SEE SHEET 2 FOR
INDEX OF SHEETS

CONT	SECT	JOB	HIGHWAY
0001	04	102, ETC.	US 62, ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP, ETC.		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

CSJ: 0001-04-102, ETC.

FEDERAL AID PROJECT NO. F 2B24(190)

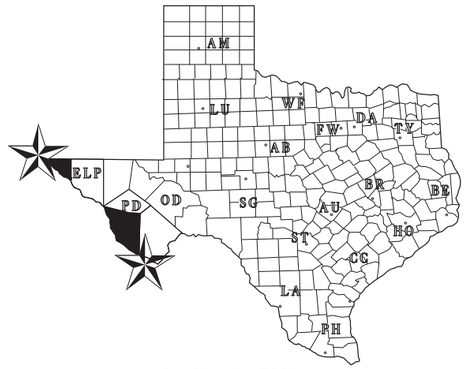
US 62, ETC.

EL PASO COUNTY, ETC.

THE CITY HEREBY CONSENT TO THE CONSTRUCTION, OF HIGHWAY TRAFFIC SIGNALS AS TO THE LOCATION AND MANNER OF CONSTRUCTION AS INDICATED ON THESE PLANS, SAID INSTALLATION BEING A PART OF "AGREEMENT (TRAFFIC SIGNAL - EXPRESSWAY TYPE E-1A), DATED NOVEMBER 12, 970" AND "AGREEMENT (TRAFFIC SIGNAL NC TYPE B), DATED JULY 16, 1991."

CITY OF EL PASO

DocuSigned by: Yvette Hernandez — F31C1F18ACA4AD... (NAME) — Grant Funded Programs Director (TITLE) — 4/18/2024 (DATE)



KEY TO COUNTIES

CSJ:	HWY/RD	LENGTH (MI)	LENGTH (FT)
0001-04-102	US 62	0.383	2,022.24
0167-02-080	BU 54A	0.100	528.00
0167-02-095	SL 478	0.500	2,640.00
0104-11-009	BU 67A	0.200	1,056.00
	TOTAL	1.183	6,246.24

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PROJECTS CONSISTING OF: IMPROVEMENT OF TRAFFIC SIGNALS AND PEDESTRIAN HYBRID BEACONS

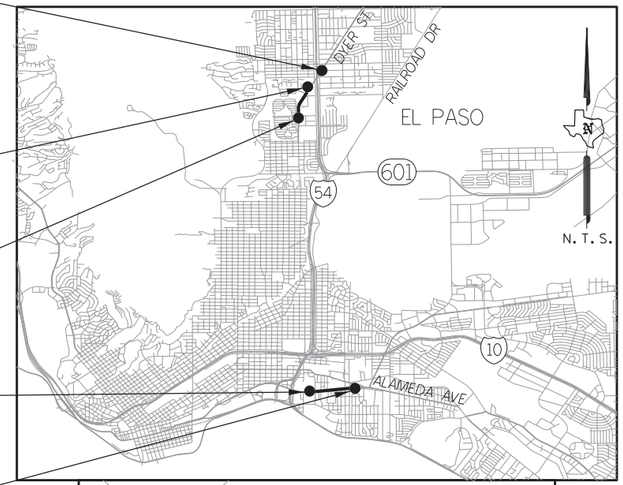
BEGIN/END PROJECT
CSJ: 0167-02-080
LAT: 31.8533982
LONG: -106.4390315
REF MRK: 26+0.146

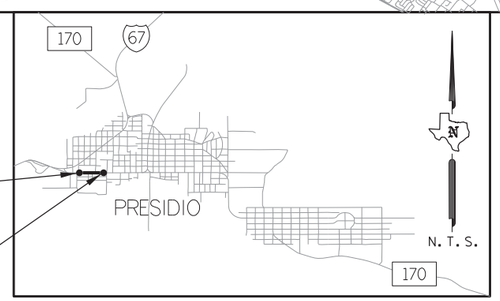
BEGIN PROJECT
CSJ: 0167-02-095
LAT: 31.8409455
LONG: -106.4451728
REF MRK: 24+1.109

END PROJECT
CSJ: 0167-02-095
LAT: 31.8476993
LONG: -106.4427987
REF MRK: 24+1.609

BEGIN PROJECT
CSJ: 0001-04-102
LAT: 31.7676695
LONG: -106.4392670
REF MRK: 20+1.572

END PROJECT
CSJ: 0001-04-102
LAT: 31.7682702
LONG: -106.4327836
REF MRK: 20+1.955





BEGIN PROJECT
CSJ: 0104-11-009
LAT: 29.5606837
LONG: -104.3797859
REF MRK: 136+0.065

END PROJECT
CSJ: 0104-11-009
LAT: 29.5606837
LONG: -104.3831103
REF MRK: 136+0.265

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED
TDLR No. TABS2024013121

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FINAL PLANS

CONTRACTOR: _____

LETTING DATE: _____

TIME CHARGES BEGAN: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED: _____

DATE WORK WAS ACCEPTED: _____

TOTAL DAYS CHARGED: _____

ORIGINAL CONTRACT AMOUNT: $ _____

AMOUNT OF CONTRACT AMENDMENTS: $ _____

FINAL CONTRACT COST: $ _____

_____
AREA ENGINEER — *20____*

4/10/2024
STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER
Carlye Lide

PLANS PREPARED BY:
Kimley»Horn F-928

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

Texas Department of Transportation

4/10/2024
REC — DocuSigned by: Eduardo Perales, P.E. — 2778C60AB5F7426...
SAFETY REVIEW COMMITTEE CHAIRMAN

4/10/2024
REC — DocuSigned by: L. Raul Ortega Jr., P.E. — 0F1750B98760474...
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

4/10/2024
APPR — DocuSigned by: Tom Thomas, P.E. — 7A68C5EA0D94496...
DISTRICT ENGINEER

DATE: 4/10/2024 12:56:25 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/1. General/102_N_01.dgn

INDEX OF SHEETS

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

3/29/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A "*" HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Carlye Lide _____, P.E. 3/29/2024
NAME DATE

Kimley»Horn F-928
2600 N Central Expy
Suite 400
Richardson, Texas 75080
Tel. No. (972) 770-1300
Fax No. (972) 239-3525

Texas Department of Transportation

TRAFFIC SAFETY IMPROVEMENTS
INDEX OF SHEETS

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)HES		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	2
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

Table 1
Basis of Estimate

Item	Description	Rate
310	Prime Coat (Multi Option)	0.20 gal./sq.yd.
3076	Dense-Graded Hot-Mix Asphalt Tack Coat (TRAIL)2	1 in. = 110 lb./sq.yd. 0.15 gal./sq.yd.

1. **Deviation from the rates shown will require approval.**
2. **Tack Coat to be applied to each layer as directed by the Engineer. Rate shown is based on the desired residual application of 0.10 gal./sq.yd.**

General Requirements

Maintain the entire project area in a neat and orderly manner throughout the duration of the work. Remove all construction litter and undesirable vegetation within the right of way inside the project limits. This work will be subsidiary to the various bid items.

General Project Description – This project consists of two pedestrian hybrid beacon designs and school flashers at US 62 and Tobin Place and US 62 and Francis Street, a pedestrian hybrid beacon design at BU 54A and Titanic Avenue, a pedestrian hybrid beacon design and school flashers at SL 478 and Julian Avenue, and a rectangular rapid flashing beacon design at BU 67A and Church Street. All locations are in El Paso County, Texas except for BU 67A at Church Street in Presidio County, Texas.

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

West Area Office:

Jonathan Concha, P.E.	**Aldo Madrid, P.E.**	**Monica Ruiz, P.E.**
West El Paso Area Engineer	**Director of Construction**	**District Construction Engineer**
Jonathan.Concha@txdot.gov	Aldo.Madrid@txdot.gov	Monica.Ruiz@txdot.gov

Questions may 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.

Traffic

Contact the Department's El Paso District Signal Shop at txdotelplocates@txdot.gov to request all Department utility line locates within the project limits. The Signal Shop will locate one time only. Record locates for the purpose of refreshing and maintaining all markings throughout the duration of the project.

Contact City of El Paso Streets and Maintenance Department at linespots@elpasotexas.gov and pavementcut@elpasotexas.gov to request all City of El Paso utility line locates within project limits. The City will locate one time only. Record locates for refreshing and maintaining all markings throughout the duration of the project.

Contact the E420ngineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. This work shall be completed at the Contractor's expense.

Inform the Engineer and the respective utility companies, when it becomes apparent that the utility lines will interfere with the work in progress.

The following Standard Detail sheets have been modified:

- **CCCG-22(MOD)**

Item 4 – Scope of Work

Schedule and perform all work to ensure proper drainage during construction or maintenance operations. All labor, tools, equipment, and supervision required, to ensure drainage, removal, and handling of water shall be considered incidental work.

Item 5 – Control of Work

The Department will furnish horizontal and vertical reference points. Contractor must verify horizontal and vertical reference points with conventional survey methods before proceeding with construction activities. Verification must be submitted for review and approval to the Department's R.P.L.S. prior to start of construction. Any discrepancies not reported will be at no additional cost to the Department.

Plan datum for this project is NAD 83 for horizontal and NAVD 88 for elevation based.

Electronic earthwork cross sections are available upon request at the Area Engineer's office.

Keep traveled surfaces used in hauling operations clear and free of dirt or other material.

Coordinate with respective utility owners before adjusting existing utility manholes, meters, valve covers, etc.

Coordinate to complete all required adjustments within project duration acceptable to the Department and each applicable Utility Agency.

Contractor shall coordinate with El Paso Water Utility for adjustments of their existing utility manholes, meters, valve covers, etc.

Existing pavement, utilities, structures, etc. damaged as a result of construction operations will be repaired at no additional cost to the Department.

Protect from damage and destruction all areas of the right of way, which are not included in the actual limits of the proposed construction areas. Exercise care to prevent damage to trees, vegetation, irrigation system and other natural features. Protect trees, shrubs, and other landscape features from abuse, marring, or damage within the actual construction and/or fenced protection areas designated for preservation.

Restore any area disturbed or damaged to a condition “as good as” or “better than” prior to start of construction operation. This work will be at the Contractor’s expense.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with “Standard Operating Procedure for Alternate Precast Proposal Submission” found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 6 – 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 link below. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Refer to section 6.10 for removal of hazardous materials.

The Department has determined the two (2) proposed pedestrian bridges being removed along US 62 contain Lead-Containing Paint (LPC).

If mechanical methods such as unbolting and mechanical shearing are not feasible for the removal of the structures, the contractor is responsible for LCP abatement necessary, dependent on the contractor’s preferred removal method, in accordance with Article 6.10, “Hazardous Materials” and specification, “Lead Containing Coating Management”.

The contractor shall schedule any required LCP abatement prior to commencing removal work on pedestrian bridges.

LCP abatement will be paid under Item 5132, “Lead Containing Coating Management”.

Item 7 – Legal Relations and Responsibilities

Comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) Sheet.

Do not discharge any liquid pollutant from vehicles onto the roadside. Immediately clean spills and dispose in compliance with local, state, and federal regulations to the satisfaction of the Engineer at no additional cost to the Department.

Occupational Safety & Health Administration (OSHA) regulations prohibit operations that bring people or equipment within 10 ft. of an energized electrical line. Where workers and/or equipment may be close to an energized electrical line, notify the electrical power company and make all necessary adjustments to ensure the safety of workers near the energized line.

Provide notification two weeks prior to beginning of construction to the City of El Paso – Streets and Maintenance Department at tcp@elpasotexas.gov when traffic control devices encroach City ROW or traffic control setup impacts City streets.

No significant traffic generator events identified.

Law Enforcement Personnel

Coordinate with TxDOT Engineer for off-duty Law enforcement assistance when needed to direct traffic during significant closures and detours, as approved unless otherwise directed by the engineer. The officer shall monitor or direct traffic during the closure as directed by the Engineer. Patrol vehicles must be clearly marked to correspond with the officer’s agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

Contractor to submit a written request at least 48 hrs prior to the need for law enforcement to the Engineer. The Engineer will make arrangements with the respective entity to formally request the services.

Fees resulting from contractor-initiated cancellations shall be the Contractor’s responsibility.

The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

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

Complete the daily tracking form provided by the department and submit proof of payment such as cancelled checks for the approved invoices that have been billed to the project no later than 30 days from the invoice date.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site.

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

Item 8 – Prosecution and Progress

Working days will be calculated in accordance with Section 8.3.1., “Standard Workweek.”

Create and maintain a Bar Chart schedule.

This project includes 120 days delay start for acquisition of traffic signals poles.

Submit baseline schedule and obtain approval prior to beginning construction. The monthly progress payment will be held if the monthly update is not submitted.

Item 9 – Measurement and Payment

Monthly progress payments will be made for items of work completed by the 27th day of each month. Any work completed after the 27th will be included for payment in the subsequent monthly progress payment.

Submit Material on Hand (MOH) payment requests at least **two (2)** working days prior to the 27th of the month for payment consideration on that month’s estimate.

Item 100 – Preparing Right of Way

This Item will be used to remove the top 13 in. of existing material and soil on the center medians.

Removal of existing loose aggregate, concrete, asphalt, and any other materials deleterious to plant growth encountered within the limits during initial grading is subsidiary to this Item.

Item 104 – Removing Concrete

All work items described under item 104.3 required to saw-cut, as shown on the plans, or as directed is considered subsidiary to this Item.

Item 110 – Excavation

To eliminate all drop-off conditions, construct tapers as directed. This work will not be paid for directly but will be considered subsidiary to pertinent bid items.

The contractor shall use this pay item to pothole and identify possible utility conflicts along proposed conduit installation and proposed drill shaft foundations.

The contractor shall pothole as directed to the proposed ground boxes, foundations, and conduit locations. This work shall be accomplished prior to commencement of the installation/construction of the above-mentioned facilities.

The intent is to determine if any conflicts with other buried utilities or structures exist. When a conflict exists, the engineer shall be notified to determine if additional exposure of the conflict is required.

The contractor shall fill the potholes up to the bottom of the pavement surface after excavating with material from the hole and compact to 95% density. The holes shall then be patched with a suitable hot mix asphalt concrete material or earthen material as directed by the engineer. The contractor shall then maintain these patches in good repair until the completion of work. All equipment, labor, and materials associated with this work shall be considered subsidiary to the various bid items.

The contractor shall inform the engineer and the respective utility companies when it becomes apparent that utility lines shall interfere with work in progress.

Item 132 – Embankment

Scarify and compact top 6 in. of existing roadway as directed before additional embankment or base course is placed. This work is subsidiary to various bid items.

Track the side slopes of the embankment to control erosion. This work will be subsidiary to various bid items.

Item 310 – Prime Coat

Cure prime coat for at least 48 hr. prior to beginning hot-mix asphalt placement operations, unless otherwise directed.

When multi option is allowed, provide AE-P, SS-1H, CSS-1H or other material approved by the Engineer.

Contractor to provide a test sample of prime coat to the engineer prior to production. Material must be tested and approved by the engineer prior to application.

Place seal coat or pavement course as shown on the plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor's expense.

Item 416 – Drilled Shaft Foundations

Stake all foundations and locations prior to commencement of drilling operations for verification to ensure no conflicts with utility lines. Approval by Engineer will be required for all non-bridge foundations.

Cover drilled shafts with plywood and delineate with pedestrian fence, to the satisfaction of the Engineer, when no work is being performed and after working hours. This work shall be considered subsidiary to this item.

Remove spoils, daily, out of the drainage areas or as directed

Item 432 – Riprap

Wire mesh and fibers for concrete will not be allowed for concrete riprap in accordance with item 432.3.1, "Concrete Riprap" on this project for this Item. Reinforce all concrete riprap using bar reinforcement conforming to Item 440, "Reinforcement for Concrete," as shown on the plans, or as directed.

Item 496 – Removing Structures

During removal contractor is responsible to maintain positive drainage.

Contractor shall submit a demolition plan for each structure that is to be removed in accordance with Item 496. Remove existing bridge structures in accordance with the phasing details shown on the Traffic Control Plans.

Existing bridge structure(s) to be removed are as follow:

1. 240720000104061

2. 240720000104062

As part of bridge removal the following items are to be removed and include but not be limited to existing concrete rail, wingwalls, expansion joints, concrete slabs, girders, caps, columns, abutments and concrete piles, stairs, chain link fence, existing concrete pilings support the pile bents and associated concrete caps as well as bridge abutments. This work is considered subsidiary to bid Item 496 "Removing Structures".

Notify the Department of Health when asbestos or lead removal is part of construction efforts. Refer to the plan's EPIC sheet for required action and additional information.

Contractor shall include in the demolition plans means to protect the roadway below when removal of bridge structures is on the plan set.

Item 502 – Barricades, Signs, and Traffic Handling

Prior to beginning construction, the Engineer will approve the routing of traffic and sequence of work.

Additional signs and barricades, placed as directed, will be considered subsidiary to this Item.

In accordance with Section 7.2.6.1, designate, in writing, a Contractor Responsible Person (CRP) and a CRP alternate to take full responsibility for the set-up, maintenance, and necessary corrective measures of the traffic control plan. The CRP or CRP alternate must be present at site and implement the initial set up of every traffic control phase/stage, at each location, and/or each call out, for the entire duration of the project.

At the written request of the Engineer, immediately remove the CRP or CRP alternate from the project if, in the opinion of the Engineer, is not competent, not present at initial TCP set-ups, or does not perform in a proper, skillful, or safe manner. These individuals shall not be reinstated without written consent of the Engineer.

CRP and CRP alternate must be trained using Department approved training. Provide a copy of the certificate of completion to the Engineer for project records.

All contractor workers involved with the traffic control implementation and maintenance must participate and complete a department approved training course. Provide a copy of the certificate of completion to the Engineer for project records. Refer to "Traffic Control Training" Material Producer List https://ftp.txdot.gov/pub/txdot-info/cmd/mpl/tct.pdf for Department approved training.

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed training must be equivalent to the Department approved training. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

Existing regulatory signs, route marker auxiliaries, guide signs, and warning signs that must be removed due to widening shall be relocated temporarily and erected on approved supports at locations shown in the plans, or as directed. This work will not be paid for directly but is considered subsidiary to this Item.

Notify the Department officials when major traffic changes are to be made, such as detours. Coordinate with the Department on all traffic changes. Advance notification for the following week's work must be made by 5 P.M. on Wednesdays.

If Law Enforcement Personnel is required by the Engineer, coordinate with local law enforcement as directed or agreed. Complete the weekly tracking form provided by the Department and submit

invoices with 5% allowance for Law Enforcement payments by Contractor that agree with the tracking form for payment at the end of each month where approved services were provided.

Provide access to intersecting side roads and driveways at all times, unless otherwise directed.

Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Use striping operations to channelize traffic into the newly completed roadway, as directed. Maintain shoulders and median areas in a condition capable of serving as emergency paths, as approved. This work will be subsidiary to this Item.

Use portable changeable message signs (PCMS) to alert public of construction two weeks prior to construction.

Use flaggers when directed. Provide two-way radio communication for all flaggers.

Place and maintain sufficient additional warning signs, beacons, delineators, and barricades to warn and guide the public of all hazards in the construction zone limits at all times, and as directed.

Use flashing arrow boards on all tapers for each lane closure.

Some signs, barricades, and channelization devices may not be shown at the precise or measured position. Place the barricades, devices, or signs, with approval, in positions to meet field conditions.

Use Type A flashing warning lights or delineators to mark open excavation, footings, foundations, or other obstructions near lanes that may be open to traffic, as directed.

Remove or cover signs that do not apply to current conditions at the end of each day's work.

Repair or replace all signs damaged by the public or due to weather events.

All project signs shall be maintained free of litter, debris, or sediment build up at the base supports. This work is subsidiary to this item of work.

Safety Contingency

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

Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls

Refer to SWP3 Sheets for total acres of disturbed area. Establish the authorization requirements for Storm Water Discharges for soil disturbed area in this project, all project locations in the Contract, and Contractor Project Specific Locations (PSLs), within one mile of the project limits. Both the Department and the Contractor shall obtain an authorization to discharge storm water from TCEQ for the construction activities shown on the plans. Obtain required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off the right of way.

Best Method Practices (BMP's) may be adjusted to meet field conditions, or as directed. The Engineer will verify all locations prior to placement of BMPs. Keep all inlets functional within the project limits throughout the entire length of the project to accept storm water as part of the Storm Water Pollution Prevention Plan (SWP3), as directed.

Place rain gauge(s) at locations as designated.

Grading operations will be limited to the catch point of the proposed cross-section.

Preserve any vegetation outside these limits.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per *Articles 4.4 and 9.7.*

Item 529 – Concrete Curb, Gutter and Combined Curb and Gutter

Use Class A concrete for these Items, unless otherwise shown on the plans. Wire mesh and fibers for concrete will not be allowed. Reinforce all concrete using reinforcement conforming to Item 440, "Reinforcement for concrete," as shown on the plans or as directed.

Construct the curb opening with metal plate configuration detailed in the plans, or as directed, to ensure roadway drainage to the earthen ditch. No direct payment will be made for these features. Payment will be made under this Item. All required manipulations or incidentals required to complete the work will be considered subsidiary to these items.

Perform all requiring grading for proposed concrete curb, gutter, and combined curb and gutter construction as shown on the plans. All grading, including excavation and fill/embankment will be subsidiary to this Item.

After construction, restore the adjacent surface to a condition approved by the Engineer. Consider this work subsidiary to this Item.

Item 530 – Intersections, Driveways, and Turnouts

The existing roadway and driveways are to be saw-cut to a straight and neat line when proposed sidewalks are being constructed across them. The area then will be cleaned out prior to concrete placement. This work is subsidiary to this Item.

Use Class A or P concrete for all concrete driveways, unless otherwise shown on the plans.

High early strength concrete for proposed driveways to be available as deemed necessary and as directed.

Item 531 – Sidewalk

The wheelchair ramp dimensions and locations shown in the plans may be adjusted, as directed, to match the field conditions. Any such modification will not be paid directly, but will be subsidiary to this Item.

Modify the sidewalk expansion joint spacing to 20 ft. spacing where waterlines may exist under the sidewalk. This work will not be paid for directly but will be subsidiary to this Item.

Provide textured finish for wheelchair ramps as directed per TxDOT standard Ped-18.

Perform all work under this Item to conform to ADA and TDLR standards.

Perform all required grading for proposed sidewalk construction as shown on the plans. All grading, including excavation, fill, and embankment will be subsidiary to this Item.

Detectable warning surface for new ramps shall be made from a Department approved surface applied vitrified polymer composite tile, red in color.

Item 610 – Roadway Illumination Assemblies

Conductor runs in Illumination Layouts must contain 5 ft. of slack.

All removed salvageable Roadway Illumination Assemblies shall be returned to the Department. Verify with the Engineer before delivery of any removed and salvaged equipment to the following location:

Texas Department of Transportation Signal Shop
915-790-4245
13301 Gateway West Blvd
El Paso, TX 79928

Item 618 – Conduit

The location of conduit is diagrammatic and may be varied to meet local conditions upon approval of the Engineer.

All bore items shall be directional.

Item 620 – Electrical Conductors

At every accessible point, bond together the grounding conductors that share the same conduit, junction box, ground box, or structure in accordance with the electrical detail sheets and the latest edition of the National Electrical Code.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Department's Materials Producers List under "Roadway Illumination and Electrical Supplies" category. Fuse holder is shown on the list under Item 610, "Roadway Illumination Assemblies," and Item 620, "Electrical Conductors." Provide 10-amp time delay fuses.

Bond metal junction boxes and metal conduit to the circuit grounding conductors in accordance with the National Electrical Code.

Refer to Article 7.18, "Electrical Requirements," for electrical certification and electrical licensing requirements.

Item 624 – Ground Boxes

Remove all conductors in ground boxes as shown on the plans to be abandoned. Payment for removal of conductors will be subsidiary to this Item.

The location of all ground boxes is diagrammatic and may be shifted to accommodate field conditions only as approved by the Engineer.

Stake all foundations and locations approved by the Engineer prior to commencement of drilling operations in order to ensure no conflicts with utility lines. Coordinate with the Utility companies for utility location within the project limits.

Ground boxes should be placed outside the path of travel leaving a clear unobstructed walking surface of at least 36" whenever possible.

Install expansion joint material approved by the Engineer between the ground box and concrete riprap apron. This material and work will be subsidiary to this pay item.

Field verify all existing ground boxes, conduit, and conductors.

The Contractor shall remove all ground boxes and conductors that are connected to existing Illumination, Traffic Signal and Traffic Management poles or as shown on the plans.

Item 628 – Electrical Services

Meet at the service locations with representatives of the Department, electrical utility company, and City of El Paso (Traffic Section) or County of El Paso at least twelve weeks before electric power is needed to finalize exact service pole placement and resolve any issues.

Coordinate with the utility company before placing multiple services within the same location.

Item 644 – Small Roadside Sign Assemblies

Stake all sign locations and receive approval prior to sign placement.

The 2-1/2 inch, Schedule 10 post will meet the following requirements:

- 0.120 in. nominal wall thickness
- Seamless or electric-resistance welded steel tubing or pipe
- Steel will be HSLAS Grade 55 per ASTM A1011 or ASTM A1008

Other steel may be used, if it meets the following:

- 55,000 psi minimum yield strength
- 70,000 psi minimum tensile strength
- 20% minimum elongation in 2 in.
- Wall thickness (uncoated) to be within the range of 0.108 in. to 0.132 in. galvanization per ASTM A123 or ASTM A653 G90

For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metalizing with zinc wire per ASTM B833.

Verify all post lengths to ensure the proper sign height. Remove and replace any sign installed incorrectly. This work will be done at no expense to the Department.

Provide Texas Universal Triangular Slip Base Bolt clamp type for all signs as shown on SMD (Slip-1)-08.

As directed, some regulatory and guide signs will be relocated before construction begins. Mark and locate each reference marker perpendicular to the road and along the right of way, or as directed, prior to removal. Re-erect reference markers at their original location upon completion of construction.

All signs removed will remain property of the Department.

Item 666 –Retroreflectorized Pavement Markings

Use a pilot line for final striping and remove pilot line after all striping is complete. Removal will be in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required as pavement surface preparation.

In those areas where existing pavement markings are to be covered or removed, field locate and record the existing pavement markings by survey or other approved method by the Engineer as directed. Place final striping on these locations.

Item 672 – Raised Pavement Markers

Use a pilot line for final pavement markers and remove pilot line after all striping is complete. Remove pilot line in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required for pavement surface preparation.

Do not place raised pavement markers when the pavement surface temperature is below 60°F.

Completely remove all existing raised pavement markers from pavement where raised pavement markers are proposed as shown in the plans. This will include all RPMs in the surrounding area of the proposed RPM. Removal of raised pavement markers is subsidiary to various bid items

Raised pavement marking spacing must be in compliance with the requirements as shown on the plans.

Item 677 – Eliminating Existing Pavement Marking and Markers

Use water blasting as the method for removal of existing pavement markings, unless otherwise approved by the engineer.

