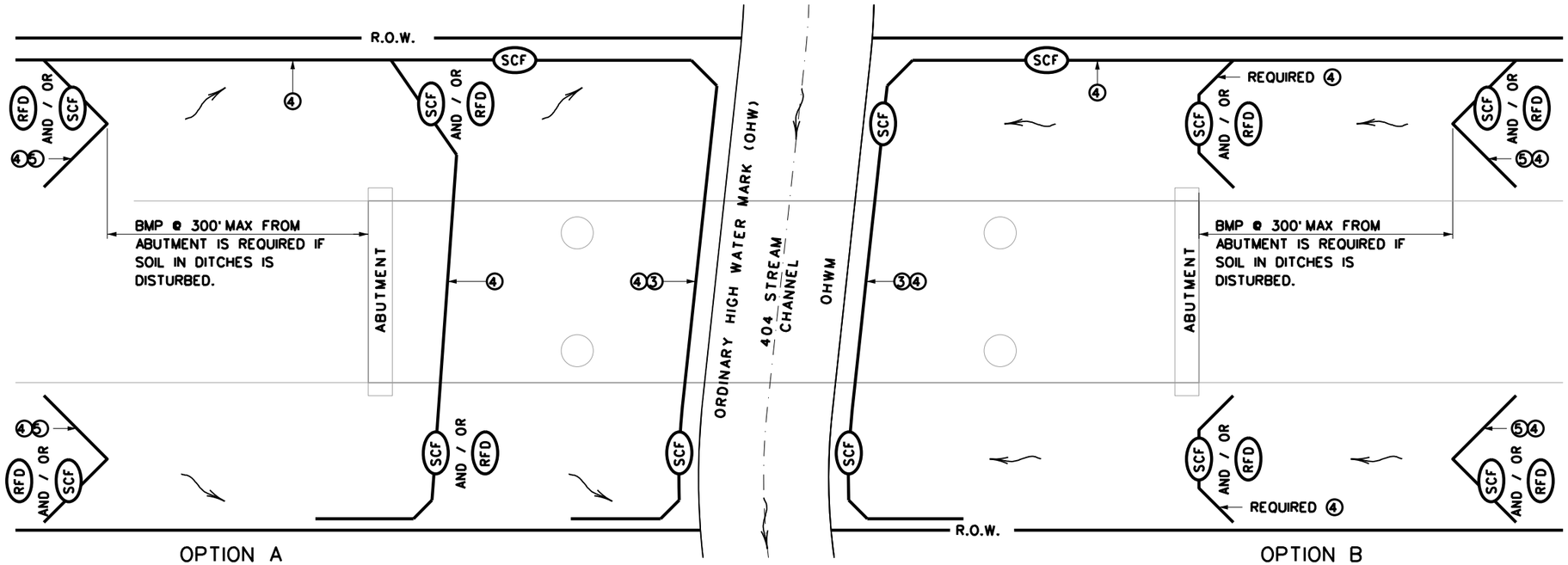
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

SCALE = NTS SHEET 10 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS DEC 2013 FEB 2015	0015	07	087	IH 35
	DIST	COUNTY		SHEET NO.
	WACO	BELL		167