Item 680 – Installation of Highway Traffic Signals

Transformer bases or shoe bases for steel mast arm pole assemblies capable of a minimum 15-degree rotation will be acceptable.

Use metallic material for traffic signal heads and mounting hardware. Do not use polycarbonate material.

When signal head is not in operations do not face down or hang them down. Signal head shall be covered with proper method or coverage material.

Data needed prior to final acceptance during construction of traffic signals of:

1. Freeway Management System Geographic Information System-FMSGIS data by providing survey information (NAD 83 State Plane) on all poles, controller cabinets, and signal heads.

2. Digital photos and serials on all poles, controller cabinets, and signal heads.

Final acceptance of traffic signals will be determined by the City of El Paso and/or the Department and will require coordination with the Contractor for interim and final inspections. Traffic control needed for interim and final inspections is subsidiary to item 502.

Ensure that the Emergency Vehicle Traffic Signal Priority Control Systems are compatible with current applications used by the City of El Paso.

Item 1005 – Loose Aggregate for Ground Cover

Protect newly graded areas from traffic and erosion.

Secure locally quarried aggregate rock that is clean, free from foreign materials and debris prior to placement and approved by the Engineer.

For Type II aggregate use crushed rhyolite rock graded to range from ¾ inch to **1** inch rock size placed in a 3" layer. Provide a color: **Sand (Beige)** rock color as approved prior to placement. Place rock where shown on the plans or as directed.

The aggregate shall fill in the eroded areas, gaps, improve and satisfy the layer thickness and to the satisfaction of the engineer.

Provide a sample of each aggregate color to project Engineer for approval.

Keep aggregate 1 in below top of concrete or concrete curb.

Rock colors will not be changed to match Contractor's rock.

Item 3076 – Dense-Graded Hot-Mix Asphalt

Provide aggregates with a Surface Aggregate Classification (SAC) of "A" for all surface mixes. Provide aggregates with a minimum SAC of B for all other layers unless otherwise shown on the plans.

In place of typical tack materials shown in Table 18 under Item 3096, use a tracking resistant asphalt interlayer (TRAIL) material as a tack coat. TRAIL shall only be required prior to the final riding surface layer of HMA. Approved TRAIL products are found on TxDOT's Material Producer List under Asphalt Interlayer (Tracking Resistant) website here: https://www.txdot.gov/business/resources/materials.html

Do not dilute the tack coat. Tack coat shall be applied to each layer as directed by the Engineer

Hydrated Lime shall be added as an additive as per Item 301 "Asphalt Antistripping Agents" between the rates of 1% minimum and 2.0% maximum by weight. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime.

When Reclaimed Asphalt Pavement (RAP) is used in the production of hot-mix asphaltic concrete, use fractionated RAP. Do not exceed 10.0% of Fractionated RAP on surface mixtures. Department-owned RAP generated through the required work on the Contract is available for the Contractor's use. Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP when RAP is generated through the required work on the Contract.

Use of Recycled Asphalt Shingles (RAS)is not allowed for any mixtures.

Substitute PG Binders (grade dumping) will not be allowed for any mixtures.

Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html Submit electronically to the Engineer.

Design the mixture at 50 gyrations (Ndesign).

Do not cover with asphaltic material, any existing survey monuments, manholes, or valve covers, etc. Adjustments will be done in coordination with the respective utility owners.

Place a string line or other suitable marking to ensure smooth, neat lines, or as directed. Provide smooth transitions to existing driveways and intersections.

Place longitudinal joints approximately 6 in. from the stripe, or as directed by the Engineer. Avoid placing joint under the wheel path. Avoid placing longitudinal joints on the outside travel lane on multi-lane roadway.

Operate the spreading and finishing machine at a uniform forward speed consistent with the plant production rate, hauling capability, and roller train capacity to result in a continuous operation. The speed will be slow enough, so that stopping between trucks is not ordinarily required. If the Engineer determines non-uniform delivery of material is affecting the HMA placement, the Engineer may require the paving operations to cease until acceptable methods are employed to minimize starting and stopping of the paver.

Item 6001 – Portable Changeable Message Sign

Provide messages as directed.

Provide two Portable Changeable Message Signs (PCMS) as advanced notification for two weeks prior to beginning project and throughout duration of project as directed.

Item 6185 – Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

All TMA Operators must participate in a TMA workshop to be conducted by the El Paso District Safety Office on the proper use of TMAs, prior to work. All TMA Operators must participate in a TMA workshop provided by the Department or equivalent approved by the Engineer. A truck mounted attenuator completion card will be issued to TMA Operators that successfully complete the TMA workshop. The workshop completion card must be carried by TMA Operators at all times while working on Department right of way. Acquire the TCP and TMA Operator's certificates of completion prior to the authorization to begin work. No time suspension will be granted and no traffic control work will be allowed without certificates of completion.

Refer to the Basis of Estimate for the TMAs required for this type of work. TMAs will be used and positioned per the applicable Traffic Control Plan standard or as directed by the Engineer. Additional TMAs required due to changes in project phasing by contractor or the Engineer will be provided by the contractor.

The supporting vehicle for the TMA shall have a minimum gross (i.e., ballasted) vehicular weight of 19,000 pounds.

Basis of Estimate for Stationary TMAs				
		TMA(Stationary)		
Phase	Standard	Required	Additional	TOTAL
	TCP (1-1)-18	1		1
	TCP (1-2)-18	1		1
	TCP (2-1)-18	1		1
	TCP (2-2)-18	1		1
	TCP (2-4)-18	1		1
	WZ (BTS-1)-13	1		1

Basis of Estimate for Mobile TMAs			
	TMA(Mobile)		
Standard	Required	Additional	TOTAL
TCP (3-1)-13	2		2
TCP (3-3)-14	2		2

CONTROL: 0001-04-102, ETC

COUNTY: EL PASO, ETC.

HIGHWAY: US 62, ETC

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0001-04-102 **DISTRICT** El Paso **COUNTY** El Paso, Presidio
HIGHWAY BU 54A, BU 67A, SL 478, US 62

													TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0001-04-102**		**0104-11-009**		**0167-02-080**		**0167-02-095**			
			PROJECT ID		**A00193317**		**A00193320**		**A00177512**		**A00198166**			
			COUNTY		**El Paso**		**Presidio**		**El Paso**		**El Paso**			
			HIGHWAY		**US 62**		**BU 67A**		**BU 54A**		**SL 478**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW		STA					3.000				3.000	
	104-6001	REMOVING CONC (PAV)		SY					259.000				259.000	
	104-6011	REMOVING CONC (MEDIANS)		SY					113.000				113.000	
	104-6015	REMOVING CONC (SIDEWALKS)		SY			3.000		4.000				7.000	
	104-6017	REMOVING CONC (DRIVEWAYS)		SY			6.000						6.000	
	104-6029	REMOVING CONC (CURB OR CURB & GUTTER)		LF					259.000				259.000	
	105-6091	REMOVING STAB BASE & ASPH PAV (8"-12")		SY					280.000				280.000	
	110-6003	EXCAVATION (SPECIAL)		CY	2.400		0.400		0.800		2.000		5.600	
	132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)		CY					30.000				30.000	
	310-6001	PRIME COAT (MULTI OPTION)		GAL					45.000				45.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)		LF					8.000				8.000	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)		LF	44.000						22.000		66.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)		LF	52.000				13.000		26.000		91.000	
	432-6003	RIPRAP (CONC)(6 IN)		CY			3.100						3.100	
	496-6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)		EA	2.000								2.000	
	500-6001	MOBILIZATION		LS	1.000								1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	5.000								5.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")		LF	10.000				20.000		12.000		42.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	10.000				20.000		12.000		42.000	
	529-6008	CONC CURB & GUTTER (TY II)		LF	198.000				439.000				637.000	
	529-6034	CONC CURB (MONO) (TY II) (MOD)		LF			152.000						152.000	
	530-6004	DRIVEWAYS (CONC)		SY			6.000						6.000	
	531-6002	CONC SIDEWALKS (5")		SY	135.000				10.000		5.000		150.000	
	531-6005	CURB RAMPS (TY 2)		EA	2.000				2.000		2.000		6.000	
	531-6006	CURB RAMPS (TY 3)		EA					1.000				1.000	
	531-6010	CURB RAMPS (TY 7)		EA	6.000		1.000				2.000		9.000	
	531-6016	CURB RAMPS (TY 21)		EA					1.000				1.000	
	531-6040	CURB RAMPS (TY3)(MOD)		EA			1.000						1.000	
	536-6002	CONC MEDIAN		SY					34.000				34.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE		LF	406.000								406.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL		EA	8.000								8.000	
	550-6003	CHAIN LINK FENCE (REMOVE)		LF	44.000								44.000	
	610-6004	RELOCATE RD IL ASM (TRANS-BASE)		EA					1.000				1.000	
	618-6023	CONDT (PVC) (SCH 40) (2")		LF	1,705.000				210.000		1,035.000		2,950.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)		LF	810.000				155.000		260.000		1,225.000	
	618-6029	CONDT (PVC) (SCH 40) (3")		LF	1,300.000				350.000		215.000		1,865.000	
	618-6030	CONDT (PVC) (SCH 40) (3") (BORE)		LF	590.000				180.000		70.000		840.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0001-04-102 **DISTRICT** El Paso **COUNTY** El Paso, Presidio
HIGHWAY BU 54A, BU 67A, SL 478, US 62

				0001-04-102		0104-11-009		0167-02-080		0167-02-095		TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB										
			PROJECT ID	A00193317		A00193320		A00177512		A00198166			
			COUNTY	El Paso		Presidio		El Paso		El Paso			
			HIGHWAY	US 62		BU 67A		BU 54A		SL 478			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	618-6070	CONDT (RM) (2")	LF							85.000		85.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	4,650.000						640.000		5,290.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	10,575.000				1,635.000		4,315.000		16,525.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA					1.000				1.000	
	624-6003	GROUND BOX TY B (122322)	EA	4.000								4.000	
	624-6004	GROUND BOX TY B (122322)W/APRON	EA	18.000				2.000		14.000		34.000	
	624-6028	REMOVE GROUND BOX	EA					1.000				1.000	
	628-6142	ELC SRV TY D 120/240 060(NS)SS(E)GC(O)	EA	2.000						1.000		3.000	
	628-6149	ELC SRV TY D 120/240 060(NS)SS(N)GC(O)	EA	1.000						1.000		2.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	26.000		4.000		13.000		13.000		56.000	
	644-6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	2.000				2.000		2.000		6.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	4.000								4.000	
	666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	530.000		70.000		265.000		305.000		1,170.000	
	666-6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	EA					3.000				3.000	
	666-6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	EA					2.000				2.000	
	666-6155	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	EA					1.000				1.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF			85.000						85.000	
	666-6225	PAVEMENT SEALER 6"	LF			85.000		200.000				285.000	
	666-6230	PAVEMENT SEALER 24"	LF	530.000		70.000		265.000		305.000		1,170.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA					3.000				3.000	
	666-6232	PAVEMENT SEALER (WORD)	EA					2.000				2.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF					200.000				200.000	
	672-6007	REFL PAV MRKR TY I-C	EA			6.000						6.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA					10.000				10.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF					17.000				17.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF			85.000		110.000				195.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF			40.000		20.000				60.000	
	678-6002	PAV SURF PREP FOR MRK (6")	LF			85.000		200.000				285.000	
	678-6008	PAV SURF PREP FOR MRK (24")	LF	530.000		70.000		265.000		305.000		1,170.000	
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA					3.000				3.000	
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA					2.000				2.000	
	680-6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	6.000				1.000		3.000		10.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	36.000				6.000		18.000		60.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	24.000				12.000		12.000		48.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA	8.000				4.000		4.000		16.000	
	682-6021	BACK PLATE (12")(1 SEC)	EA	24.000						12.000		36.000	
	682-6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	12.000				6.000		6.000		24.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0001-04-102 **DISTRICT** El Paso **COUNTY** El Paso, Presidio
HIGHWAY BU 54A, BU 67A, SL 478, US 62

													TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0001-04-102**		**0104-11-009**		**0167-02-080**		**0167-02-095**				
		PROJECT ID		**A00193317**		**A00193320**		**A00177512**		**A00198166**				
		COUNTY		**El Paso**		**Presidio**		**El Paso**		**El Paso**				
		HIGHWAY		**US 62**		**BU 67A**		**BU 54A**		**SL 478**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	5,665.000				1,885.000		965.000			8,515.000	
	684-6038	TRF SIG CBL (TY A)(14 AWG)(12 CONDR)	LF	2,905.000				1,010.000		430.000			4,345.000	
	684-6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	5,436.000				1,411.000		603.000			7,450.000	
	686-6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	4.000						2.000			6.000	
	686-6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA	2.000						2.000			4.000	
	686-6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA	2.000									2.000	
	686-6147	INS TRF SIG PL AM(S)2 ARM(40-36')LUM	EA					1.000					1.000	
	687-6001	PED POLE ASSEMBLY	EA	8.000				2.000		4.000			14.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA	8.000				3.000		4.000			15.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA	2.000				1.000		1.000			4.000	
	1005-6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY	6.000				22.000					28.000	
	3076-6079	D-GR HMA TY-C PG70-22 (EXEMPT)	TON					45.000					45.000	
	5132-6002	LEAD CONTAINING COATING MNGMT-12" STRIP	EA	39.000									39.000	
	6000-6008	REMOVE CONDUCTOR	LF					1,170.000					1,170.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000		2.000		2.000		2.000			10.000	
	6027-6003	CONDUIT (PREPARE)	LF					10.000					10.000	
	6027-6008	GROUND BOX (PREPARE)	EA					2.000					2.000	
	6185-6002	TMA (STATIONARY)	DAY	16.000		3.000		8.000		8.000			35.000	
	6420-6001	REC RAPID FLASH BEACON (2-WAY SOLAR)	EA			2.000							2.000	
	14	PUBLIC UTILITY FORCE ACCT WORK (PARTICIPATING)	LS	1.000									1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000									1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000									1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000									1.000	

SUMMARY OF REMOVAL ITEMS

LOCATION	100 6002 PREPARING ROW (STA)	104 6001 REMOVING CONC (PAV) (SY)	104 6011 REMOVING CONC (MEDIANS) (EA)	104 6015 REMOVING CONC (SIDEWALKS) (SY)	104 6017 REMOVING CONC (DRIVEWAYS) (SY)	104 6029 REMOVING CONC (CURB OR CURB & GUTTER) (LF)	105 6091 REMOVING STAB BASE & ASPH PAV (8"-12") (SY)	110 6003 EXCAVATION (SPECIAL) (CY)	496 6010 REMOV STR (BRIDGE 100 - 499 FT LENGTH) (EA)	542 6001 REMOVE METAL BEAM GUARD FENCE (LF)	542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL (EA)	550 6003 CHAIN LINK FENCE (REMOVE) (LF)	624 6028 REMOVE GROUND BOX (EA)	5132 6002 LEAD CONTAINING COATING MNGMT-12" STRI (EA)
CSJ: 0001-04-102														
US 62 AT TOBIN PLACE														
EXISTING CONDITIONS AND REMOVALS SHEET 1 OF 1								1.2	1	204	4	22		21
US 62 AT FRANCIS STREET														
EXISTING CONDITIONS AND REMOVALS SHEET 2 OF 4								1.2	1	202	4	22		18
CSJ: 0001-04-102 TOTALS								**2.4**	**2**	**406**	**8**	**44**		**39**
CSJ: 0167-02-080														
BU 54A AT TITANIC AVENUE														
REMOVAL LAYOUT SHEET 1 OF 1	3	259	113	4		259	280	0.6					1	
CSJ: 0167-02-080 TOTALS	**3**	**259**	**113**	**4**		**259**	**280**	**0.6**					**1**	
CSJ: 0104-11-009														
BU 67A AT CHURCH STREET														
EXISTING CONDITIONS AND REMOVALS SHEET 1 OF 1				3	6			0.4						
CSJ: 0104-11-009 TOTALS				**3**	**6**			**0.4**						
PROJECT TOTALS	**3**	**259**	**113**	**7**	**6**	**259**	**280**	**3.4**	**2**	**406**	**8**	**44**	**1**	**39**

SUMMARY OF SWPPP ITEMS

LOCATION	506 6040 BIODEG EROSN CONT LOGS (INSTL) (8") (LF)	506 6043 BIODEG EROSN CONT LOGS (REMOVE) (LF)
CSJ: 0001-04-102		
US 62 AT TOBIN PLACE	5	5
US 62 AT FRANCIS STREET	5	5
CSJ: 0001-04-102 TOTALS	**10**	**10**
CSJ: 0167-02-080		
BU54A AT TITANIC AVENUE	20	20
CSJ: 0167-02-080 TOTALS	**20**	**20**
CSJ: 0167-02-095		
SL 478 AT JULIAN AVENUE	12	12
CSJ: 0167-02-095 TOTALS	**12**	**12**
PROJECT TOTALS	**42**	**42**

SUMMARY OF MOBILIZATION

LOCATION	500 6001 MOBILIZATION	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING
UNITS	LS	MO
CCSJ: 0001-04-120	1	5
PROJECT TOTALS	**1**	**5**

5/1/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

Carlye Lide

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Richardson, Texas 75080
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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

REMOVAL, SWPPP, AND MOBILIZATION

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	5
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

SUMMARY OF ROADWAY ITEMS

LOCATION	132 6001 EMBANKMENT (FINAL) (ORD COMP) (TY A) CY	310 6001 PRIME COAT (MULTI OPTION) CY	432 6003 RIPRAP (CONC) (6 IN) CY	529 6034 CONC CURB (MONO) (TY II) (MOD) LF	529 6008 CONC CURB & GUTTER (TY II) LF	530 6004 DRIVEWAYS (CONC) SY	531 6002 CONC SIDEWALKS (5") SY	536 6002 CONC MEDIAN SY	1005 6002 LOOSE AGGR FOR GROUNDCOVER (TYPE II) CY	3076 6079 D-GR HMA TY-C PG70-22 (EXEMPT) TON
CSJ: 0001-04-102										
US 62 AT TOBIN PLACE										
RAMP LAYOUT SHEET 1 OF 1					98		69		4	
US 62 AT FRANCIS STREET										
RAMP LAYOUT SHEET 1 OF 1					100		66		2	
CSJ: 0001-04-102 TOTALS					**198**		**135**		**6**	
CSJ: 0167-02-080										
BU54A AT TITANIC AVENUE										
PROPOSED PAVING DETAILS SHEET 1 OF 1	30	45			419			34	20	45
CSJ: 0167-02-080 TOTALS	**30**	**45**			**419**			**34**	**20**	**45**
CSJ: 0104-11-009										
BU 67A AT CHURCH STREET										
RAMP LAYOUT SHEET 1 OF 1			3.1	152		6				
CSJ: 0104-11-009 TOTALS			**3.1**	**152**		**6**				
PROJECT TOTALS	**30**	**45**	**3.1**	**152**	**617**	**6**	**135**	**34**	**26**	**45**

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN EA	6185 6002 TMA (STATIONARY) DAY
CSJ: 0001-04-102		
US 62 AT TOBIN PLACE	2	8
US 62 AT FRANCIS STREET	2	8
CSJ: 0001-04-102 TOTALS	**4**	**16**
CSJ: 0167-02-080		
BU54A AT TITANIC AVENUE	2	8
CSJ: 0167-02-080 TOTALS	**2**	**8**
CSJ: 0167-02-095		
SL 478 AT JULIAN AVENUE	2	8
CSJ: 0167-02-095 TOTALS	**2**	**8**
CSJ: 0104-11-009		
BU 67A AT CHURCH STREET	2	3
CSJ: 0104-11-009 TOTALS	**2**	**3**
PROJECT TOTALS	**10**	**35**

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

ROADWAY AND
TRAFFIC CONTROL

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	6
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

SUMMARY OF ADA ITEMS

LOCATION	529 6008	531 6002	531 6005	531 6006	531 6010	531 6016	531 6040	682 6018	687 6001	688 6001	688 6003	1005 6002
	CONC CURB & GUTTER (TY II)	CONC SIDEWALKS (5")	CURB RAMPS (TY 2)	CURB RAMPS (TY 3)	CURB RAMPS (TY 7)	CURB RAMPS (TY 21)	CURB RAMPS (TY3) (MOD)	PED SIG SEC (LED) (COUNTDOWN)	PED POLE ASSEMBLY	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT	LOOSE AGGR FOR GROUNDCOVER (TYPE II)
	LF	SY	EA	EA	EA	EA	EA	EA	EA	EA	EA	CY
CSJ: 0001-04-102												
US 62 AT TOBIN PLACE												
RAMP LAYOUT SHEET 1 OF 1			1		3							
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4								4	4	4	1	
US 62 AT FRANCIS STREET												
RAMP LAYOUT SHEET 1 OF 1			1		3							
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4								4	4	4	1	
CSJ: 0001-04-102 TOTALS			**2**		**6**			**8**	**8**	**8**	**2**	
CSJ: 0167-02-080												
BU54A AT TITANIC AVENUE												
RAMP LAYOUT SHEET 1 OF 1	20	10	2	1		1						2
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4								4	2	3	1	
CSJ: 0167-02-080 TOTALS	**20**	**10**	**2**	**1**		**1**		**4**	**2**	**3**	**1**	**2**
CSJ: 0167-02-095												
SL 478 AT JULIAN AVENUE												
RAMP LAYOUT SHEET 1 OF 1		5	2		2							
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 2								4	4	4	1	
CSJ: 0167-02-095 TOTALS		**5**	**2**		**2**			**4**	**4**	**4**	**1**	
CSJ: 0104-11-009												
BU 67A AT CHURCH STREET												
RAMP LAYOUT SHEET 1 OF 1					1		1					
RECTANGULAR RAPID FLASHING BEACON LAYOUT SHEET 1 OF 2												
CSJ: 0104-11-009 TOTALS					1		1					
PROJECT TOTALS	20	15	6	1	9	1	1	16	14	15	4	2

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

ADA

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	7
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/1, General/102_QSUM_03_ADA.dgn
$$$$SCALE$$$$
BY: $USER$

LOCATION	110 6003	416 6031	416 6032	618 6023	618 6024	618 6070	618 6029	618 6030	620 6008	620 6010	624 6003	624 6004	628 6142	628 6149	680 6001
	EXCAVATION (SPECIAL)	DRILL SHAFT (TRF SIG POLE) (30 IN)	DRILL SHAFT (TRF SIG POLE) (36 IN)	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	CONDT (RM) (2")	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 40) (3") (BORE)	ELEC CONDR (NO. 8) INSULATED	ELEC CONDR (NO. 6) INSULATED	GROUND BOX TY B (122322)	GROUND BOX TY B (122322) W/APRON	ELC SRV TY D 120/240 060(NS)SS(E)GC(O)	ELC SRV TY D 120/240 060(NS)SS(N)GC(O)	INSTALL HWY TRF SIG (FLASH BEACON)
	CY	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA
CSJ: 0001-04-102															
US 62 AT WASHINGTON ST															
SCHOOL FLASHERS LAYOUT SHEET 1 OF 2		11					200			600		2		1	1
US 62 AT TOBIN PLACE															
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4				390			390		780	780		2	1		
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 2 OF 4			26	55	180		150	245	510	630	3	1			1
US 62 AT FRANCIS STREET															
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 1 OF 6		22		370	195					1965		4			2
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 2 OF 6			26	570	250		415	250	2040	4165	1	4			1
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 3 OF 6				305	185		145	95	1320	2390		4	1		
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 4 OF 6		11		15						45		1			1
CSJ: 0001-04-102 TOTALS		**44**	**52**	**1705**	**810**		**1300**	**590**	**4650**	**10575**	**4**	**18**	**2**	**1**	**6**
CSJ: 0167-02-080															
BU54A AT TITANIC AVENUE															
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4			13				10	105		115		1			1
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 2 OF 4							340	75		425		1			
CSJ: 0167-02-080 TOTALS			**13**				**350**	**180**		**540**		**2**			**1**
CSJ: 0167-02-095															
SL 478 AT JULIAN AVENUE															
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 3	1.2		26	160	70		215	70	640	865		5	1		1
SL 478 SCHOOL FLASHERS															
SCHOOL FLASHERS LAYOUT SHEET 1 OF 3	0.4	11		480	130					1830		6		1	1
SCHOOL FLASHERS LAYOUT SHEET 2 OF 3	0.4	11		395	60	85				1620		3		1	1
CSJ: 0167-02-095 TOTALS	2	22	26	1035	260	85	215	70	640	4315		14	1	1	3
CSJ: 0104-11-009															
BU 67A AT CHURCH STREET															
RECTANGULAR RAPID FLASHING BEACON LAYOUT SHEET 1 OF 2															
CSJ: 0104-11-009 TOTALS															
PROJECT TOTALS	2	66	91	2740	1070	85	1865	840	5290	15430	4	34	3	2	10

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

TRAFFIC SIGNAL

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	8
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

	SUMMARY OF TRAFFIC SIGNAL ITEMS													
LOCATION	682 6003	682 6005	682 6021	682 6051	684 6031	684 6038	684 6079	686 6033	686 6043	686 6047	686 6147	6027 6003	6027 6008	6420 6001
	VEH SIG SEC (12")LED(YEL)	VEH SIG SEC (12")LED(RED)	BACK PLATE (12")(1 SEC)	BACKPLATE W/REFL BRDR(3 SEC)ALUM	TRF SIG CBL (TYA)(14 AWG)(5 CONDR)	TRF SIG CBL (TYA)(14 AWG)(12 CONDR)	TRF SIG CBL (TYC)(12 AWG)(2 CONDR)	INS TRF SIG PL AM(S)1 ARM(32')	INS TRF SIG PL AM(S)1 ARM(40')LUM	INS TRF SIG PL AM(S)1 ARM(44')LUM	INS TRF SIG PL AM(S)2 ARM(40-36')LUM	CONDUIT (PREPARE)	GROUND BOX (PREPARE)	REC RAPID FLASH BEACON (2-WAY SOLAR)
	EA	EA	EA	EA	LF	LF	LF	EA	EA	EA	EA	LF	EA	EA
CSJ: 0001-04-102														
US 62 AT WASHINGTON ST														
SCHOOL FLASHERS LAYOUT SHEET 1 OF 2	6		6		165			1						
US 62 AT TOBIN PLACE														
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4					1560	780	1560							
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 2 OF 4	6	12		6	885	495	853		1	1				
US 62 AT FRANCIS STREET														
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 1 OF 6	12		12					2						
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 2 OF 6	6	12		6	2095	1150	2063		1	1				
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 3 OF 6					960	480	960							
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 4 OF 6	6		6					1						
CSJ: 0001-04-102 TOTALS	**36**	**24**	**24**	**12**	**5665**	**2905**	**5436**	**4**	**2**	**2**				
CSJ: 0167-02-080														
BU54A AT TITANIC AVENUE														
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 4	6	12		6	1545	840	1156				1	10	1	
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 2 OF 4					340	170	255							
CSJ: 0167-02-080 TOTALS	**6**	**12**		**6**	**1885**	**1010**	**1411**				**1**	**10**	**1**	
CSJ: 0167-02-095														
SL 478 AT JULIAN AVENUE														
PEDESTRIAN HYBRID BEACON LAYOUT SHEET 1 OF 3	6	12		6	635	430	603		2					
SL 478 SCHOOL FLASHERS														
SCHOOL FLASHERS LAYOUT SHEET 1 OF 3	6		6		165			1						
SCHOOL FLASHERS LAYOUT SHEET 2 OF 3	6		6		165			1						
CSJ: 0167-02-095 TOTALS	**18**	**12**	**12**	**6**	**965**	**430**	**603**	**2**	**2**					
CSJ: 0104-11-009														
BU 67A AT CHURCH STREET														
RECTANGULAR RAPID FLASHING BEACON LAYOUT SHEET 1 OF 2														2
CSJ: 0104-11-009 TOTALS														**2**
PROJECT TOTALS	60	48	36	24	8515	4345	7450	6	4	2	1	10	1	2

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

TRAFFIC SIGNAL

SHEET 5 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	9
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

SUMMARY OF ILLUMINATION ITEMS									
LOCATION	110 6003	416 6029	610 6004	618 6023	618 6024	620 6010	624 6002	6000 6008	6027 6008
	EXCAVATION (SPECIAL)	DRILL SHAFT (RDWY ILL POLE) (30 IN)	RELOCATE RD IL ASM (TRANS-BASE)	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	ELEC CONDR (NO. 6) INSULATED	GROUND BOX TY A (122311) W/APRON	REMOVE CONDUCTOR	GROUND BOX (PREPARE)
	CY	LF	EA	LF	LF	LF	EA	LF	EA
CSJ: 0167-02-080									
BU54A AT TITANIC AVENUE									
ILLUMINATION LAYOUT SHEET 1 OF 1	0.2	8	1	210	155	1095	1	1170	1
CSJ: 0167-02-080 TOTALS	**0.2**	**8**	**1**	**210**	**155**	**1095**	**1**	**1170**	**1**
PROJECT TOTALS	**0.2**	**8**	**1**	**210**	**155**	**1095**	**1**	**1170**	**1**

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

ILLUMINATION

SHEET 6 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	10
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

SUMMARY OF SIGNING AND PAVEMENT MARKING ITEMS

LOCATION	644 6001	644 6067	644 6068	666 6047	666 6053	666 6077	666 6155	666 6174	666 6225	666 6230	666 6231	666 6232	666 6320	672 6007	672 6009	677 6003	677 6005	677 6007	678 6002	678 6008	678 6009	678 6016
	IN SM RD SN SUP&AM TY10BWG (1)SA(P)	IN SM RD SN SUP&AM (INST SIGN ONLY)	RELOCATE SM RD SN SUP&AM TY 10BWG	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	REFL PAV MRK TY I (W)(ARROW)(090MIL)	REFL PAV MRK TY I (W)(WORD)(090MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	REFL PAV MRK TY II (W) 6" (SLD)	PAVEMENT SEALER 6"	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (WORD)	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (ARROW)	PAV SURF PREP FOR MRK (WORD)
	EA	EA	EA	LF	EA	EA	EA	LF	LF	LF	EA	EA	LF	EA	EA	LF	LF	LF	LF	LF	EA	EA
CSJ: 0001-04-102																						
US 62 AT WASHINGTON ST																						
SCHOOL FLASHERS SHEET 1 OF 2	1	1		70						70										70		
US 62 AT TOBIN PLACE																						
PAVEMENT MARKING LAYOUT SHEET 1 OF 1	12			210						210										210		
US 62 AT FRANCIS STREET																						
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 1 OF 6																						
PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHERS LAYOUT SHEET 4 OF 6	1	1	2	80						80										80		
PAVEMENT MARKING LAYOUT SHEET 1 OF 1	12		2	170						170										170		
CSJ: 0001-04-102 TOTALS	**26**	**2**	**4**	**530**						**530**										**530**		
CSJ: 0167-02-080																						
BU54A AT TITANIC AVENUE																						
PAVEMENT MARKING LAYOUT SHEET 1 OF 1	13	2		265	3	2	1		200	265	3	2	200		10	17	110	20	200	265	3	2
CSJ: 0167-02-080 TOTALS	**13**	**2**		**265**	**3**	**2**	**1**		**200**	**265**	**3**	**2**	**200**		**10**	**17**	**110**	**20**	**200**	**265**	**3**	**2**
CSJ: 0167-02-095																						
SL 478 AT JULIAN AVENUE																						
PAVEMENT MARKING LAYOUT SHEET 1 OF 1	11			165						165										165		
SL 478 SCHOOL FLASHERS																						
SCHOOL FLASHERS LAYOUT SHEET 1 OF 3	1	1		70						70										70		
SCHOOL FLASHERS LAYOUT SHEET 2 OF 3	1	1		70						70										70		
CSJ: 0167-02-095 TOTALS	**13**	**2**		**305**						**305**										**305**		
CSJ: 0104-11-009																						
BU 67A AT CHURCH STREET																						
PAVEMENT MARKING LAYOUT SHEET 1 OF 1	4			70				85	85	70				6			85	40	85	70		
CSJ: 0104-11-009 TOTALS	**4**			**70**				**85**	**85**	**70**				**6**			**85**	**40**	**85**	**70**		
PROJECT TOTALS	**56**	**6**	**4**	**1170**	**3**	**2**	**1**	**85**	**285**	**1170**	**3**	**2**	**200**	**6**	**10**	**17**	**195**	**60**	**285**	**1170**	**3**	**2**

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TRAFFIC SAFETY IMPROVEMENTS

SUMMARY OF QUANTITIES

SIGNING AND PAVEMENT MARKING

SHEET 7 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	11
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
			SPEED LIMIT 45									
49	5	R2-1		24"x 30"	X		10BWG	1	SA	P		
	4	S5-2	END SCHOOL ZONE	24"x 30"	X							
59	1	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							
59	2	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							
59	3	R10-6L	STOP HERE ON RED	24"x 36"	X		10BWG	1	SA	P		
59	4	R10-6R	STOP HERE ON RED	24"x 36"	X		10BWG	1	SA	P		
59	5	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR		24"x 12"	X							
59	6	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL		24"x 12"	X							
59	7	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR		24"x 12"	X							
59	8	R10-6R	STOP HERE ON RED	24"x 36"	X		10BWG	1	SA	P		
59	9	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL		24"x 12"	X							
59	10	R10-6L	STOP HERE ON RED	24"x 36"	X		10BWG	1	SA	P		
59	11	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							

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

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

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NOTE:

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

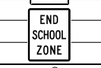
SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-16	DIST	COUNTY		SHEET NO.
8-16	ELP	ELP,ETC.		12

18

DATE: 3/29/2024 8:59:44 AM
FILE:

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
										PREFABRICATED	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		
59	12	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
68	19	R2-1		24"x 30"	X		10BWG	1	SA	P		
	18	S5-2		24"x 30"	X							
72	1	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
72	2	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
72	3	R10-6R		24"x 36"	X		10BWG	1	SA	P		
72	4	R10-6L		24"x 36"	X		10BWG	1	SA	P		
72	5	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR		24"x 12"	X							
72	6	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL		24"x 12"	X							
72	7	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR		24"x 12"	X							
72	8	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL		24"x 12"	X							
72	9	R10-6L		24"x 36"	X		10BWG	1	SA	P		
72	10	R10-6R		24"x 36"	X		10BWG	1	SA	P		

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0001	04	102,ETC.	US62,ETC.
4-16 8-16		DIST	COUNTY		SHEET NO.
		ELP	ELP,ETC.		13

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DATE: 3/29/2024 9:00:07 AM
FILE:

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
72	11	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
72	12	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
72	13	R7-107A		12"x 24"	X		RELOCATE SIGN ASSEMBLY TYPE "10 BWG"					
72	14	R7-107A		12"x 24"	X		RELOCATE SIGN ASSEMBLY TYPE "10 BWG"					
80	1	R3-2		24"x 24"	X		10BWG	1	SA	P		
80	2	R3-2		24"x 24"	X		10BWG	1	SA	P		
80	3	R6-1R		36"x 12"	X		10BWG	1	SA	P		
80	4	R5-1		30"x 30"	X		10BWG	1	SA	P		
80	5	R6-1R		36"x 12"	X		10BWG	1	SA	P		
80	6	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
80	7	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P		24"x 12"	X							
80	8	R10-6L		24"x 36"	X		10BWG	1	SA	P		

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

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NOTE:

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DATE: 3/29/2024 9:00:28 AM
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-16 8-16	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		14

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FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
80	9	R10-6R		24"x 36"	X		10BWG	1	SA	P		
80	10	W11-2 W16-7PL		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
80	11	W11-2 W16-7PL		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
80	12	R10-6L		24"x 36"	X		10BWG	1	SA	P		
80	13	R10-6R		24"x 36"	X		10BWG	1	SA	P		
80	14	W11-2 W16-9P		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
80	15	W11-2 W16-9P		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
80	16	W11-2 W16-7PR		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
80	17	W11-2 W16-7PR		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
88	1	W11-2 W16-9P		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
88	2	W11-2 W16-9P		18"x 18" 24"x 12"	X X		10BWG	1	SA	P		
88	3	R10-6R		24"x 36"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-16 8-16	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		15

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
88	4	R10-6L	STOP HERE ON RED ↙	24"x 36"	X		10BWG	1	SA	P		
88	5	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR	↘	24"x 12"	X							
88	6	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL	↙	24"x 12"	X							
88	7	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PR	↘	24"x 12"	X							
88	8	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-7PL	↙	24"x 12"	X							
88	9	R10-6L	STOP HERE ON RED ↙	24"x 36"	X		10BWG	1	SA	P		
88	10	R10-6R	STOP HERE ON RED ↘	24"x 36"	X		10BWG	1	SA	P		
88	11	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							
91	5	R2-1	SPEED LIMIT 40	24"x 30"	X		10BWG	1	SA	P		
	4	S5-2	END SCHOOL ZONE	24"x 30"	X							
92	9	R2-1	SPEED LIMIT 40	24"x 30"	X		10BWG	1	SA	P		
	8	S5-2	END SCHOOL ZONE	24"x 30"	X							
99	1	W11-2		18"x 18"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							
99	2	W11-2		36"x 36"	X		10BWG	1	SA	P		
		W16-9P	AHEAD	24"x 12"	X							

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

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Traffic Operations Division Standard

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-16	DIST	COUNTY		SHEET NO.
8-16	ELP	ELP,ETC.		16

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
99	3	R1-5BL		36"x 36"	X		10BWG	1	SA	P		
99	4	R1-5BL		36"x 36"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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DATE: 3/29/2024 9:01:40 AM
FILE:

SHEET 6 OF 6

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0001	04	102,ETC.	US62,ETC.
4-16		DIST	COUNTY		SHEET NO.
8-16		ELP	ELP,ETC.		17

BU 54A

TITANIC

	Station	Northing	Easting
Element: Linear			
POT ( )	0.00	10689584.41	401493.42
POT ( )	14681.14	10701959.44	409392.45

Tangential Direction: N32.550°E
Tangential Length: 14681.14

3/29/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED PROFESSIONAL ENGINEER

Carlye Lide

Kimley»Horn

F-928

2600 N Central Expy
Suite 400
Richardson, Texas 75080

Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

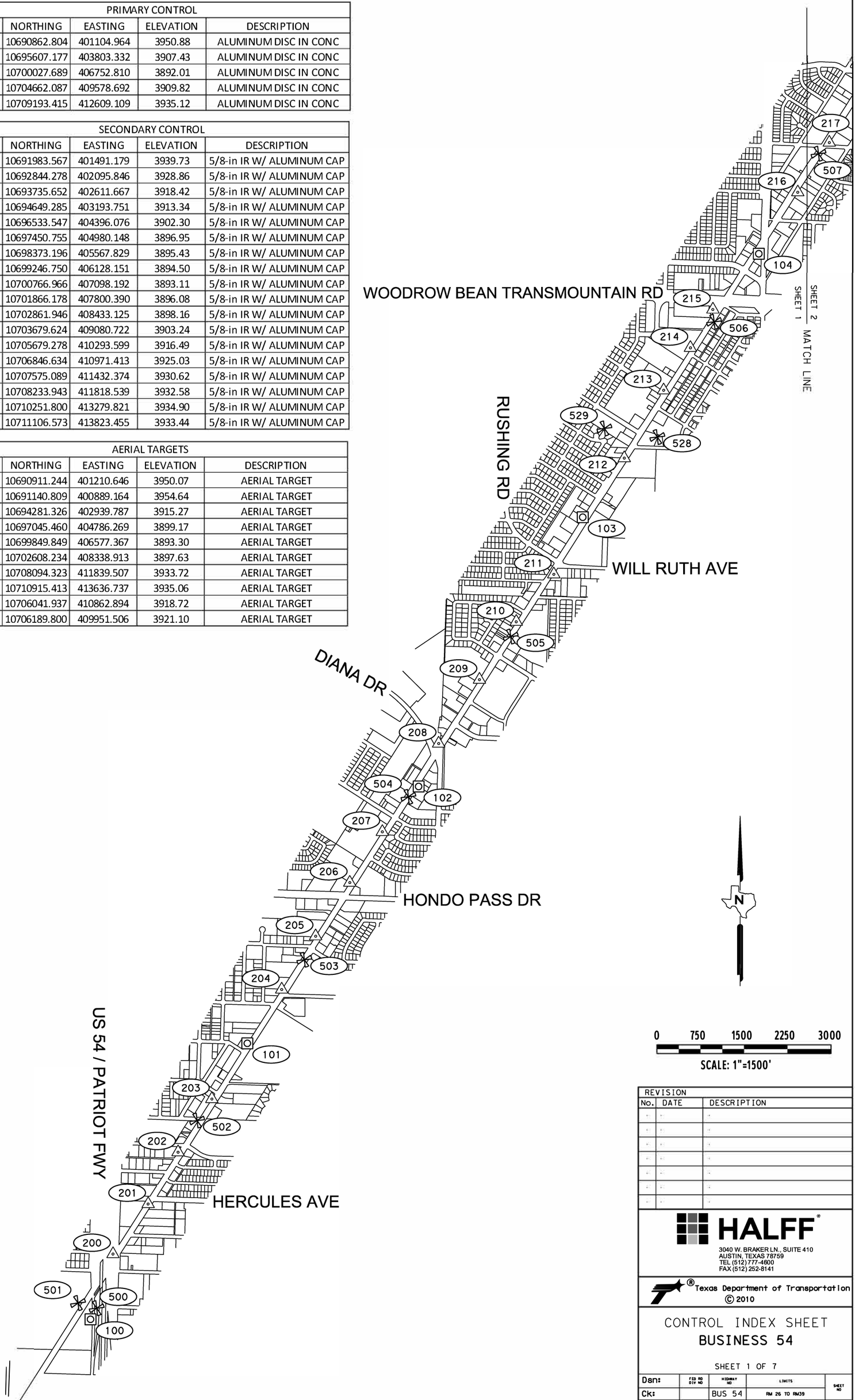
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	18
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/3. Roadway/TITANIC_HAD.dgn
$$$SCALE$$$
BY: $USER$

PRIMARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	10690862.804	401104.964	3950.88	ALUMINUM DISC IN CONC
101	10695607.177	403803.332	3907.43	ALUMINUM DISC IN CONC
102	10700027.689	406752.810	3892.01	ALUMINUM DISC IN CONC
103	10704662.087	409578.692	3909.82	ALUMINUM DISC IN CONC
104	10709193.415	412609.109	3935.12	ALUMINUM DISC IN CONC

SECONDARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
200	10691983.567	401491.179	3939.73	5/8-in IR W/ ALUMINUM CAP
201	10692844.278	402095.846	3928.86	5/8-in IR W/ ALUMINUM CAP
202	10693735.652	402611.667	3918.42	5/8-in IR W/ ALUMINUM CAP
203	10694649.285	403193.751	3913.34	5/8-in IR W/ ALUMINUM CAP
204	10696533.547	404396.076	3902.30	5/8-in IR W/ ALUMINUM CAP
205	10697450.755	404980.148	3896.95	5/8-in IR W/ ALUMINUM CAP
206	10698373.196	405567.829	3895.43	5/8-in IR W/ ALUMINUM CAP
207	10699246.750	406128.151	3894.50	5/8-in IR W/ ALUMINUM CAP
208	10700766.966	407098.192	3893.11	5/8-in IR W/ ALUMINUM CAP
209	10701866.178	407800.390	3896.08	5/8-in IR W/ ALUMINUM CAP
210	10702861.946	408433.125	3898.16	5/8-in IR W/ ALUMINUM CAP
211	10703679.624	409080.722	3903.24	5/8-in IR W/ ALUMINUM CAP
212	10705679.278	410293.599	3916.49	5/8-in IR W/ ALUMINUM CAP
213	10706846.634	410971.413	3925.03	5/8-in IR W/ ALUMINUM CAP
214	10707575.089	411432.374	3930.62	5/8-in IR W/ ALUMINUM CAP
215	10708233.943	411818.539	3932.58	5/8-in IR W/ ALUMINUM CAP
216	10710251.800	413279.821	3934.90	5/8-in IR W/ ALUMINUM CAP
217	10711106.573	413823.455	3933.44	5/8-in IR W/ ALUMINUM CAP

AERIAL TARGETS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
500	10690911.244	401210.646	3950.07	AERIAL TARGET
501	10691140.809	400889.164	3954.64	AERIAL TARGET
502	10694281.326	402939.787	3915.27	AERIAL TARGET
503	10697045.460	404786.269	3899.17	AERIAL TARGET
504	10699849.849	406577.367	3893.30	AERIAL TARGET
505	10702608.234	408338.913	3897.63	AERIAL TARGET
506	10708094.323	411839.507	3933.72	AERIAL TARGET
507	10710915.413	413636.737	3935.06	AERIAL TARGET
528	10706041.937	410862.894	3918.72	AERIAL TARGET
529	10706189.800	409951.506	3921.10	AERIAL TARGET



REVISION		
No.	DATE	DESCRIPTION

HALFF
3040 W. BRAKER LN., SUITE 410
AUSTIN, TEXAS 78759
TEL (512) 777-4800
FAX (512) 252-8141

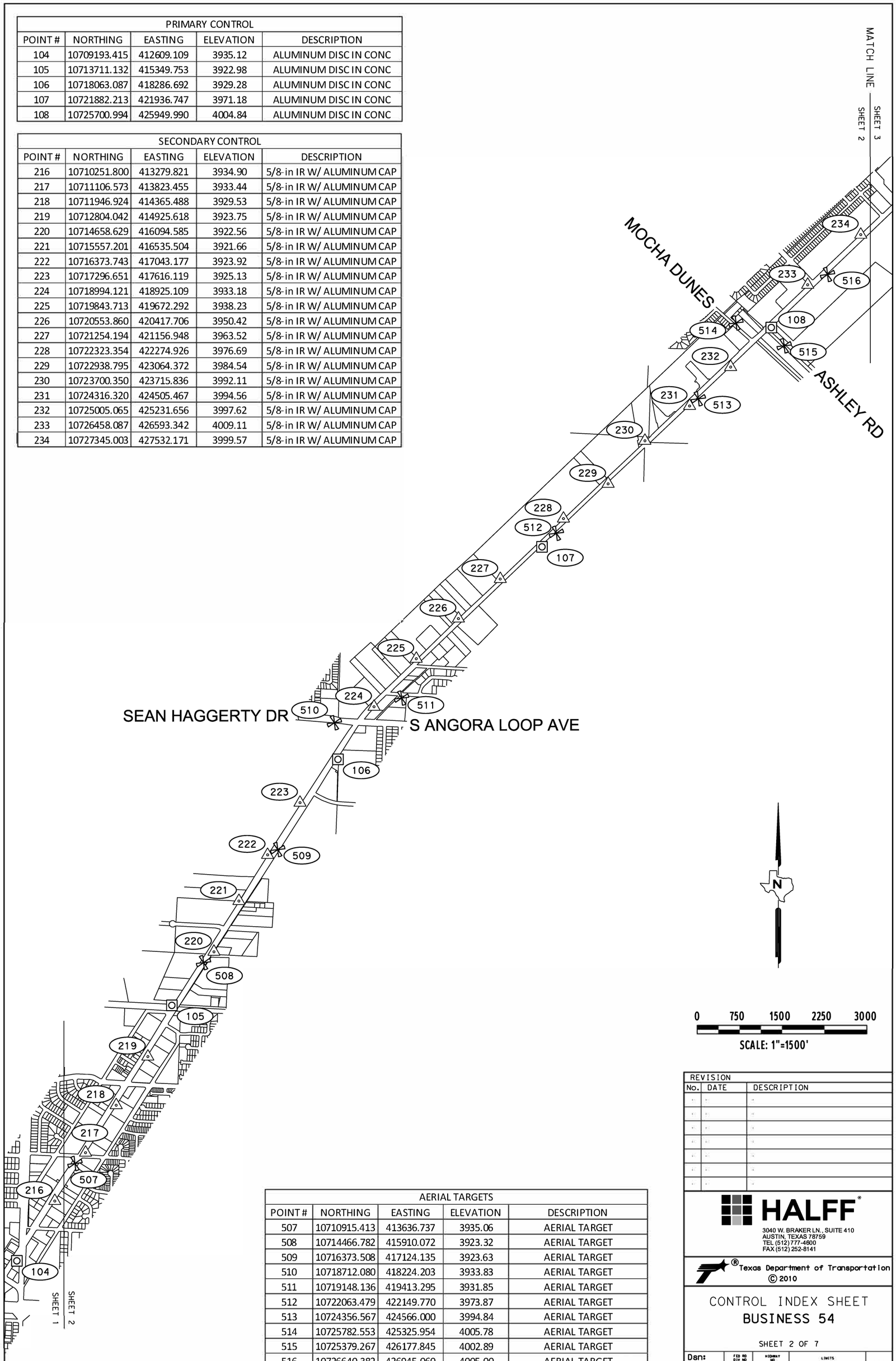
CONTROL INDEX SHEET
BUSINESS 54

SHEET 1 OF 7

Dsn:	FED RD DIV NO	HIGHWAY NO	LIMITS			SHEET NO
Ck:		BUS 54	RM 26 TO RM39			
Drn:	MM	COUNTY	CONT	SECT	JOB	
Ck:	AS	EL PASO	0167	02	051	19

PRIMARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
104	10709193.415	412609.109	3935.12	ALUMINUM DISC IN CONC
105	10713711.132	415349.753	3922.98	ALUMINUM DISC IN CONC
106	10718063.087	418286.692	3929.28	ALUMINUM DISC IN CONC
107	10721882.213	421936.747	3971.18	ALUMINUM DISC IN CONC
108	10725700.994	425949.990	4004.84	ALUMINUM DISC IN CONC

SECONDARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
216	10710251.800	413279.821	3934.90	5/8-in IR W/ ALUMINUM CAP
217	10711106.573	413823.455	3933.44	5/8-in IR W/ ALUMINUM CAP
218	10711946.924	414365.488	3929.53	5/8-in IR W/ ALUMINUM CAP
219	10712804.042	414925.618	3923.75	5/8-in IR W/ ALUMINUM CAP
220	10714658.629	416094.585	3922.56	5/8-in IR W/ ALUMINUM CAP
221	10715557.201	416535.504	3921.66	5/8-in IR W/ ALUMINUM CAP
222	10716373.743	417043.177	3923.92	5/8-in IR W/ ALUMINUM CAP
223	10717296.651	417616.119	3925.13	5/8-in IR W/ ALUMINUM CAP
224	10718994.121	418925.109	3933.18	5/8-in IR W/ ALUMINUM CAP
225	10719843.713	419672.292	3938.23	5/8-in IR W/ ALUMINUM CAP
226	10720553.860	420417.706	3950.42	5/8-in IR W/ ALUMINUM CAP
227	10721254.194	421156.948	3963.52	5/8-in IR W/ ALUMINUM CAP
228	10722323.354	422274.926	3976.69	5/8-in IR W/ ALUMINUM CAP
229	10722938.795	423064.372	3984.54	5/8-in IR W/ ALUMINUM CAP
230	10723700.350	423715.836	3992.11	5/8-in IR W/ ALUMINUM CAP
231	10724316.320	424505.467	3994.56	5/8-in IR W/ ALUMINUM CAP
232	10725005.065	425231.656	3997.62	5/8-in IR W/ ALUMINUM CAP
233	10726458.087	426593.342	4009.11	5/8-in IR W/ ALUMINUM CAP
234	10727345.003	427532.171	3999.57	5/8-in IR W/ ALUMINUM CAP



AERIAL TARGETS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
507	10710915.413	413636.737	3935.06	AERIAL TARGET
508	10714466.782	415910.072	3923.32	AERIAL TARGET
509	10716373.508	417124.135	3923.63	AERIAL TARGET
510	10718712.080	418224.203	3933.83	AERIAL TARGET
511	10719148.136	419413.295	3931.85	AERIAL TARGET
512	10722063.479	422149.770	3973.87	AERIAL TARGET
513	10724356.567	424566.000	3994.84	AERIAL TARGET
514	10725782.553	425325.954	4005.78	AERIAL TARGET
515	10725379.267	426177.845	4002.89	AERIAL TARGET
516	10726640.382	426945.060	4005.00	AERIAL TARGET

REVISION		
No.	DATE	DESCRIPTION

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CONTROL INDEX SHEET
BUSINESS 54

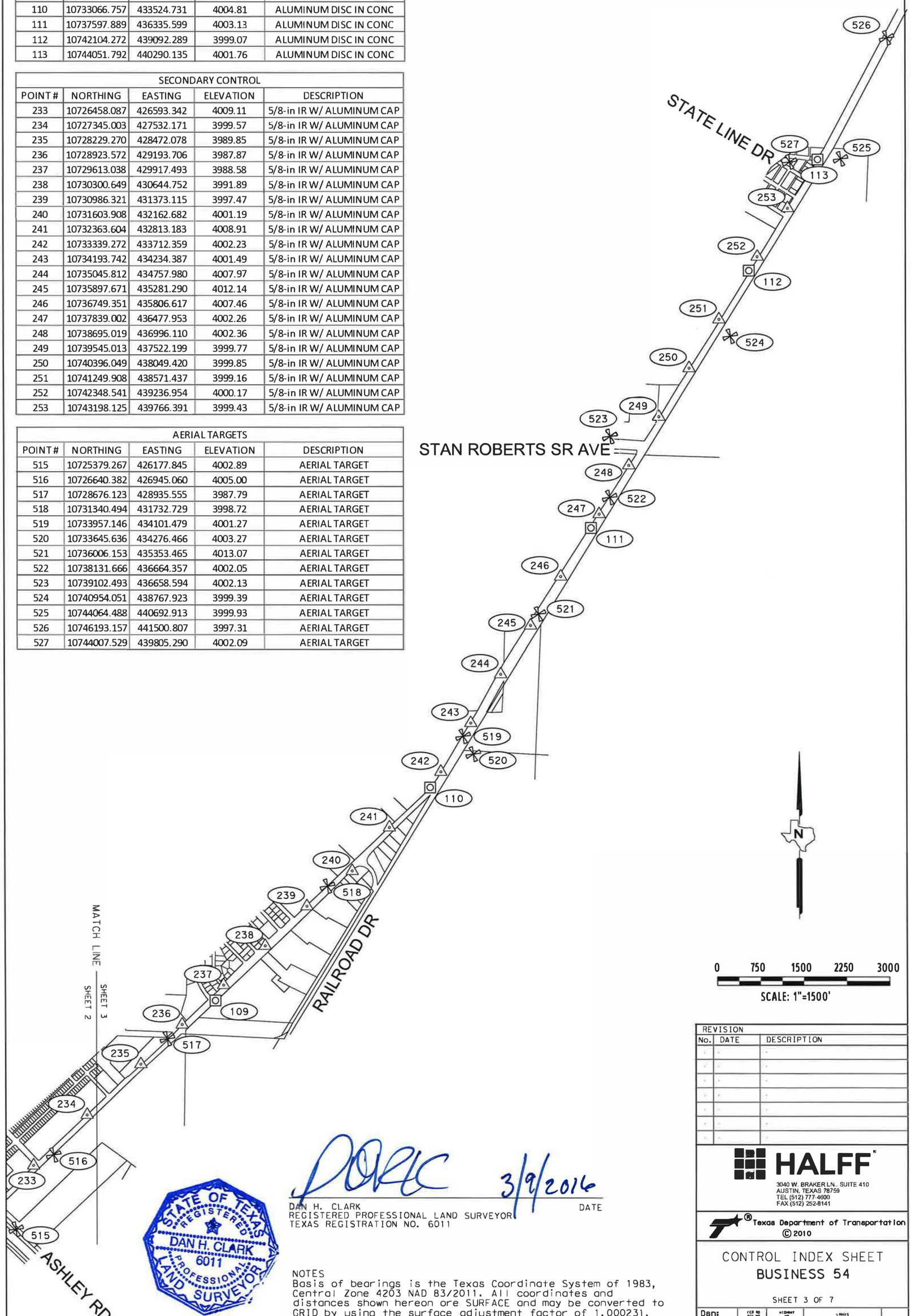
SHEET 2 OF 7

Dsn:	FED RD DIV NO	HIGHWAY NO	LIMITS			SHEET NO
Ck:		BUS 54	RM 26 TO RM39			
Drn:	MM	COUNTY	CONT	SECT	JOB	
Ck:	AS	EL PASO	0167	02	051	20

PRIMARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
109	10729344.278	429774.964	3987.61	ALUMINUM DISC IN CONC
110	10733066.757	433524.731	4004.81	ALUMINUM DISC IN CONC
111	10737597.889	436335.599	4003.13	ALUMINUM DISC IN CONC
112	10742104.272	439092.289	3999.07	ALUMINUM DISC IN CONC
113	10744051.792	440290.135	4001.76	ALUMINUM DISC IN CONC

SECONDARY CONTROL				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
233	10726458.087	426593.342	4009.11	5/8-in IR W/ ALUMINUM CAP
234	10727345.003	427532.171	3999.57	5/8-in IR W/ ALUMINUM CAP
235	10728229.270	428472.078	3989.85	5/8-in IR W/ ALUMINUM CAP
236	10728923.572	429193.706	3987.87	5/8-in IR W/ ALUMINUM CAP
237	10729613.038	429917.493	3988.58	5/8-in IR W/ ALUMINUM CAP
238	10730300.649	430644.752	3991.89	5/8-in IR W/ ALUMINUM CAP
239	10730986.321	431373.115	3997.47	5/8-in IR W/ ALUMINUM CAP
240	10731603.908	432162.682	4001.19	5/8-in IR W/ ALUMINUM CAP
241	10732363.604	432813.183	4008.91	5/8-in IR W/ ALUMINUM CAP
242	10733339.272	433712.359	4002.23	5/8-in IR W/ ALUMINUM CAP
243	10734193.742	434234.387	4001.49	5/8-in IR W/ ALUMINUM CAP
244	10735045.812	434757.980	4007.97	5/8-in IR W/ ALUMINUM CAP
245	10735897.671	435281.290	4012.14	5/8-in IR W/ ALUMINUM CAP
246	10736749.351	435806.617	4007.46	5/8-in IR W/ ALUMINUM CAP
247	10737839.002	436477.953	4002.26	5/8-in IR W/ ALUMINUM CAP
248	10738695.019	436996.110	4002.36	5/8-in IR W/ ALUMINUM CAP
249	10739545.013	437522.199	3999.77	5/8-in IR W/ ALUMINUM CAP
250	10740396.049	438049.420	3999.85	5/8-in IR W/ ALUMINUM CAP
251	10741249.908	438571.437	3999.16	5/8-in IR W/ ALUMINUM CAP
252	10742348.541	439236.954	4000.17	5/8-in IR W/ ALUMINUM CAP
253	10743198.125	439766.391	3999.43	5/8-in IR W/ ALUMINUM CAP

AERIAL TARGETS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
515	10725379.267	426177.845	4002.89	AERIAL TARGET
516	10726640.382	426945.060	4005.00	AERIAL TARGET
517	10728676.123	428935.555	3987.79	AERIAL TARGET
518	10731340.494	431732.729	3998.72	AERIAL TARGET
519	10733957.146	434101.479	4001.27	AERIAL TARGET
520	10733645.636	434276.466	4003.27	AERIAL TARGET
521	10736006.153	435353.465	4013.07	AERIAL TARGET
522	10738131.666	436664.357	4002.05	AERIAL TARGET
523	10739102.493	436658.594	4002.13	AERIAL TARGET
524	10740954.051	438767.923	3999.39	AERIAL TARGET
525	10744064.488	440692.913	3999.93	AERIAL TARGET
526	10746193.157	441500.807	3997.31	AERIAL TARGET
527	10744007.529	439805.290	4002.09	AERIAL TARGET



REVISION		
No.	DATE	DESCRIPTION

DAN H. CLARK
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 6011

3/9/2016
DATE

STATE OF TEXAS
REGISTERED
DAN H. CLARK
6011
PROFESSIONAL
LAND SURVEYOR

NOTES
Basis of bearings is the Texas Coordinate System of 1983, Central Zone 4203 NAD 83/2011. All coordinates and distances shown hereon are SURFACE and may be converted to GRID by using the surface adjustment factor of 1.000231. Units: U.S. Survey Feet.

HALFF
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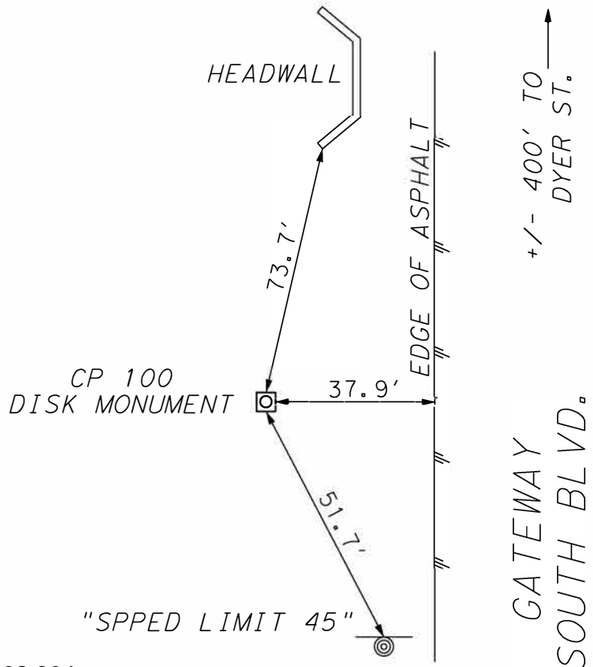
CONTROL INDEX SHEET
BUSINESS 54

SHEET 3 OF 7

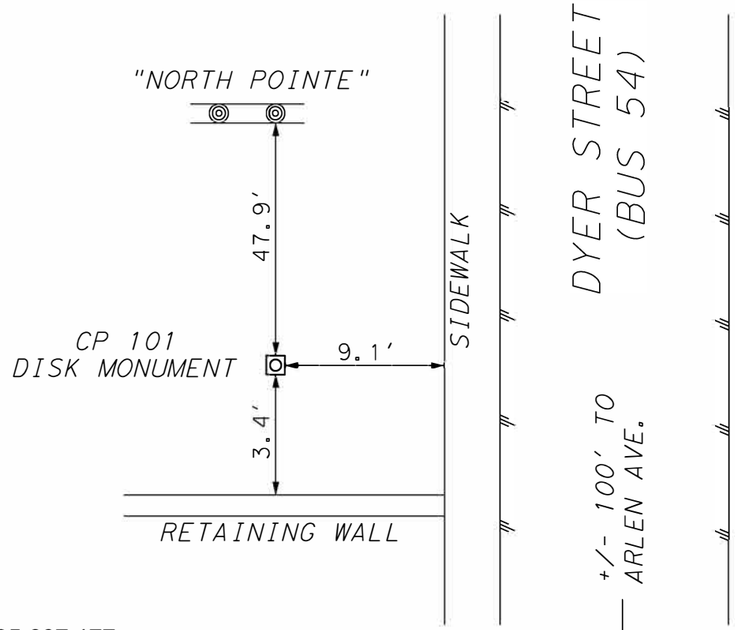
Dsn:	FED RD DIV NO	HIGHWAY NO	CONTROL SECTION JOB			SHEET NO
Ck:		BUS 54	RM 76 TO RM39			
Drn:	MM	COUNTY	CONT	SECT	JOB	
Ck:	AS	EL PASO	0167	02	051	21

100



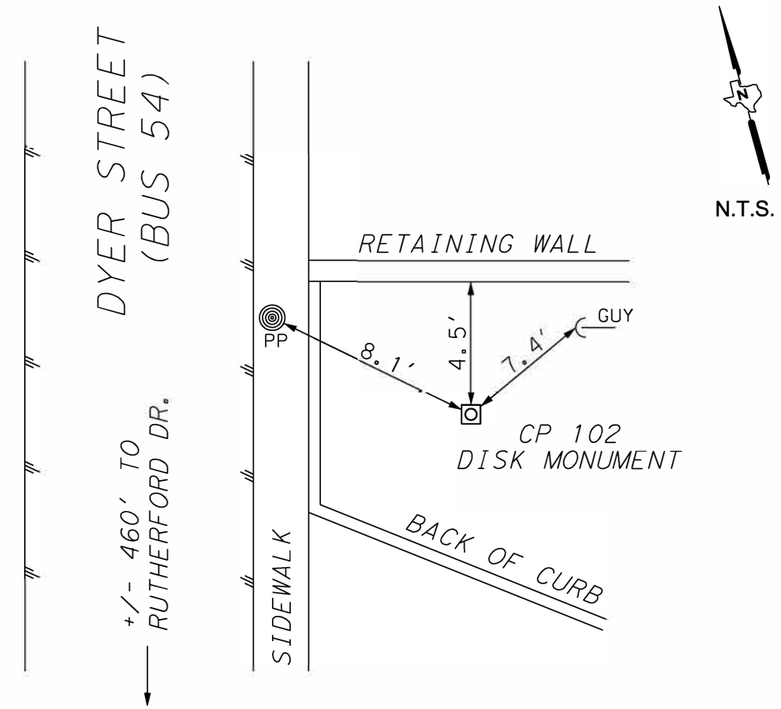
N - 10,690,862.804
E - 401,104.964
ELEV - 3,950.880

101



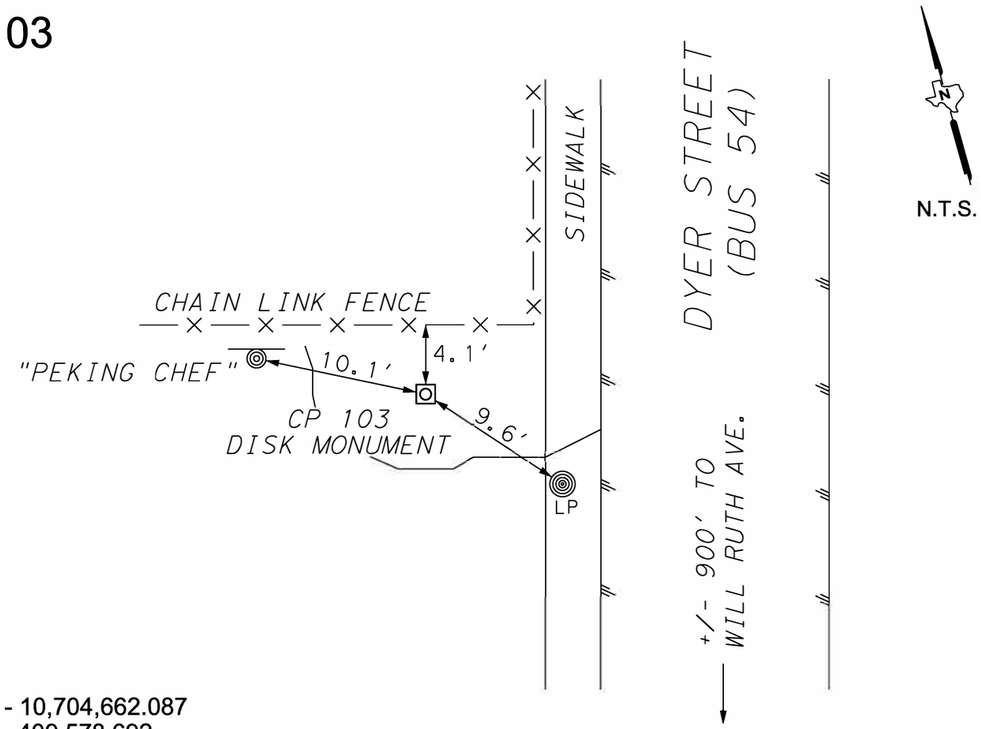
N - 10,695,607.177
E - 403,803.332
ELEV - 3,907.431

102



N - 10,700,027.689
E - 406,752.810
ELEV - 3,892.007

103



N - 10,704,662.087
E - 409,578.692
ELEV - 3,909.817

REVISION		
No.	DATE	DESCRIPTION

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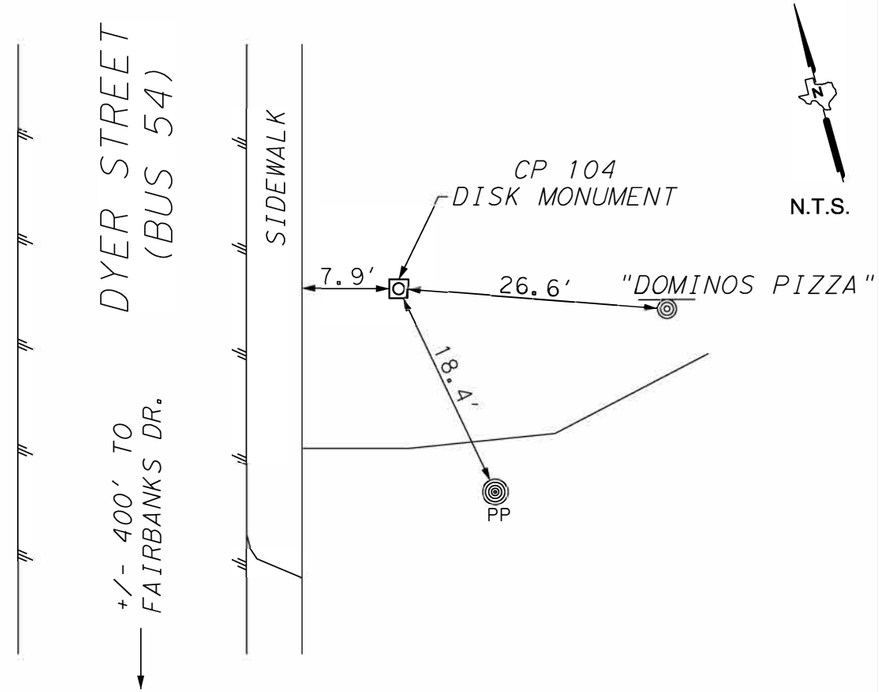
CONTROL INDEX SHEET
BUSINESS 54

SHEET 4 OF 7

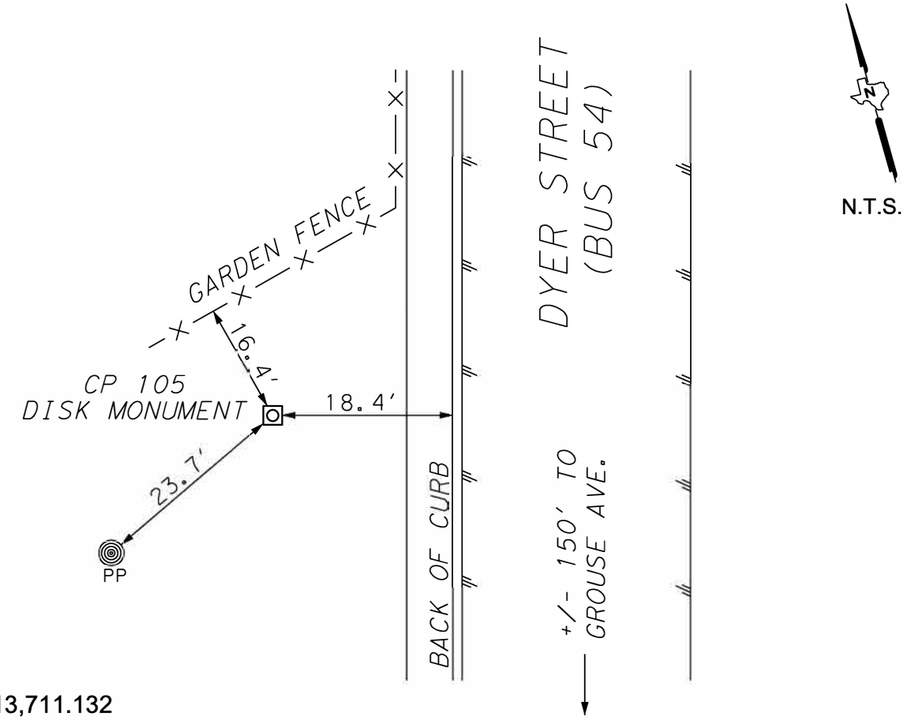
Dsn:	FED RD DIV NO	HIGHWAY NO	LIMITS			SHEET NO
Ck:		BUS 54	RM 26 TO RM39			
Drn:	MM	COUNTY	CONT	SECT	JOB	22
Ck:	AS	EL PASO	0167	02	051	

104



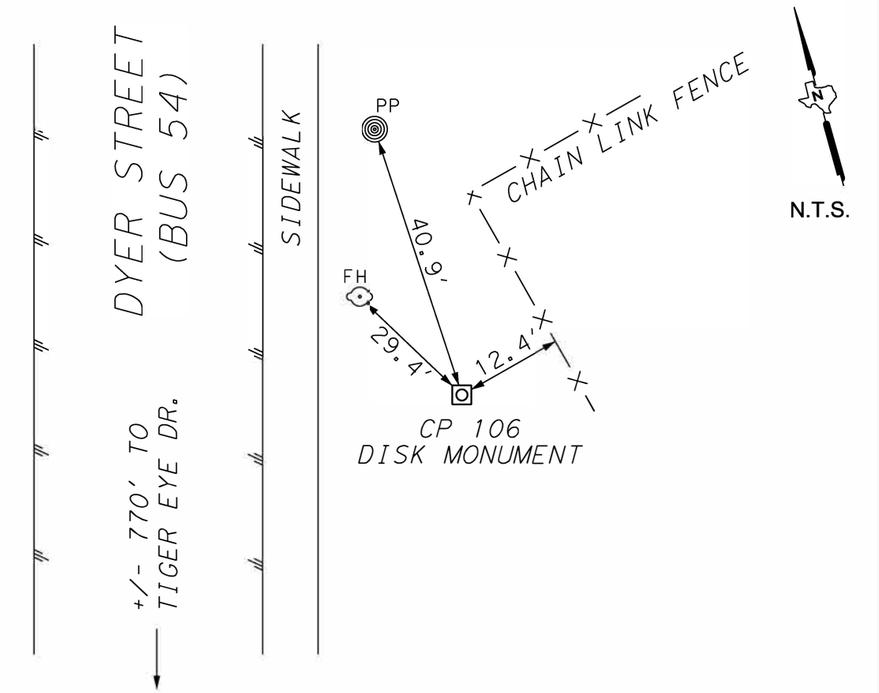
N - 10,709,193.415
E - 412,609.109
ELEV - 3,935.124

105



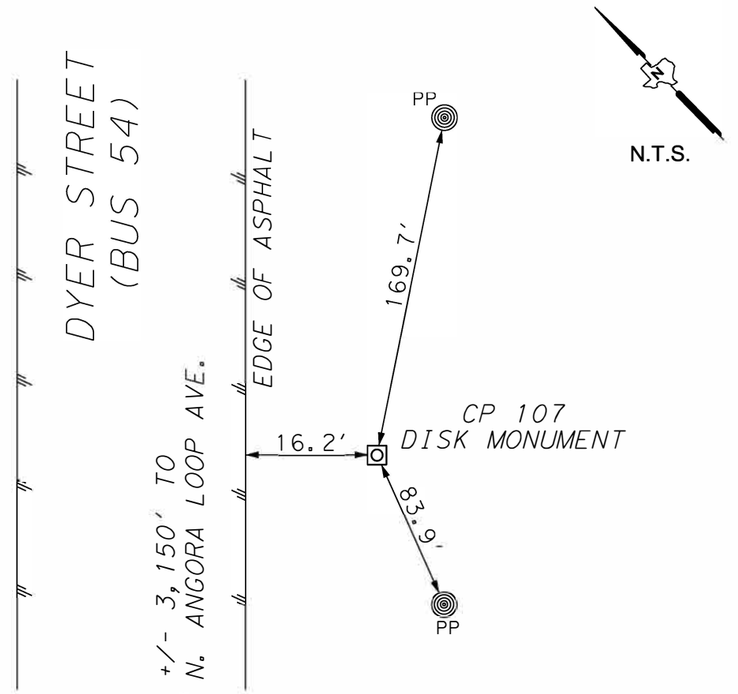
N - 10,713,711.132
E - 415,349.753
ELEV - 3,922.976

106



N - 10,718,063.087
E - 418,286.692
ELEV - 3,929.283

107



N - 10,721,882.213
E - 421,936.747
ELEV - 3,971.181

REVISION		
No.	DATE	DESCRIPTION

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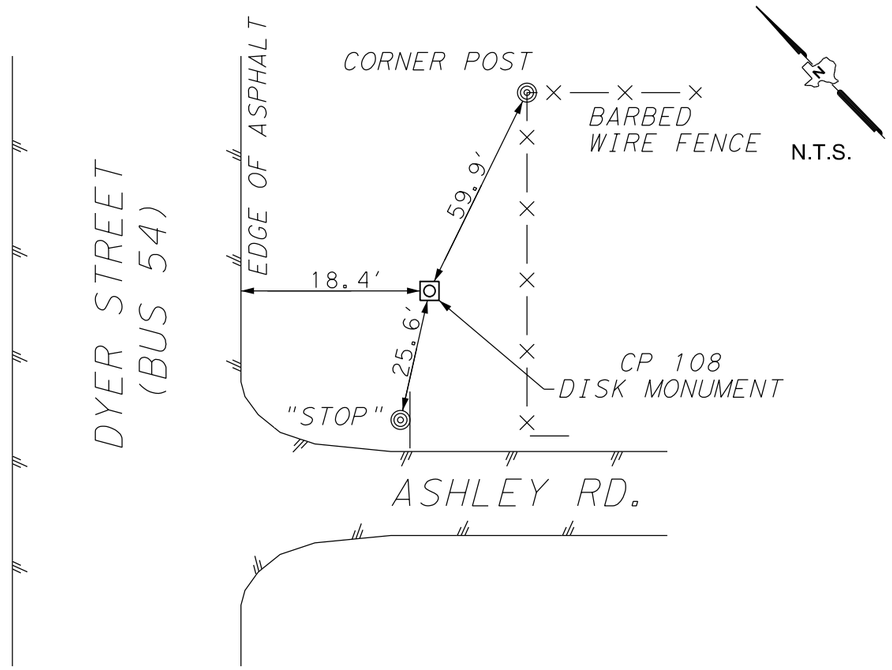
CONTROL INDEX SHEET
BUSINESS 54

SHEET 5 OF 7

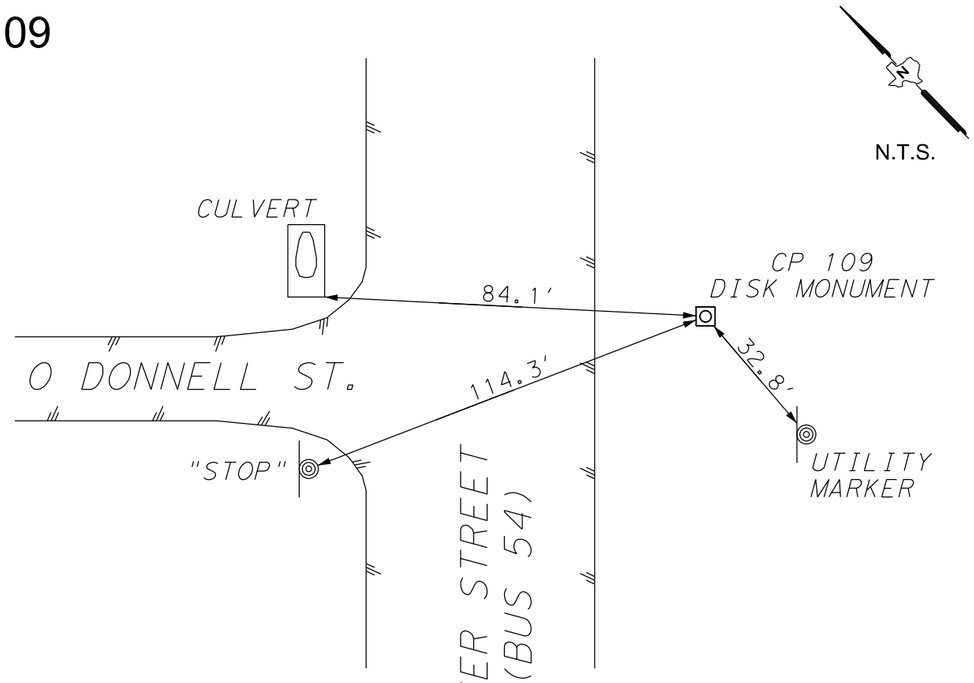
Dsn:	FED RD DIV NO	HIGHWAY NO	LIMITS			SHEET NO
Ck:		BUS 54	R M 2 6 T O R M 3 9			23
Drn:	MM	COUNTY	CONT	SECT	JOB	
Ck:	AS	EL PASO	0167	02	051	

108



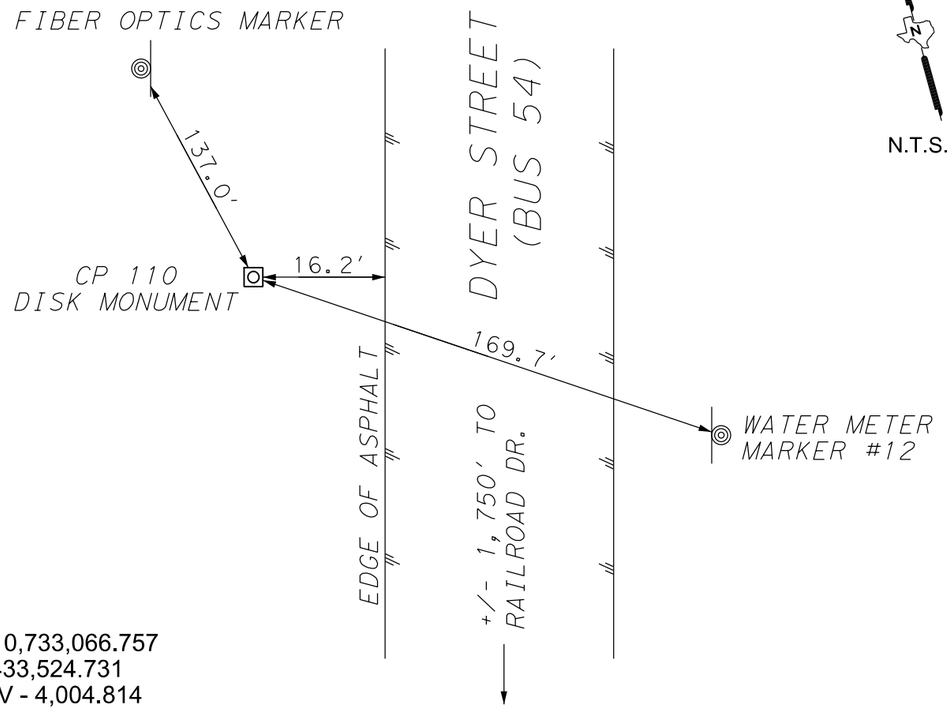
N - 10,725,700.994
E - 425,949.990
ELEV - 4,004.836

109



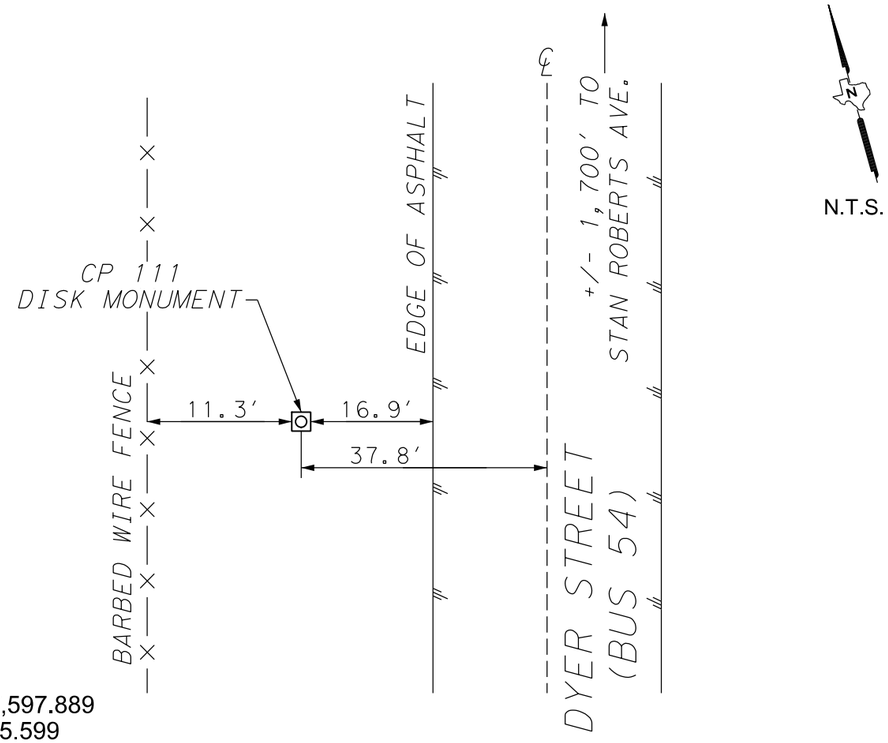
N - 10,729,344.278
E - 429,774.964
ELEV - 3,987.607

110



N - 10,733,066.757
E - 433,524.731
ELEV - 4,004.814

111



N - 10,737,597.889
E - 436,335.599
ELEV - 4,003.130

REVISION		
No.	DATE	DESCRIPTION

HALFF
3040 W. BRAKER LN., SUITE 410
AUSTIN, TEXAS 78759
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CONTROL INDEX SHEET
BUSINESS 54

SHEET 6 OF 7

Dsn:	FED RD DIV NO	HIGHWAY NO	LIMITS			SHEET NO
Ck:		BUS 54	RM 26 TO RM39			
Drn:	MM	COUNTY	CONT	SECT	JOB	24
Ck:	AS	EL PASO	0167	02	051	

TCP SELECTION TABLE

TYPE OF WORK	STANDARD SHEET	SHEET DESCRIPTION	SHEET DIAGRAM	SUGGESTED USE
BRIDGE REMOVAL	TRAFFIC CONTROL PLAN DETOUR LAYOUT	FULL US 62 (PAISANO) CLOSURE TO REMOVE EXISTING PEDESTRIAN BRIDGES	TRAFFIC CONTROL PLAN DETOUR LAYOUT	NIGHT & WEEKEND WORK ONLY FROM SUNDAY - THURSDAY (9 PM - 6 AM). LAW ENFORCEMENT WILL BE REQUIRED.
DRILLED SHAFT PLACEMENT	WZ (BTS - 1) - 13	TRAFFIC SIGNAL WORK TYPICAL DETAILS	NEAR SIDE LANE CLOSURE FAR RIGHT LANE CLOSURE FAR SIDE LEFT LANE CLOSURE	SHORT TERM STATIONARY LANE CLOSURES. ONLY ONE LOCATION WILL BE ALLOWED TO BE WORKED AT ONCE. WORK ONLY ALLOWED DURING OFF-PEAK HOURS M-F 9AM-4PM OR SUN-THURS 9PM-6AM.
TRENCHING	SEE DRILLED SHAFT PLACEMENT			
BORING	TCP (1- 1) - 18	TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK	TCP (1 - 1a)	BORE PIT AREAS SHALL BE AWAY FROM THE TRAVELING PUBLIC TO AVOID THE NEED OF LANE CLOSURES . CROSSWALK CLOSURES MAY BE REQUIRED.
MEDIANS, SIDEWALKS & RAMPS WORKING HOURS	WZ (BTS - 1) - 13	TRAFFIC SIGNAL WORK TYPICAL DETAILS	NEAR SIDE LANE CLOSURE FAR RIGHT LANE CLOSURE FAR SIDE LEFT LANE CLOSURE	SHORT TERM STATIONARY LANE CLOSURES. ONLY ONE LOCATION WILL BE ALLOWED TO BE WORKED AT ONCE. WORK ONLY ALLOWED DURING OFF-PEAK HOURS M-F 9AM-4PM OR SUN-THURS 9PM-6AM.
MEDIANS, SIDEWALKS & RAMPS NON-WORKING HOURS	TCP (2 - 1) - 18	TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK	TCP (2 - 1a)	INTERMEDIATE TERM STATIONARY SHOULDER CLOSURES. TO BE USED FOR OVERNIGHT CONDITIONS WHERE NO WORKERS WILL BE PRESENT (NO TMA REQUIRED).
POLE INSTALLATION	SEE DRILLED SHAFT PLACEMENT			
MAST ARM INSTALLATION	TCP (2 - 4) - 18	TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS	TCP (2 - 4a)	INTERMEDIATE TERM STATIONARY LANE CLOSURES. INSTALLATION OF ALL MAST ARMS WILL BE LIMITED TO NIGHT TIME WORK (SUN-THURS BETWEEN 9PM - 6AM). LAW ENFORCEMENT WILL BE REQUIRED.
ALL (AFFECTED PEDESTRIAN FACILITIES)	WZ (BTS - 2) - 13	TRAFFIC SIGNAL WORK BARRICADES AND SIGNS	CROSSWALK CLOSURES	CROSSWALK CLOSURES WILL BE USED FOR ALL TYPES OF WORK WHEREVER NECESSARY. DURATION OF CLOSURES WILL BE DEPENDENT ON THE ACCESSIBILITY THROUGH THE WORK ZONE.
PAVEMENT MARKINGS	TCP (3 - 1) - 13 TCP (3 - 3) - 14	TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS	TCP (3 - 1a) TCP (3 - 3d)	MOBILE OPERATION

TCP SELECTION TABLE

1. PLACE TRAFFIC CONTROL DEVICES AND ADVANCED WARNING SIGNS AS SHOWN IN THE STANDARDS AND IN ACCORDANCE WITH THE TXMUTCD.
2. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT POINTS WHERE IT IS NECESSARY FOR TRUCKS TO STOP AND UNLOAD, PROVIDE WARNING SIGNS AND FLAGGERS AS NECESSARY TO ADEQUATELY PROTECT TRAVELING PUBLIC. IT MAY BE NECESSARY TO SET UP A LANE CLOSURE ON THE MAINLANES TO FACILITATE CONSTRUCTION TRAFFIC ENTRANCE AND EXIT.
3. CONTRACTOR TO CONTACT ONE-CALL AND VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO BEGINNING WORK.
4. THE CONTRACTOR WILL ONLY BE ALLOWED TO WORK AT ONE CORNER OF AN INTERSECTION. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER FOR ANY EXCEPTIONS.
5. DAY TIME WORK WILL BE ALLOWED BETWEEN 9:00 AM TO 4:00 PM.
6. NIGHT TIME WORK SHALL BE FROM SUNDAY THROUGH THURSDAY BETWEEN THE HOURS OF 9:00 PM TO 6:00 AM.
7. THE CONTRACTOR SHALL MAINTAIN THE EXISTING TRAFFIC SIGNALS IN OPERATION UNTIL THE NEW TRAFFIC SIGNALS ARE FUNCTIONING AND OPERATIONAL.
8. THE CONTRACTOR SHALL HAVE A UNIFORMED POLICE OFFICER PRESENT FOR THE TRANSITION FROM THE EXISTING SIGNALS TO THE PROPOSED SIGNALS.
9. CONTRACTOR SHALL MAINTAIN DRIVEWAY ACCESS AT ALL TIMES.

SIGNAL WORK

TRAFFIC OPERATIONS :

1. MAINTAIN ONE LANE OF TRAFFIC AT ALL TIMES.
2. PORTABLE MESSAGE SIGNS TO BE PLACED AS DIRECTED BY THE ENGINEER.

CONSTRUCTION :

1. SET UP CONSTRUCTION SIGNS IN ACCORDANCE WITH TXDOT STANDARDS.
2. PORTABLE MESSAGE SIGNS TO BE PLACED AS DIRECTED BY THE ENGINEER.
3. POT HOLE ALL NECESSARY LOCATIONS.
4. PLACE SEDIMENT CONTROL DEVICES.
5. CONSTRUCT PER PLAN.
6. REMOVE SEDIMENT CONTROL DEVICES.
7. REMOVE TRAFFIC CONTROL DEVICES AND CONSTRUCTION SIGNS.

4/9/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

Carlye Lide

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2600 N Central Expy
Suite 400
Richardson, Texas 75080
Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS
TRAFFIC CONTROL PLAN

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	
CHECK	CONTROL	SECTION	JOB	25
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 4/9/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/2. TCP/081_TCP_01.dgn
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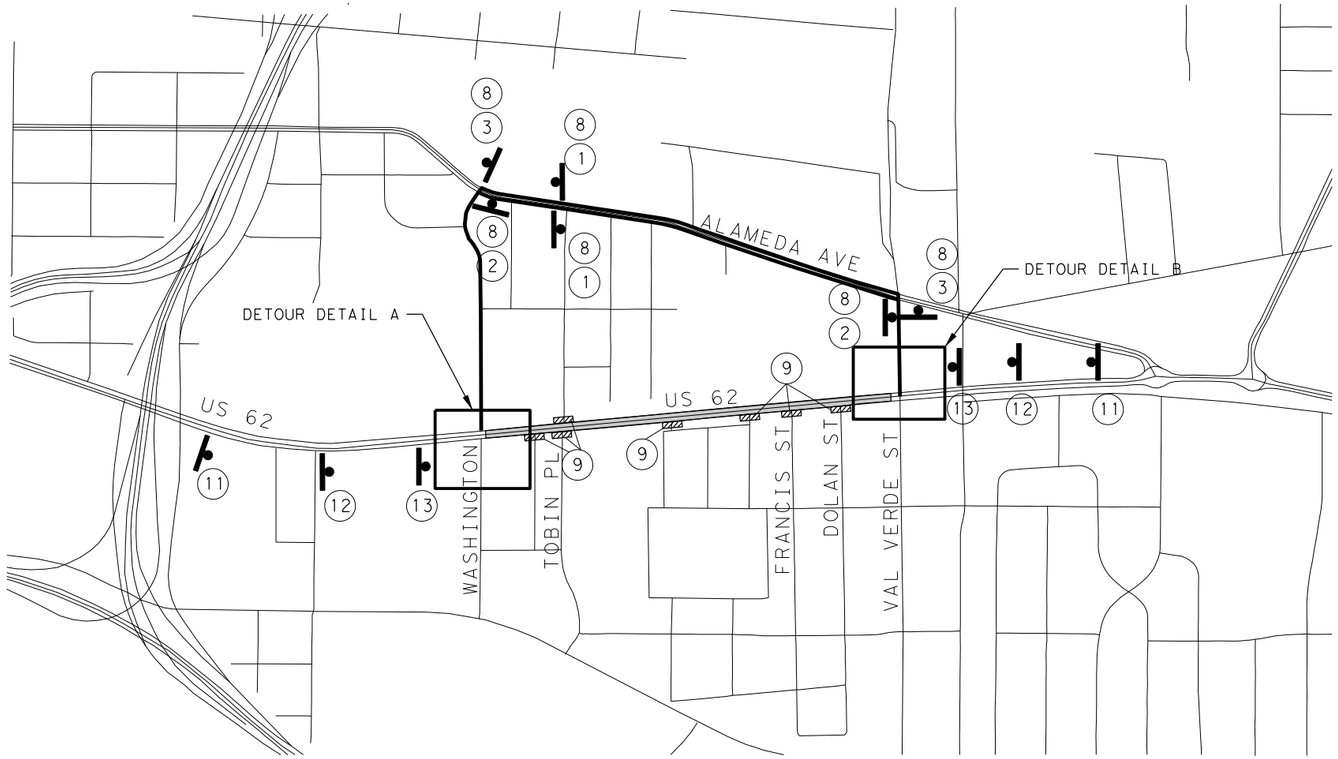
BY: $USER$



N

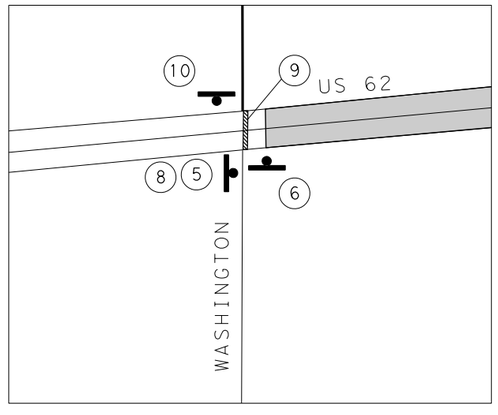
LEGEND:

- PROPOSED TCP SIGN
- TYPE III BARRICADES
- WORK AREA

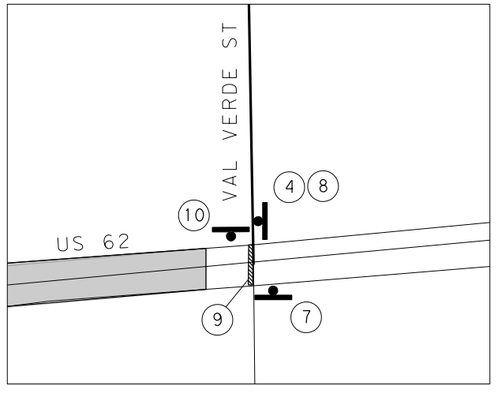
NOTES:

1. TEMPORARY SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.
2. MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES.
3. SEE TCP SIGNS GUIDE FOR CORRESPONDING SIGN NUMBERS.
4. CONTRACTOR TO WORK WITH PIO REGARDING DETOURS AND PUBLIC COORDINATION.
5. CONTRACTOR TO COORDINATE WITH PIO TWO WEEKS BEFORE ANY DETOUR.
6. LOCATIONS OF PORTABLE CTB AT THE BRIDGE CLOSURE SHALL BE DIRECTED BY THE ENGINEER.

DETOUR DETAIL A
NOT TO SCALE



DETOUR DETAIL B
NOT TO SCALE



DETOUR LAYOUT SIGNS GUIDE

												
M4-9S 30"x24"	M4-9R 30"x34"	M4-9L 30"x24"	R11-2 48"x30" M4-10R 48"x18"	R11-2 48"x30" M4-10L 48"x18"	R3-1 36"x36"	R3-2 36"x36"	M4-12T 48"x12"	R11-2 W/TY III BARRICADES 48"x30"	END DETOUR	PCMS	ROAD CLOSED AHEAD 30 M.P.H.	DETOUR AHEAD 30 M.P.H.
1	2	3	4	5	6	7	8	9	10	11	12	13

3/26/2024

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Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

TRAFFIC CONTROL PLAN DETOUR LAYOUT

US 62 (PAISANO DR)

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	26
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

DATE: 3/26/2024 11:53:45 AM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/2. TCP/Standards/bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	ELP	ELP,ETC.		27
5-10 5-21				

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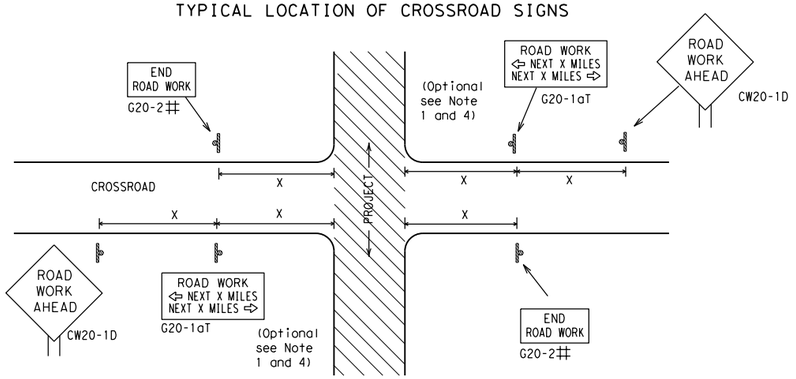
FILE: pw://kn-pw.bentley.com:kn-pw-01/Documents/01 Active Projects/TX-RCH-0646702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/2. TCP/Standards/bc-21.dgn

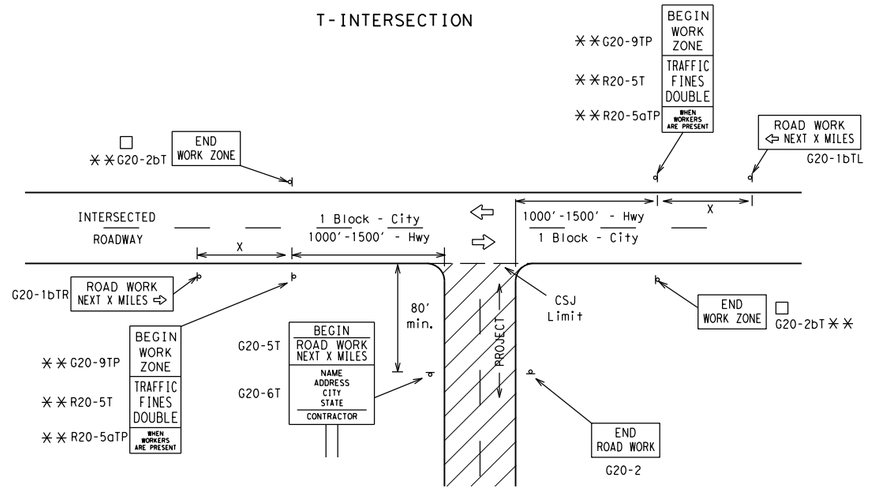
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

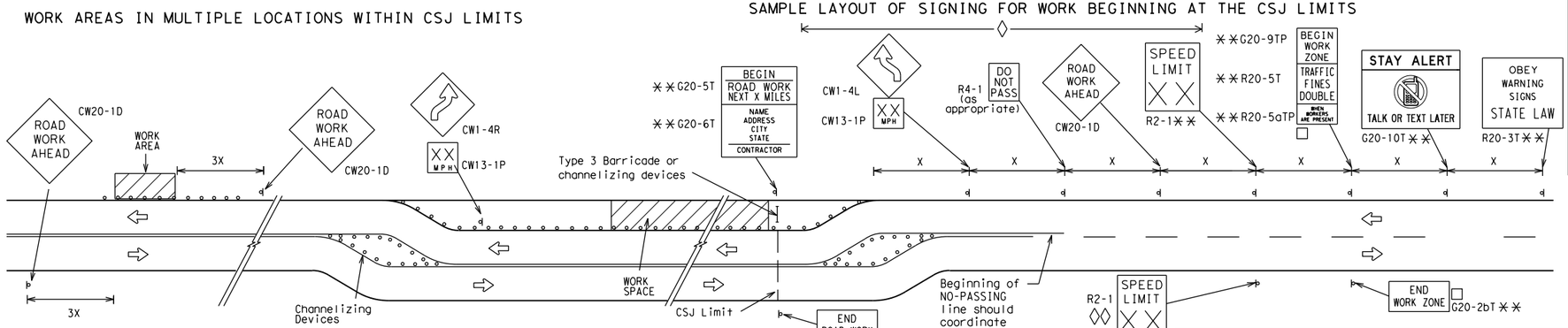
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

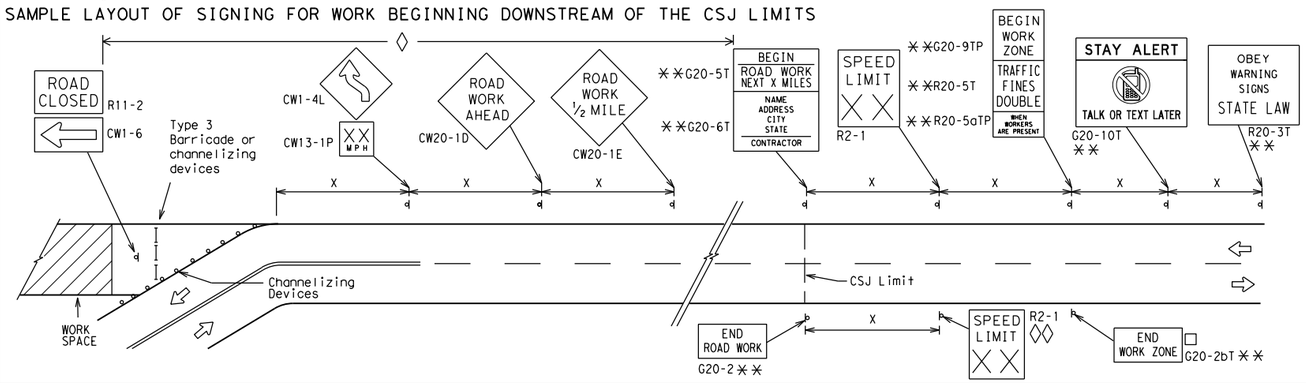
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0001	04	102,ETC.	US62,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP,ETC.		28

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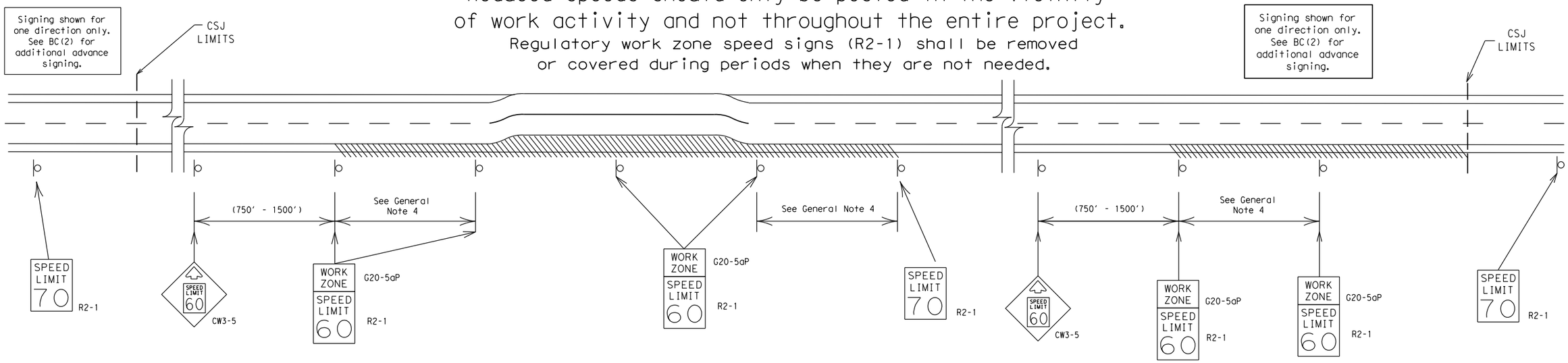
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064802-102- TxDOT ELP signal designs/4 Design/Plan Set/Package 2 - PAB and ARB, 102/2. TCP/Standards/bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP,ETC.		29

DATE: 3/26/2024 11:53:45 AM
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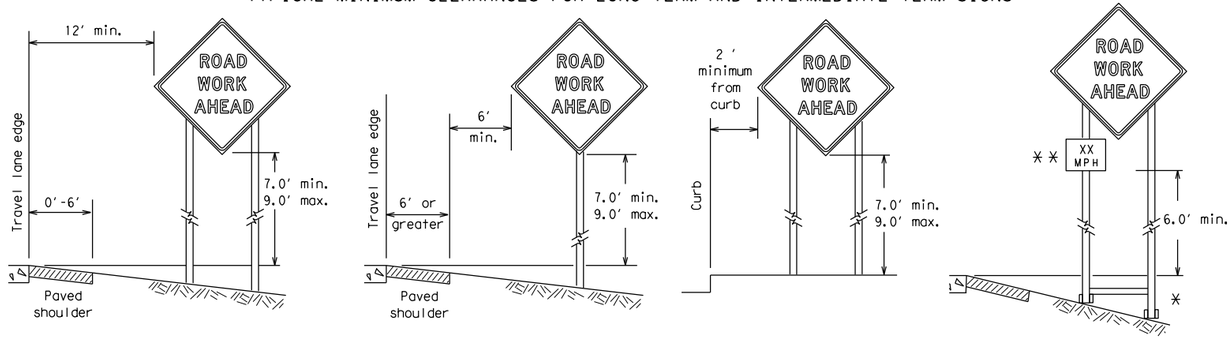
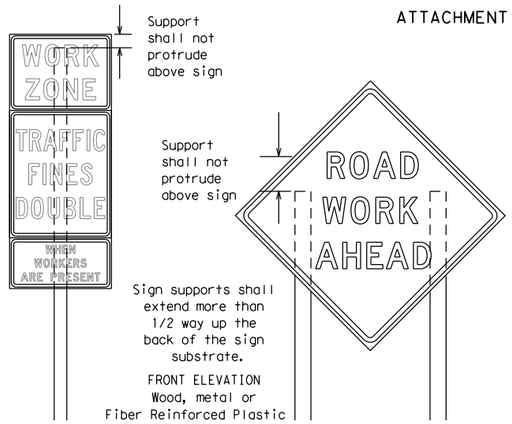
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

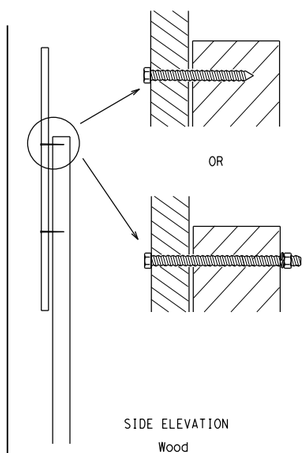


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





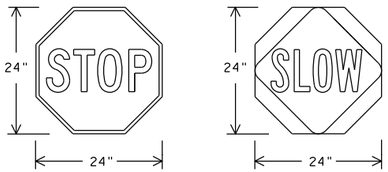
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

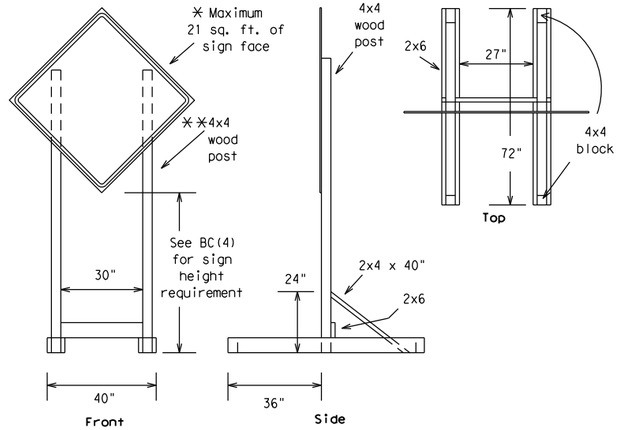
Texas Department of Transportation

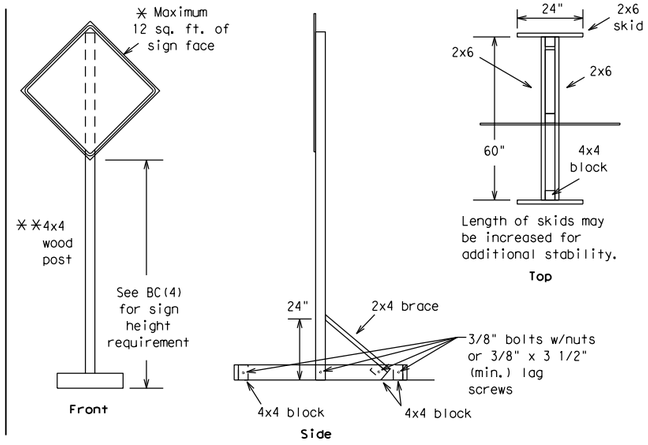
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

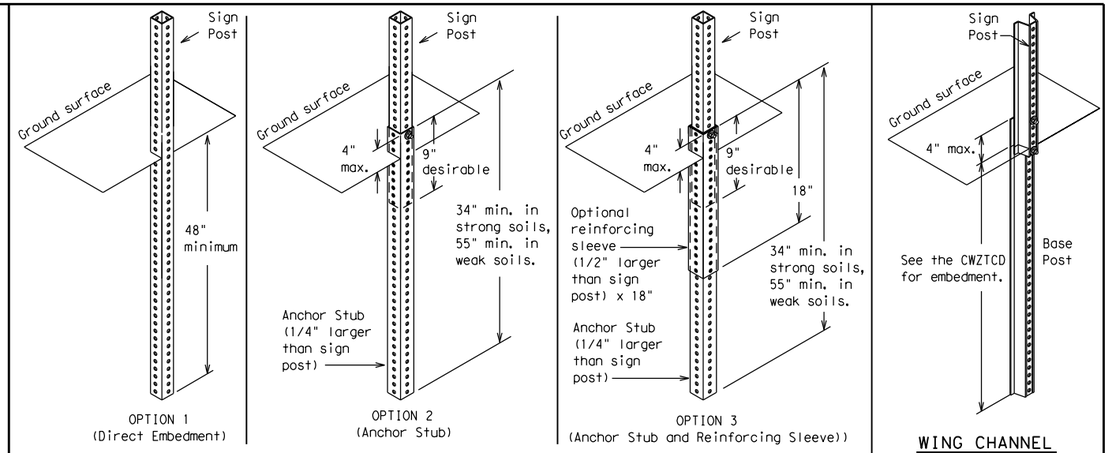
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP,ETC.		30





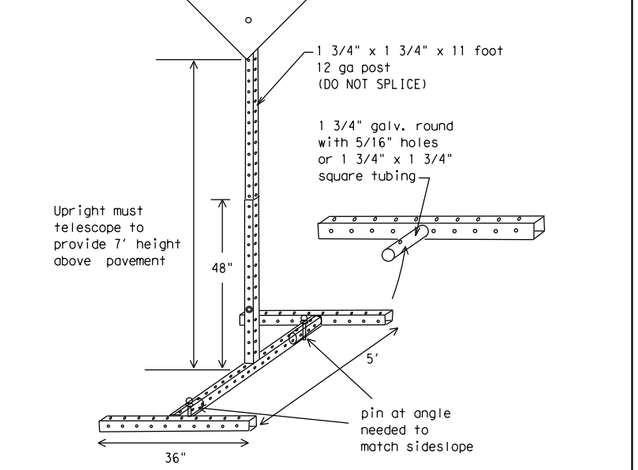
SKID MOUNTED WOOD SIGN SUPPORTS

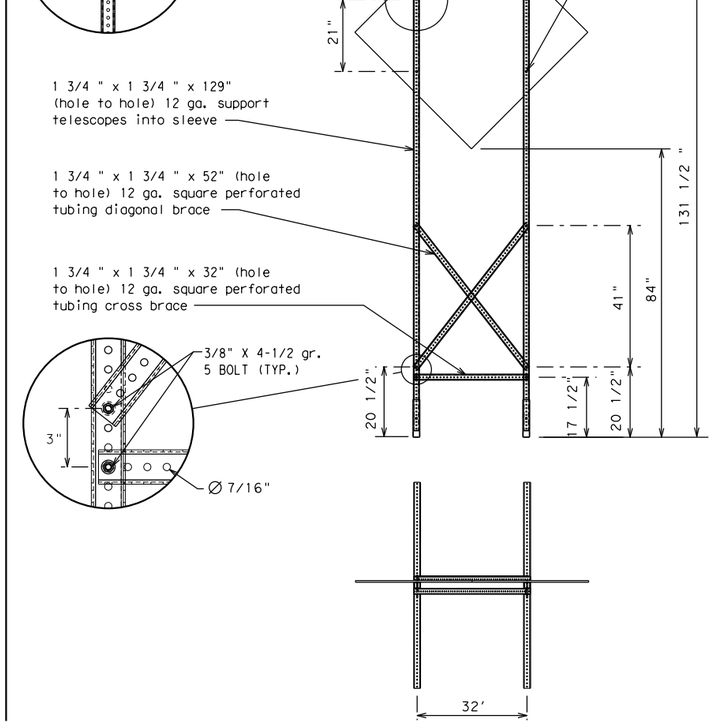
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

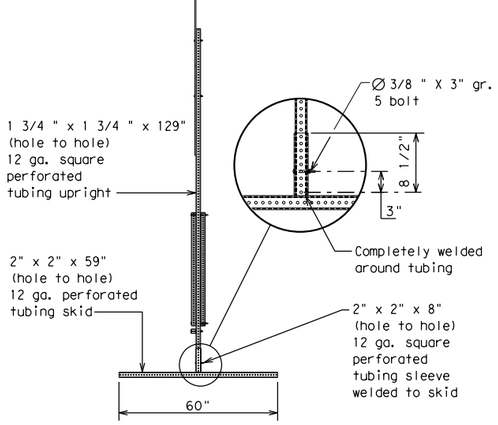


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP, ETC.		31

DATE: 3/26/2024 11:53:46 AM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - 02702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/2. TCP/Standards/bc-21.dgn

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

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

** 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
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP,ETC.		32

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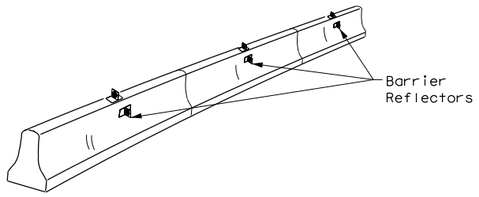
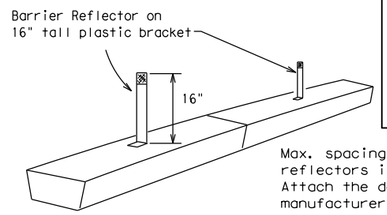
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/2. TCP/Standards/bc-21.dgn

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



CONCRETE TRAFFIC BARRIER (CTB)

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

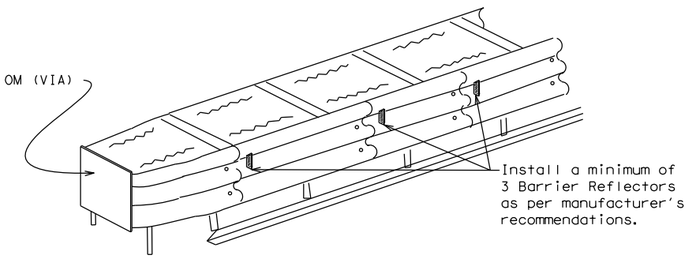


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

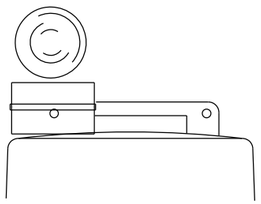


DELINEATION OF END TREATMENTS

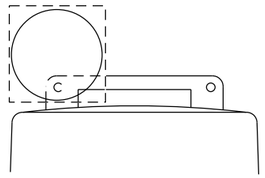
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

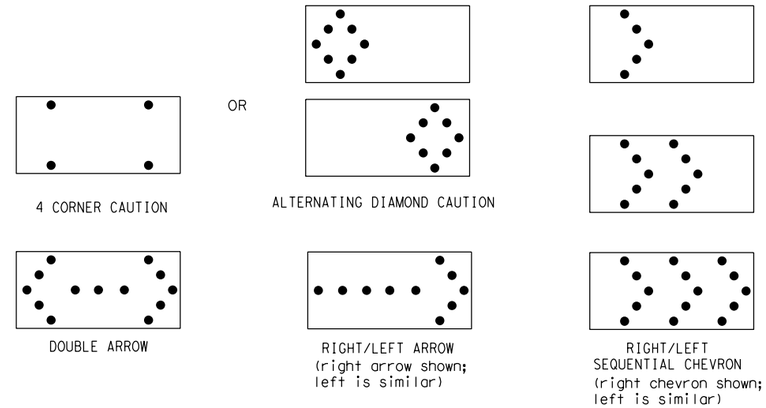
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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	0001	04	102, ETC.	US62, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP, ETC.		33

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DATE: 3/26/2024 11:53:46 AM
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

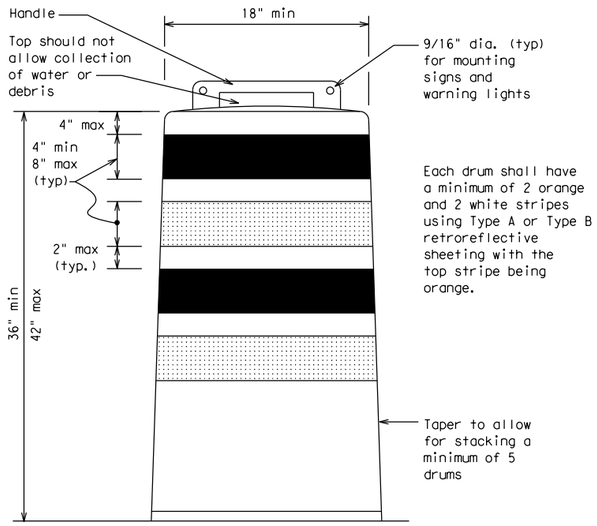
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

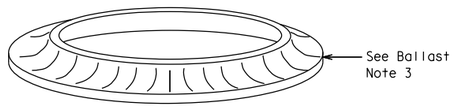
RETROREFLECTIVE SHEETING

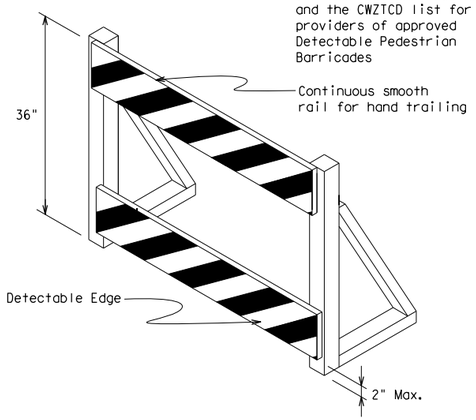
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

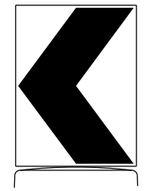




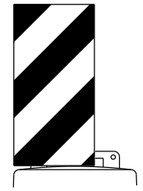


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ELP	ELP,ETC.		34
7-13				

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DATE: 3/26/2024 11:53:47 AM
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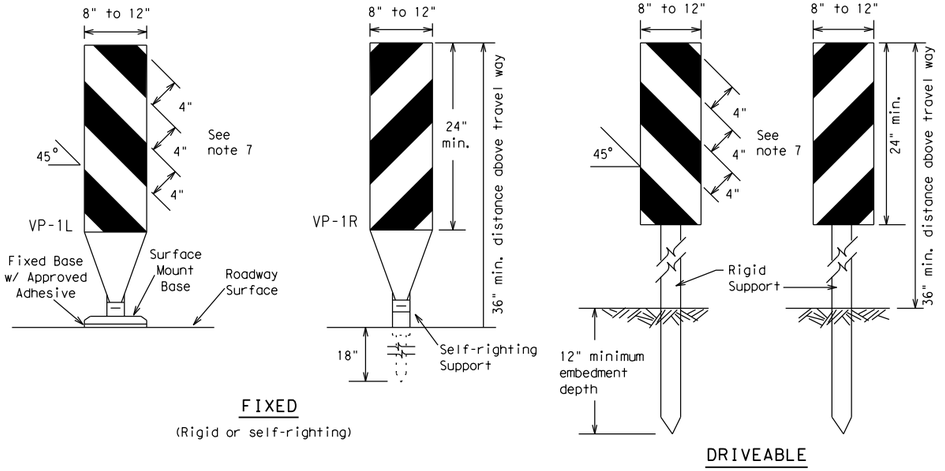
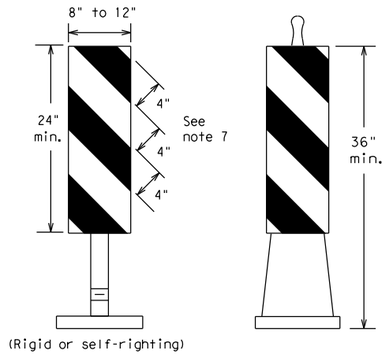


FIXED
(Rigid or self-righting)

DRIVEABLE

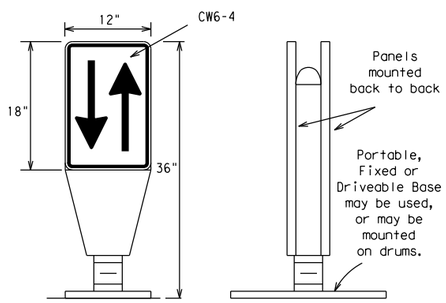


(Rigid or self-righting)

PORTABLE

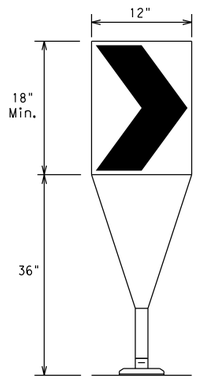
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



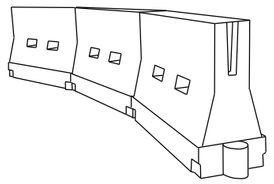
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 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

SHEET 9 OF 12

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP,ETC.		35

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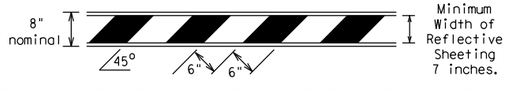
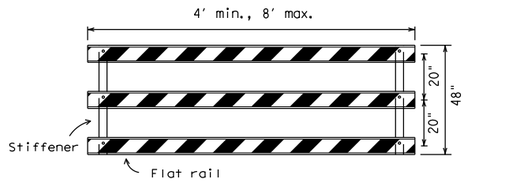
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



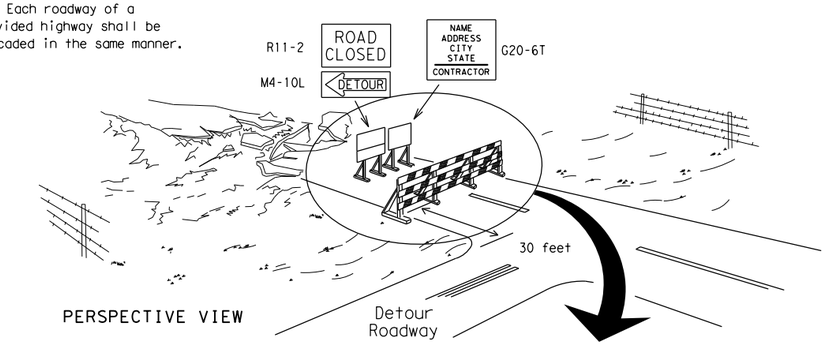
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

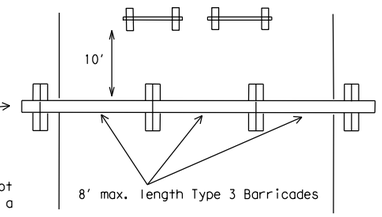
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

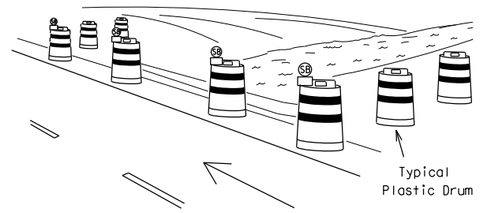
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

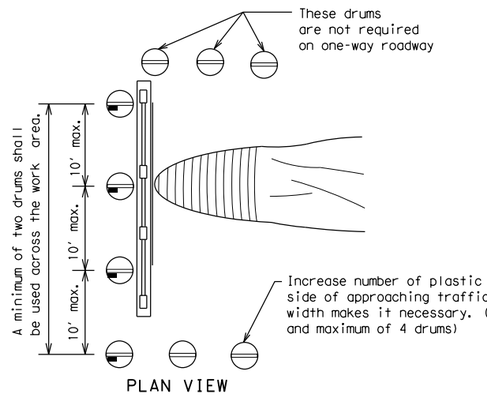
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

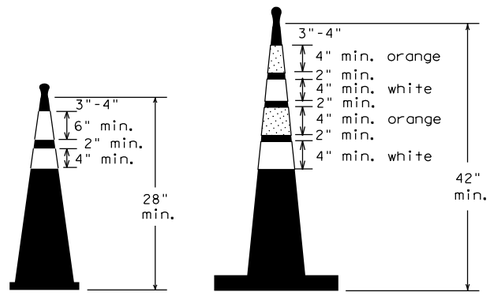
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

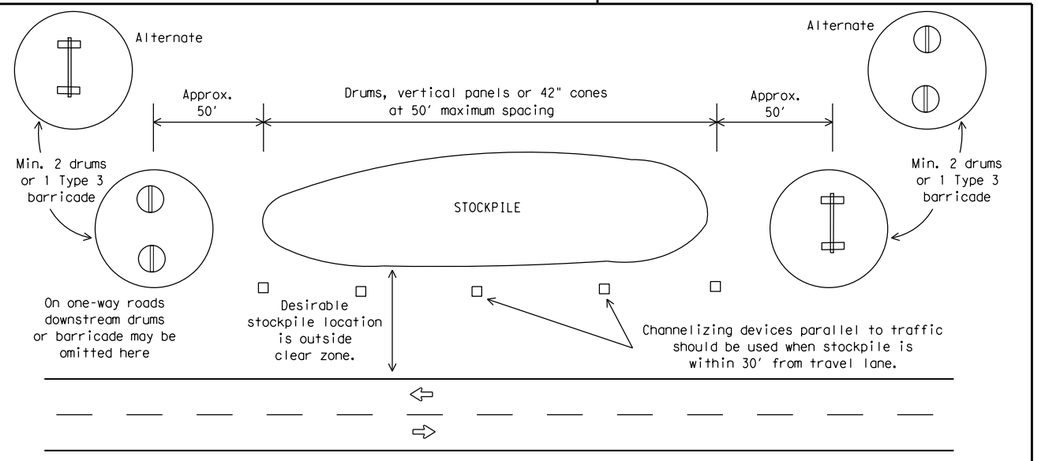
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	ELP, ETC.		36

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

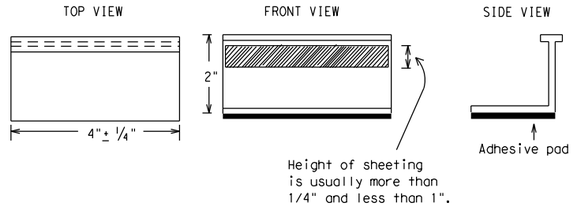
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	ELP	ELP,ETC.		37
11-02 8-14				

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DATE: 3/26/2024 11:53:47 AM
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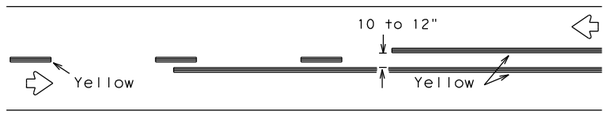
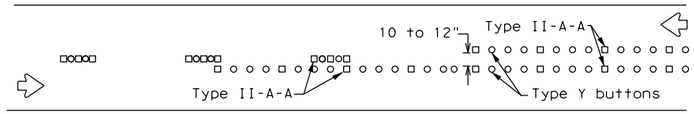
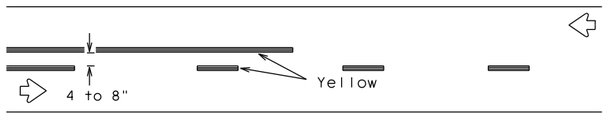
PAVEMENT MARKING PATTERNS



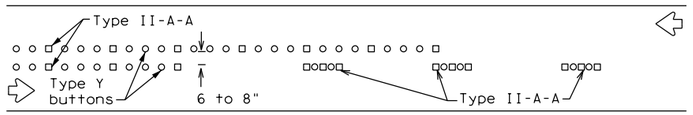
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



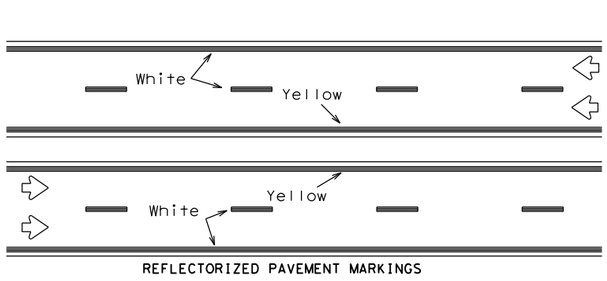
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



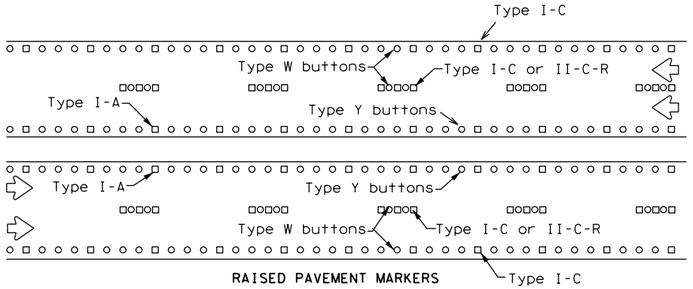
RAISED PAVEMENT MARKERS - PATTERN B

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



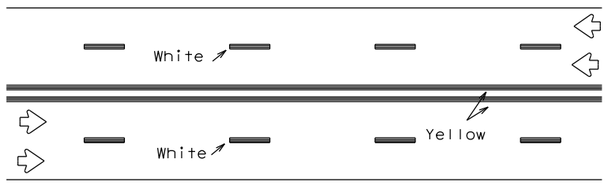
REFLECTORIZED PAVEMENT MARKINGS



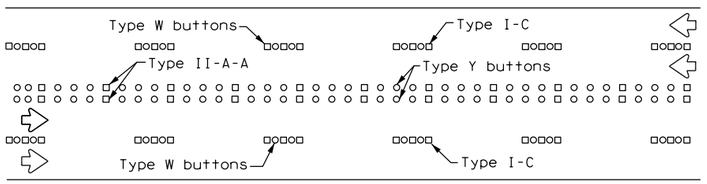
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



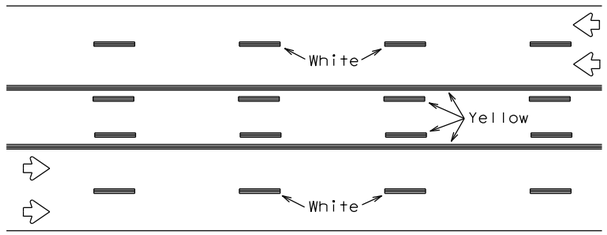
REFLECTORIZED PAVEMENT MARKINGS



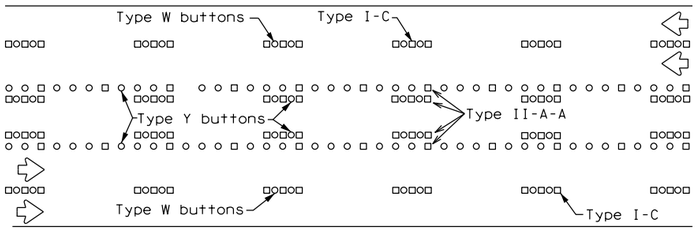
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

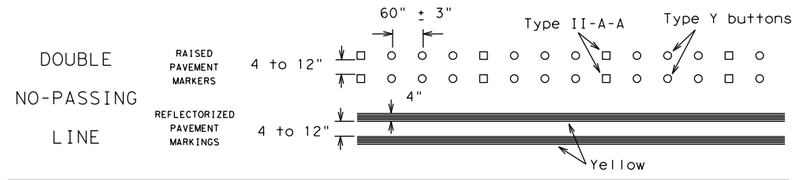
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

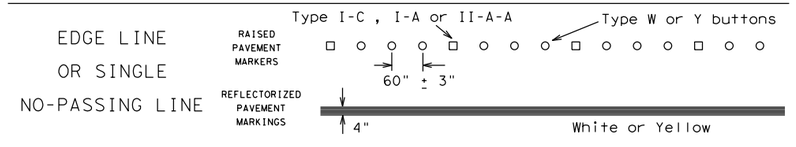
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

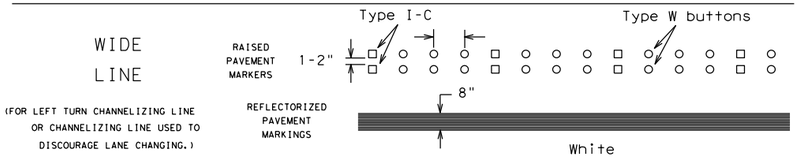


EDGE LINE OR SINGLE NO-PASSING LINE



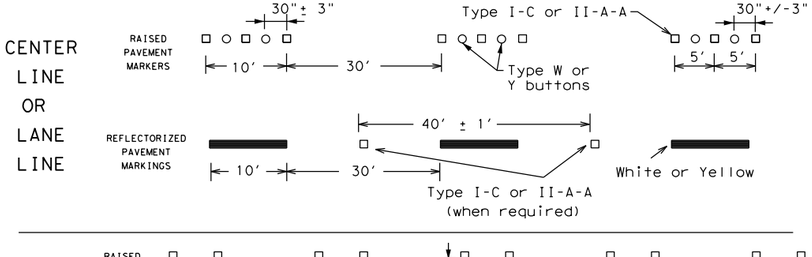
WIDE LINE

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

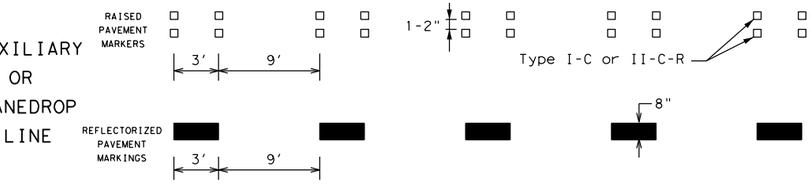


BROKEN LINES

CENTER LINE OR LANE LINE

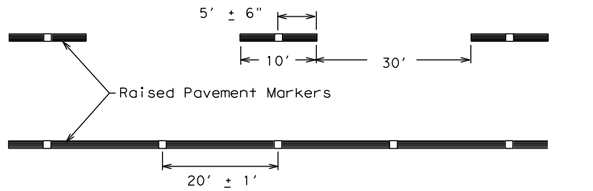


AUXILIARY OR LANEDROP LINE



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	0001	04	102,ETC.	US62,ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		38

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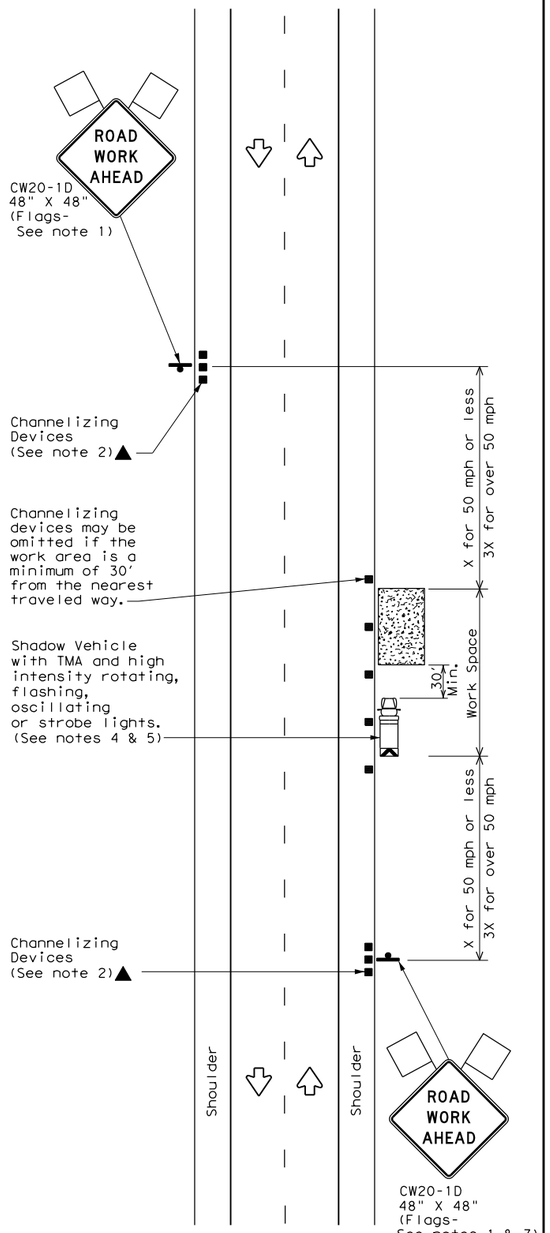
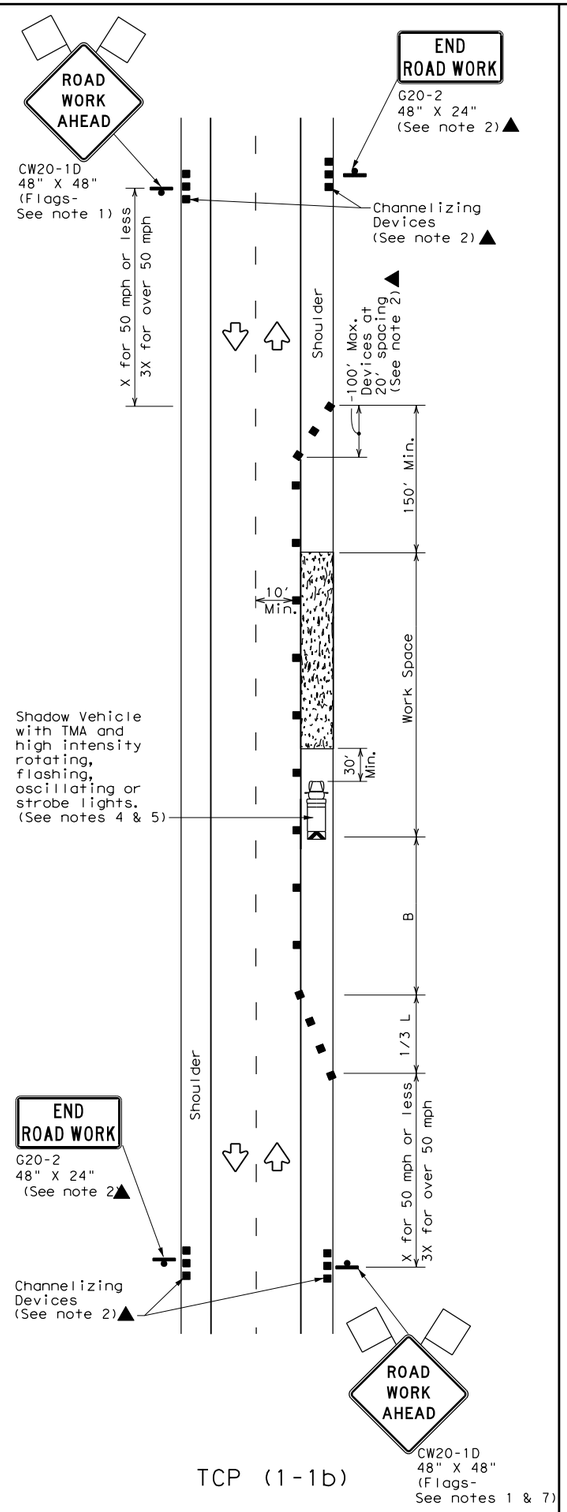


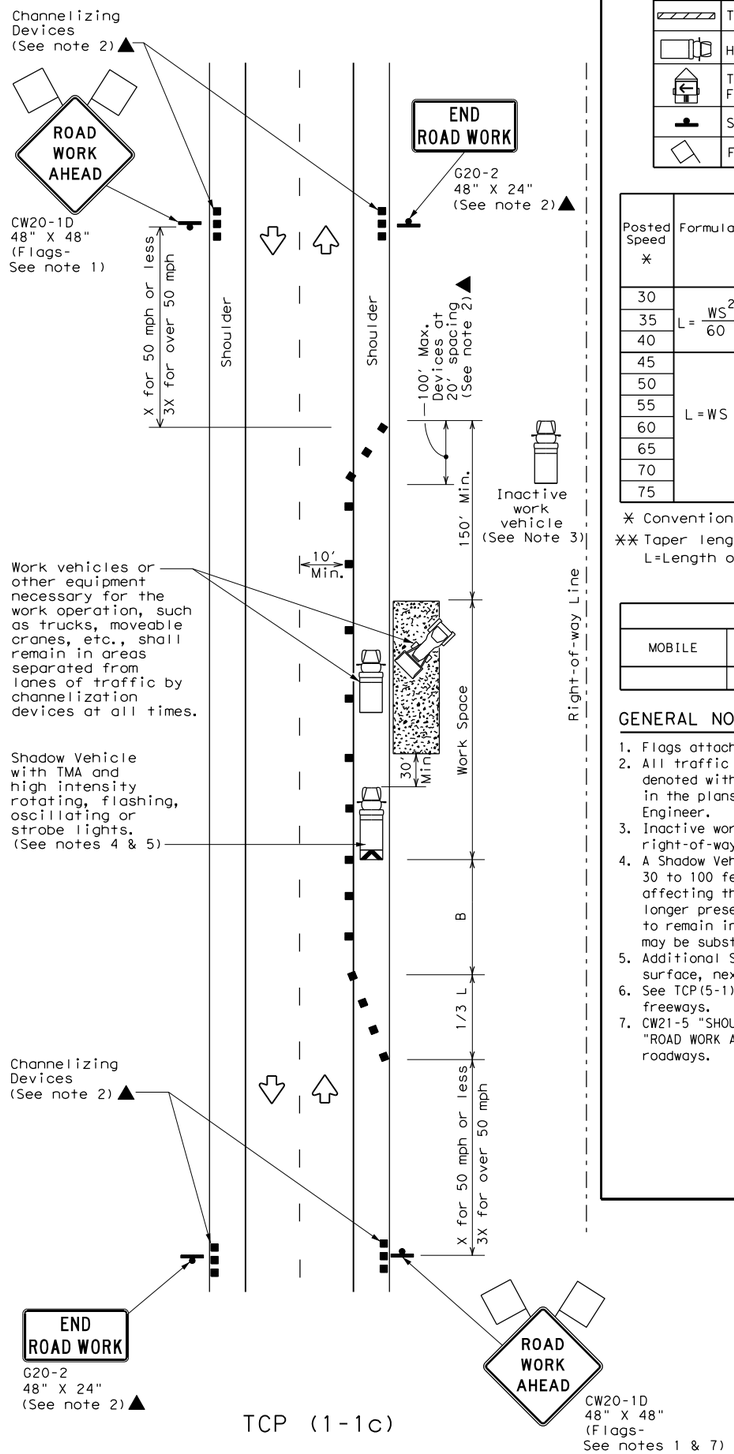
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	ELP	ELP,ETC.		39
1-97 2-18				

151

DATE:
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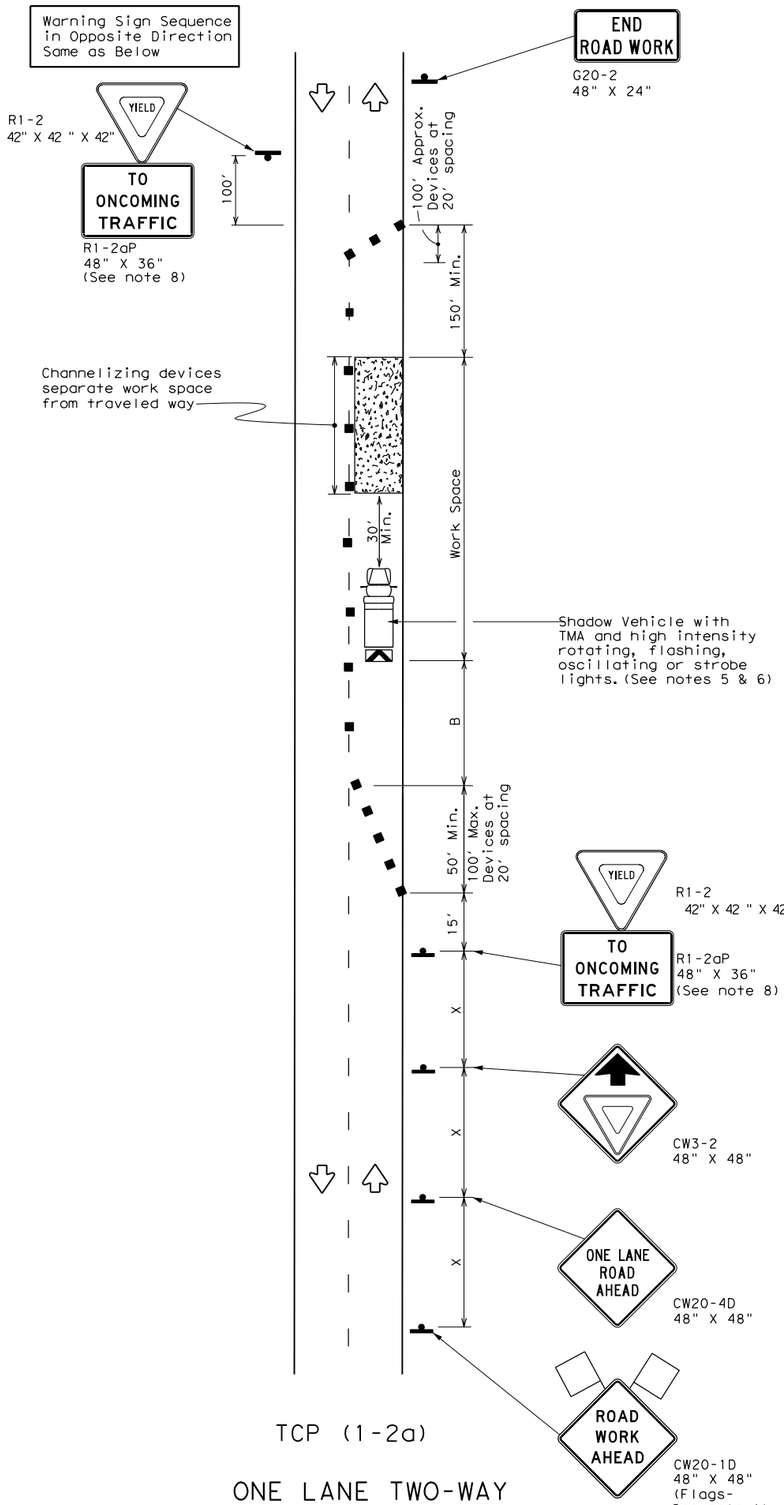
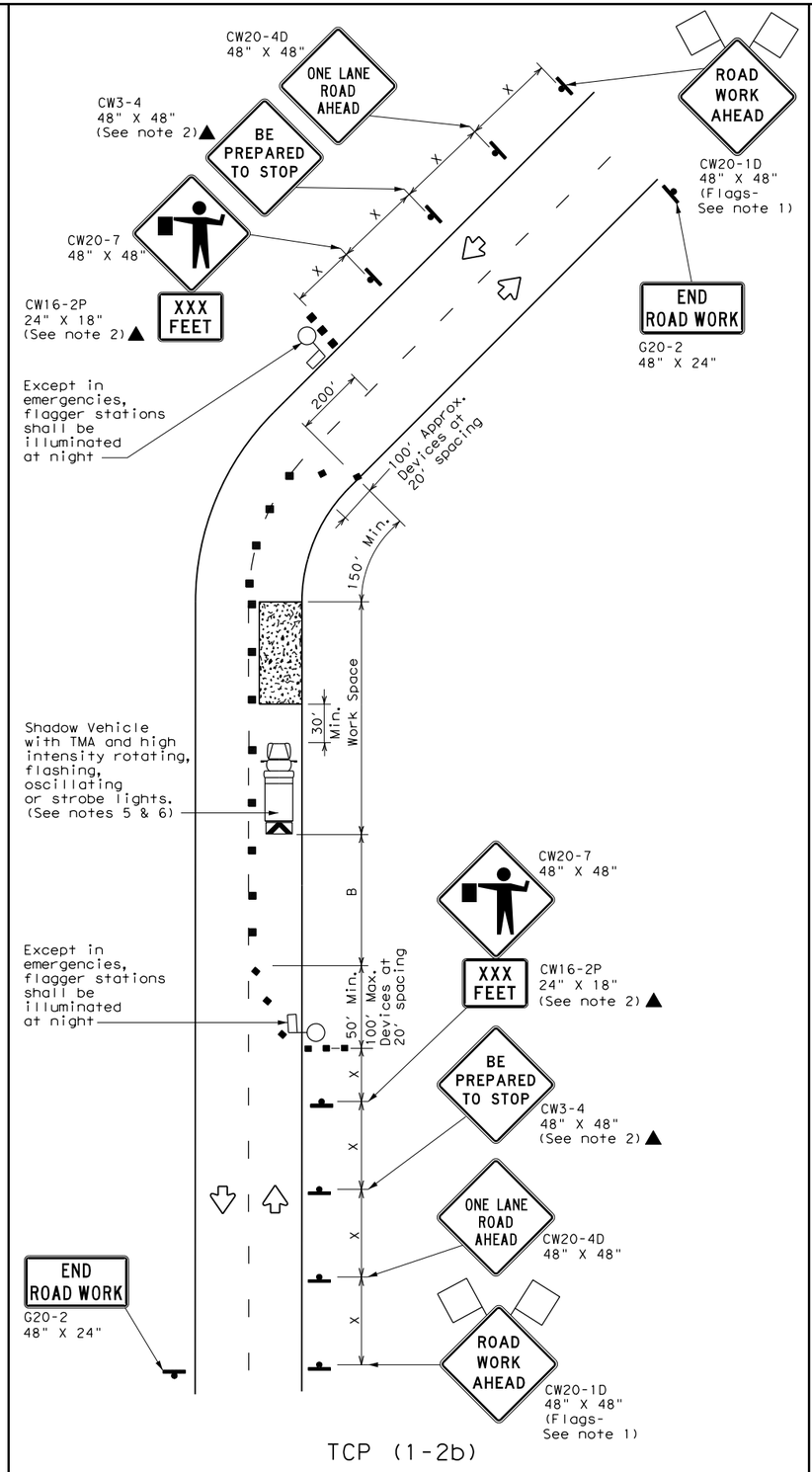


TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0001	04	102, ETC.	US62, ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		40

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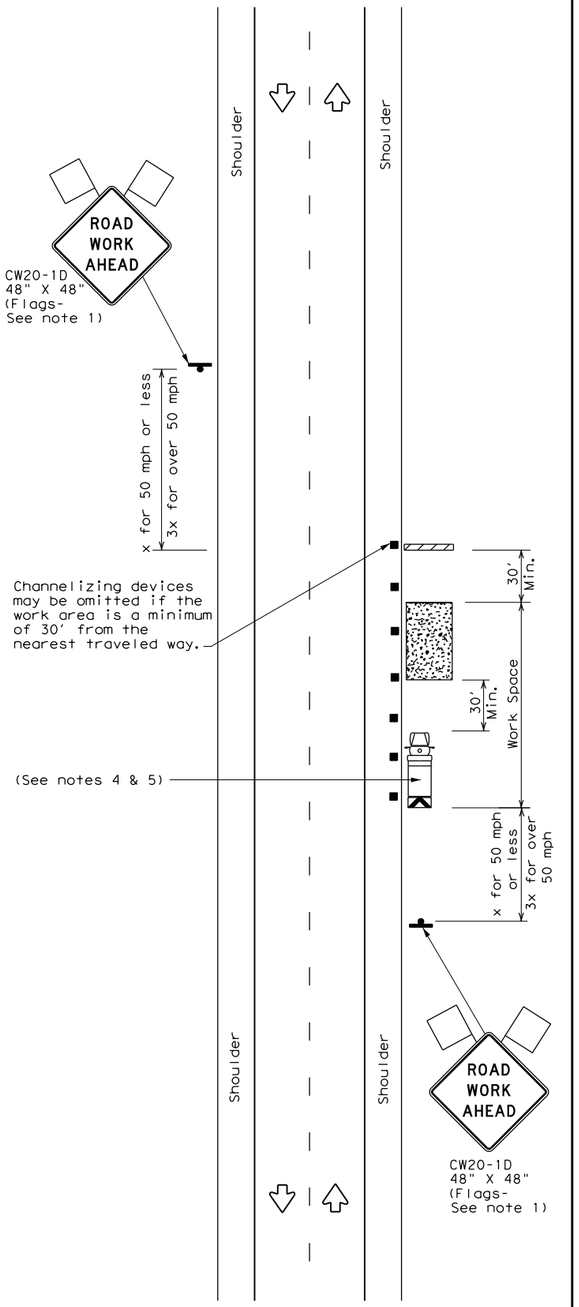
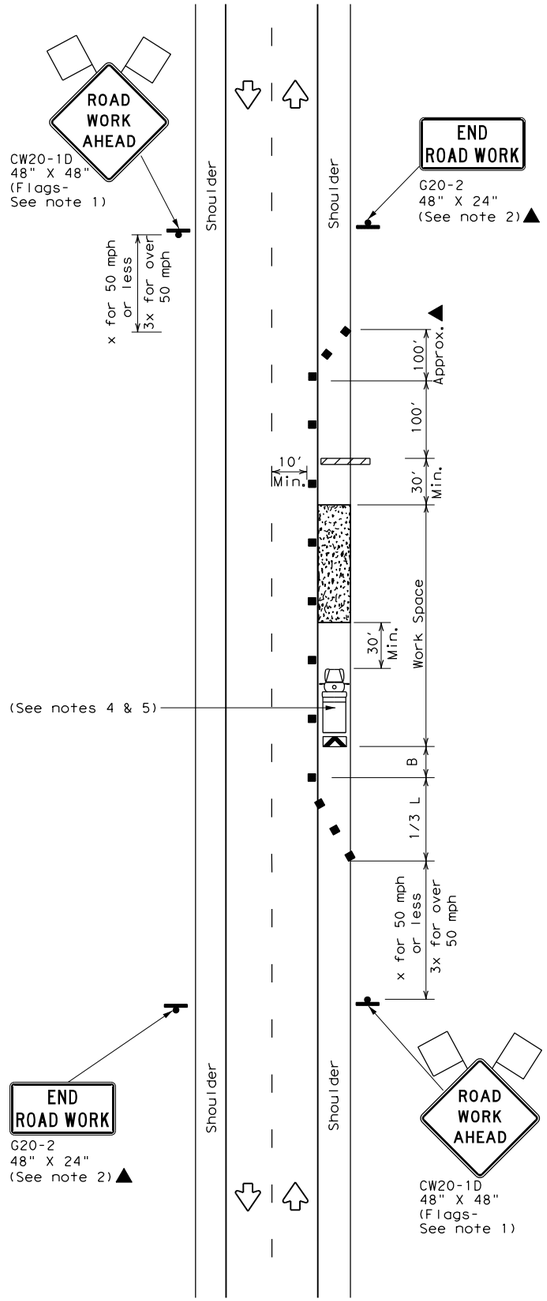


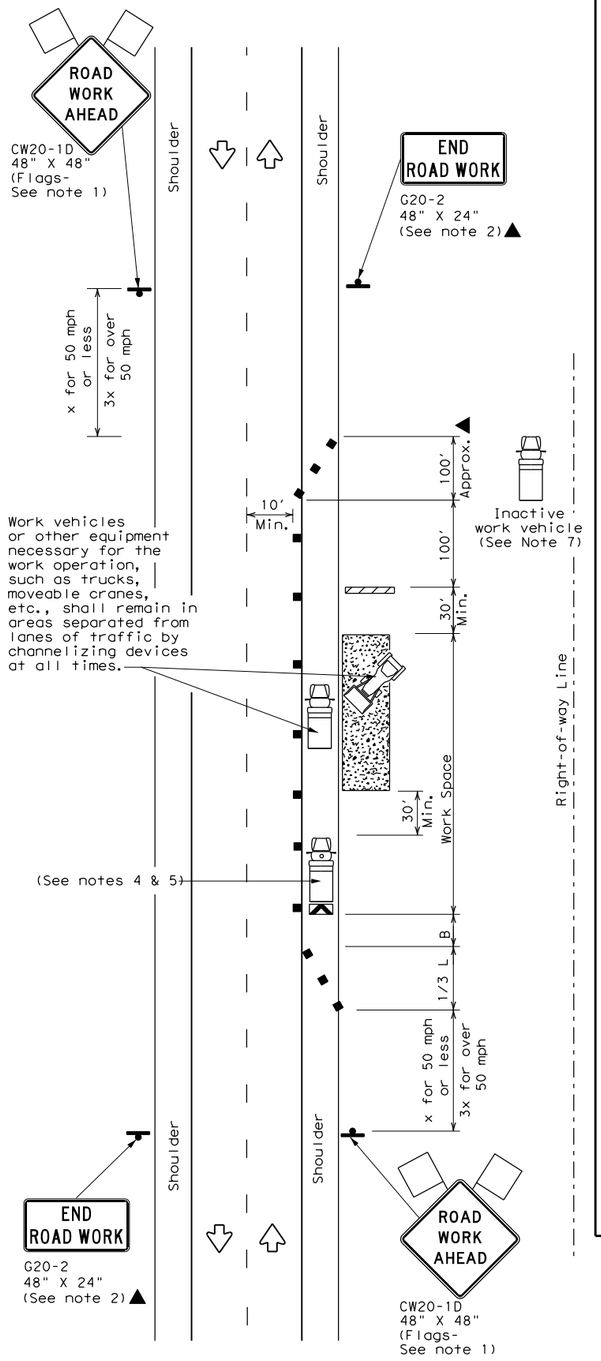
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

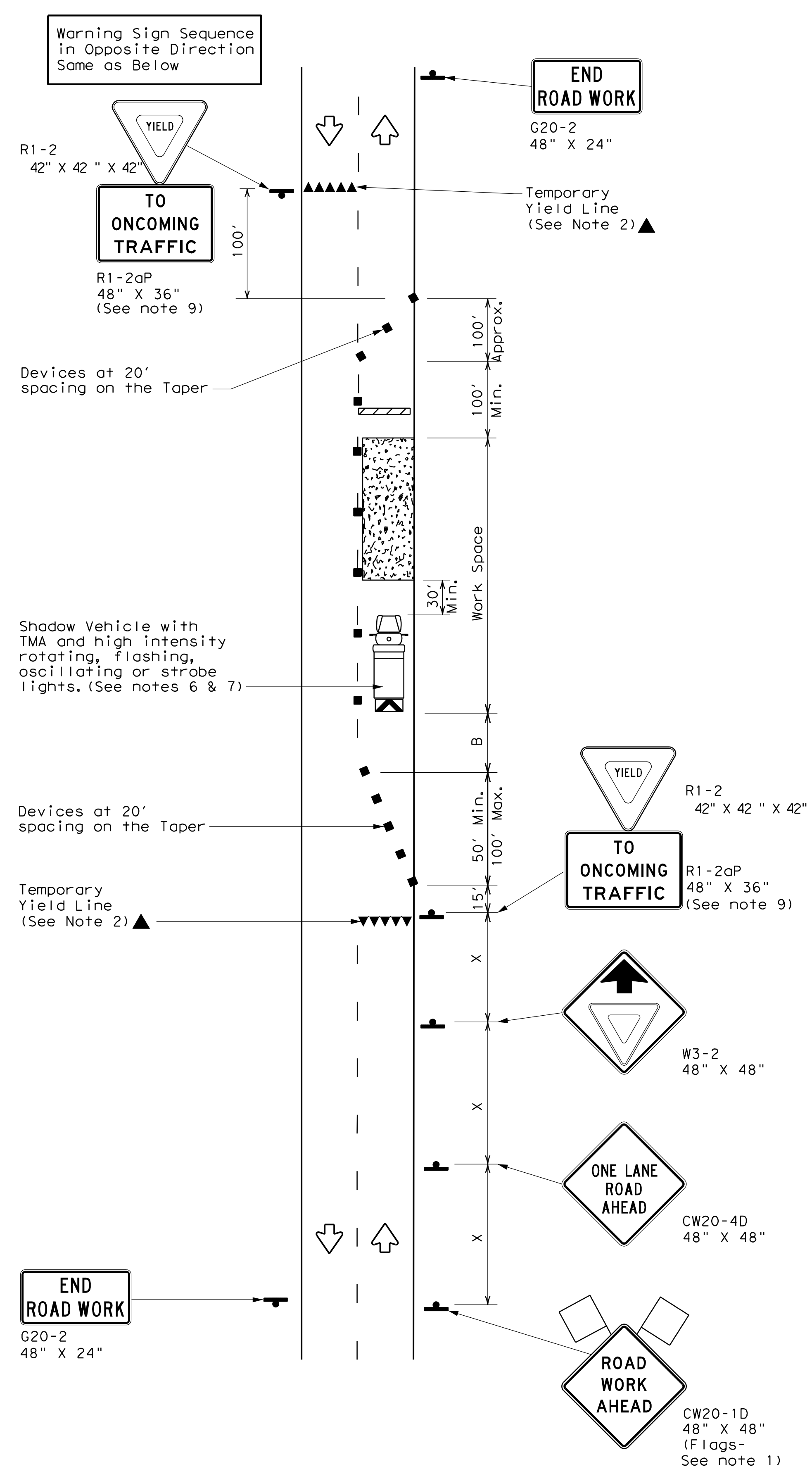
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	ELP	ELP,ETC.		41
1-97 2-18				

161



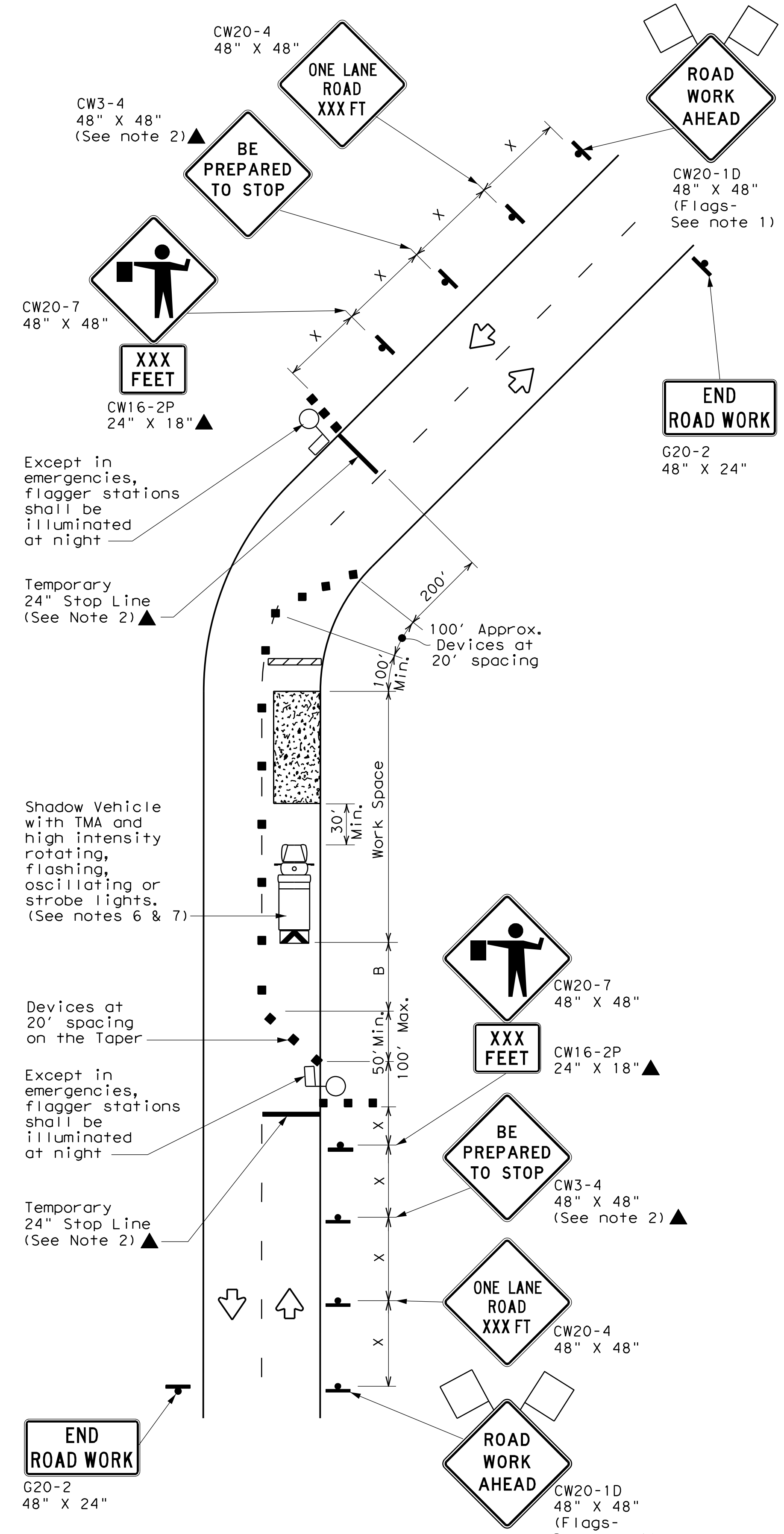
TCP (2-2a)

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		Portable Changeable Message Sign (PCMS)	
Sign		Traffic Flow	
Flag		Flagger	

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	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	0001	04	102,ETC.	US62,ETC.
	DIST		COUNTY	SHEET NO.
	ELP		ELP,ETC.	42

162

DATE: 3/26/2024 11:55:09 AM
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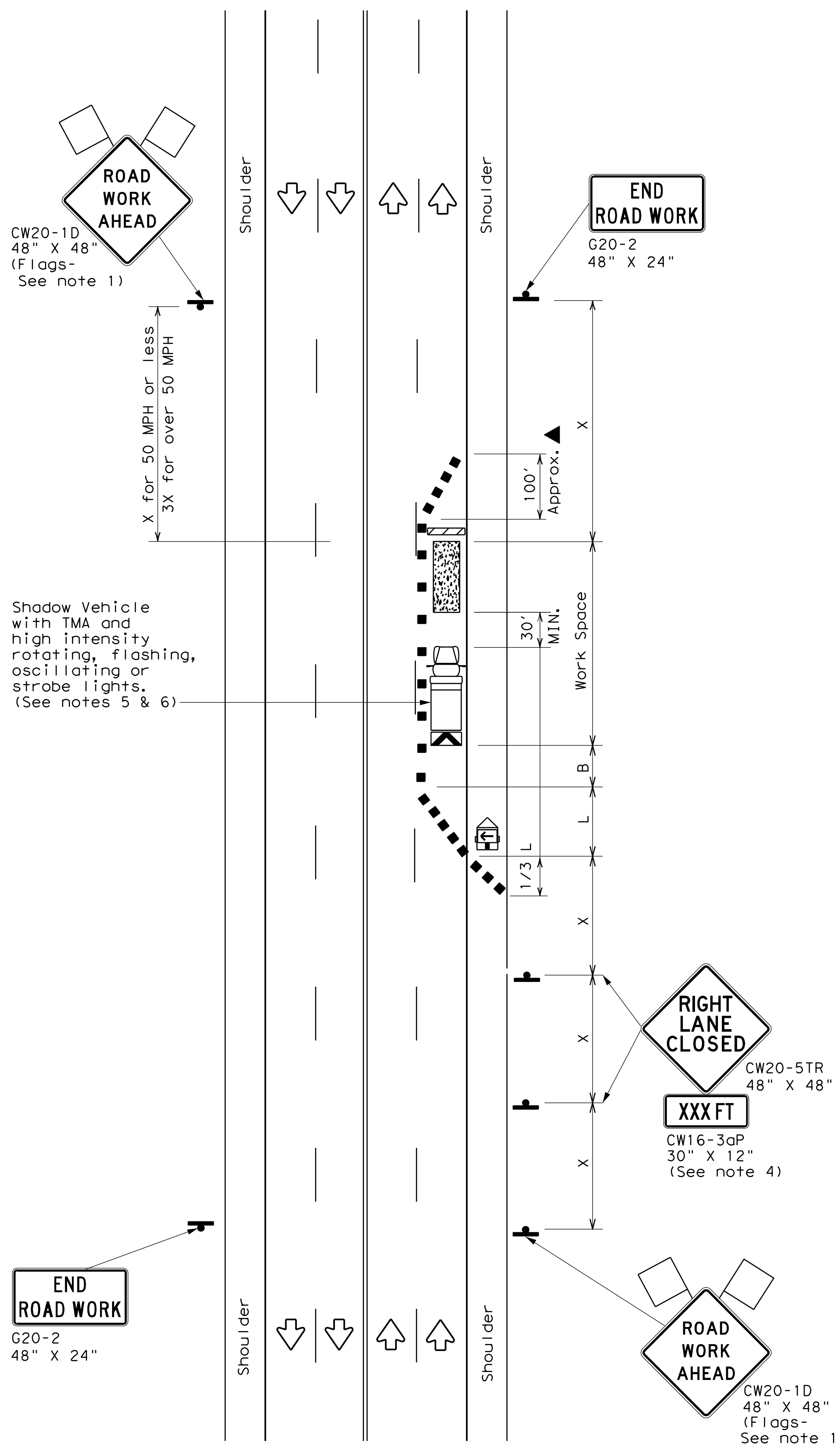
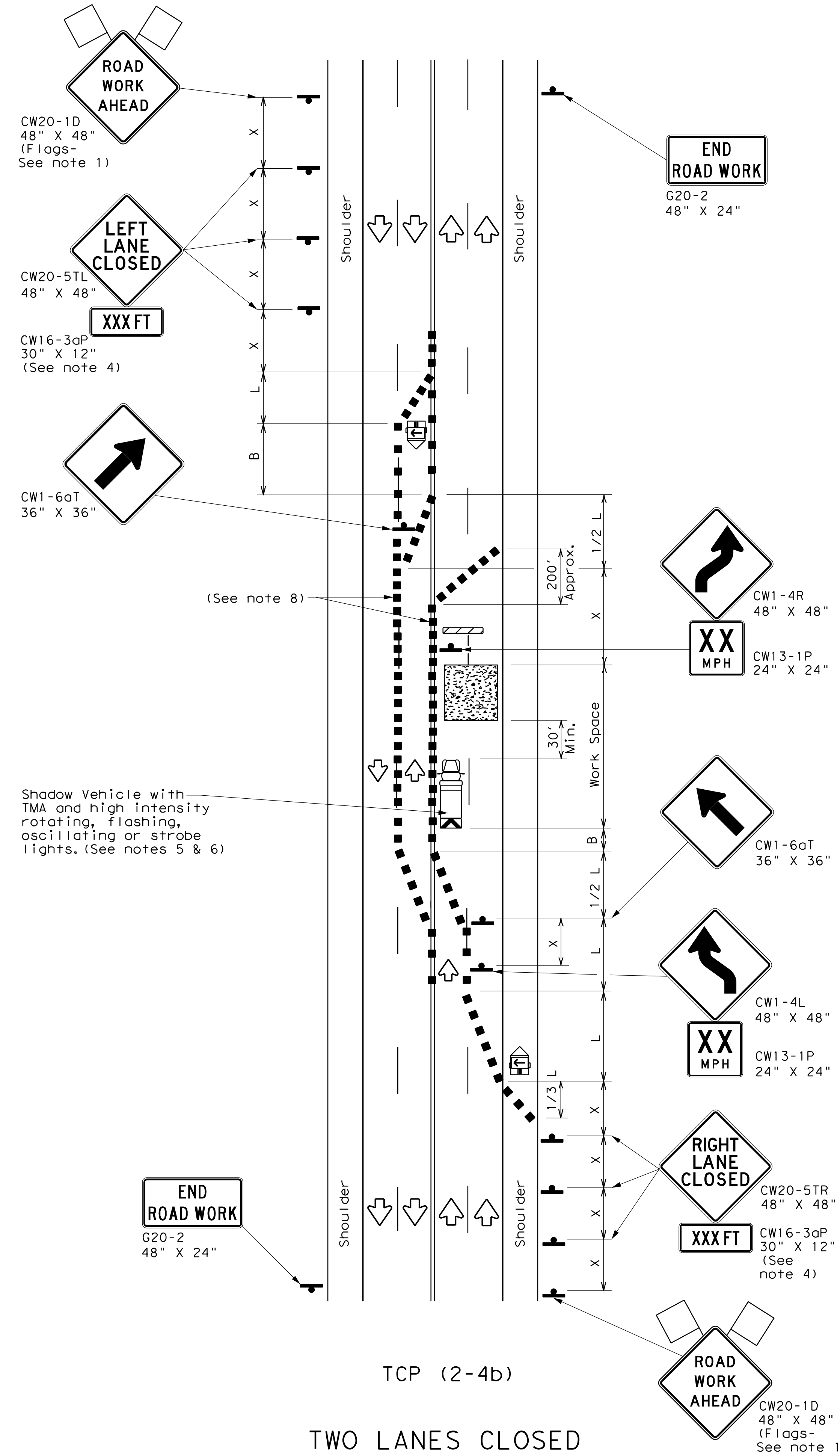


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.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	0001	04	102, ETC.	US62, ETC.
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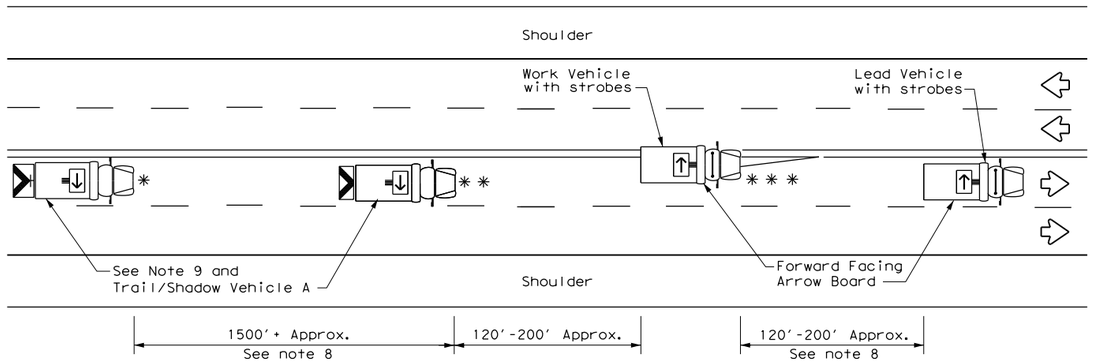
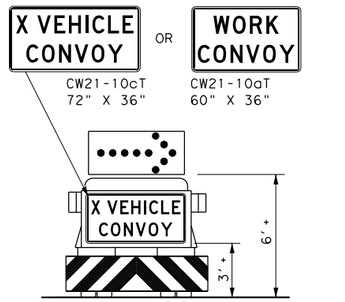


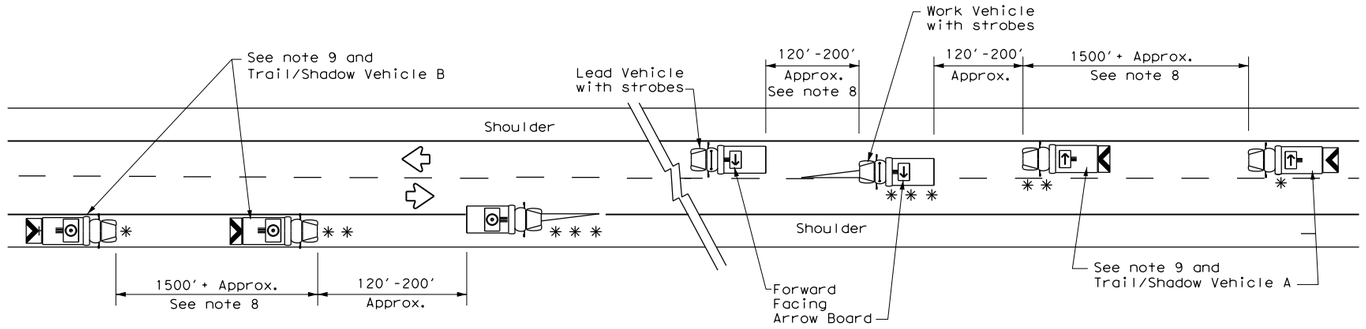
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

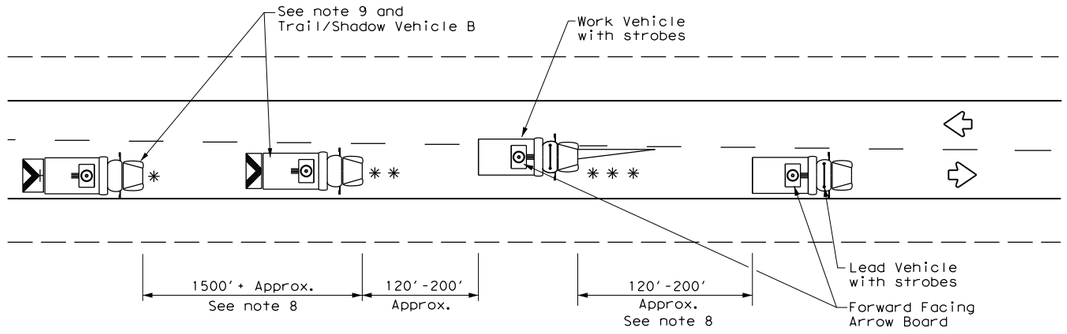


WORK ON SHOULDER

WORK ON TRAVEL LANE

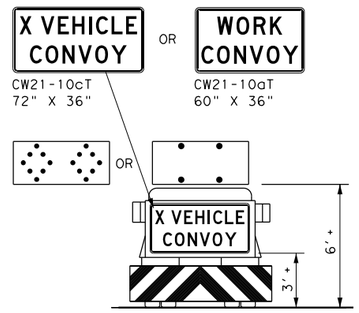
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

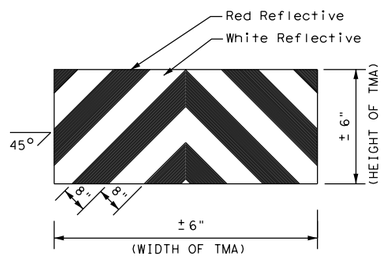
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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8-95 7-13	ELP	ELP, ETC.		44
1-97				

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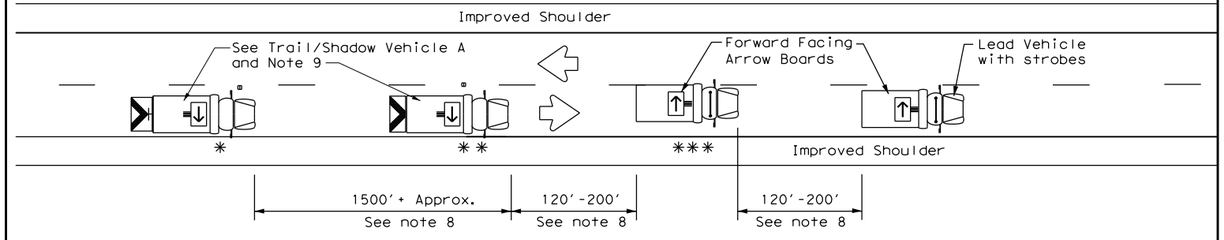
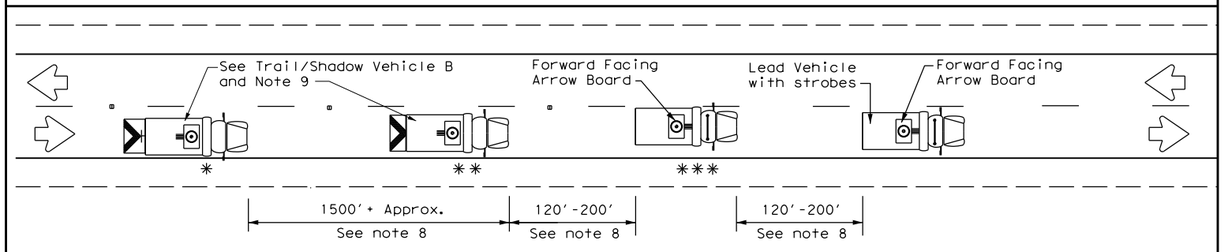


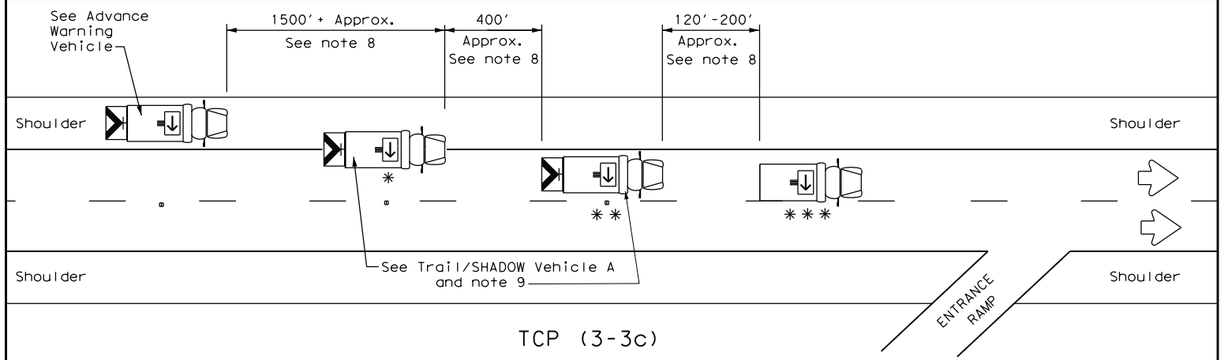
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



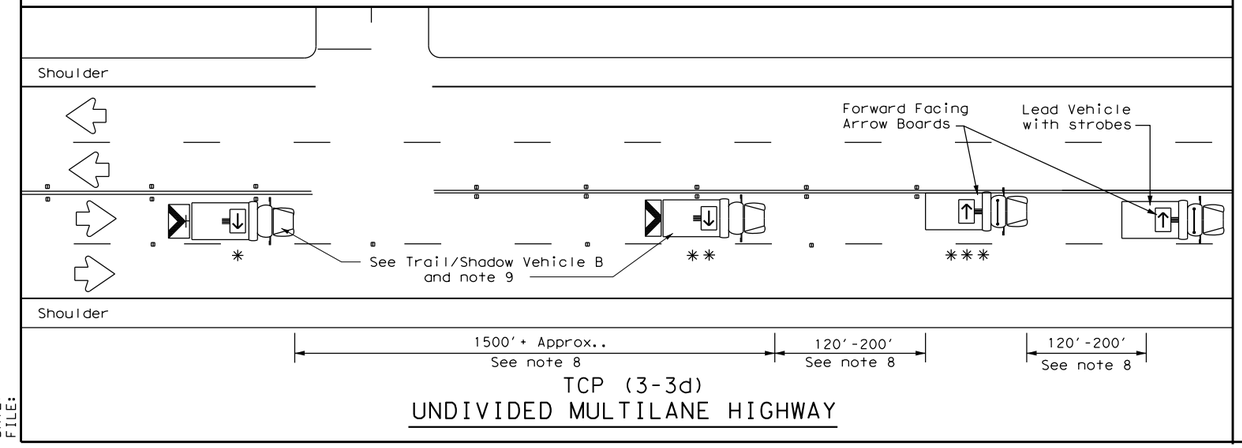
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



TCP (3-3c)

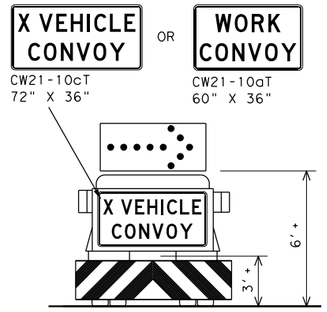
DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

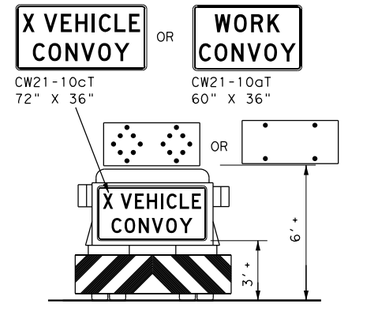
UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



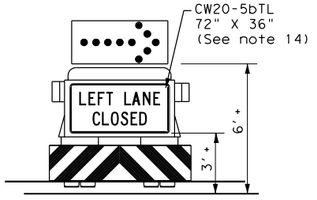
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

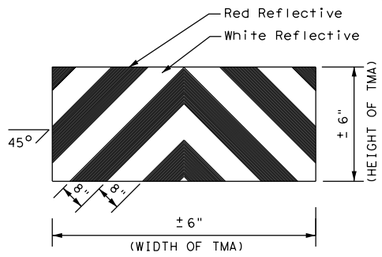


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ELP	ELP,ETC.		45
1-97 7-14				

177

DATE: 3/26/2024 11:56:29 AM
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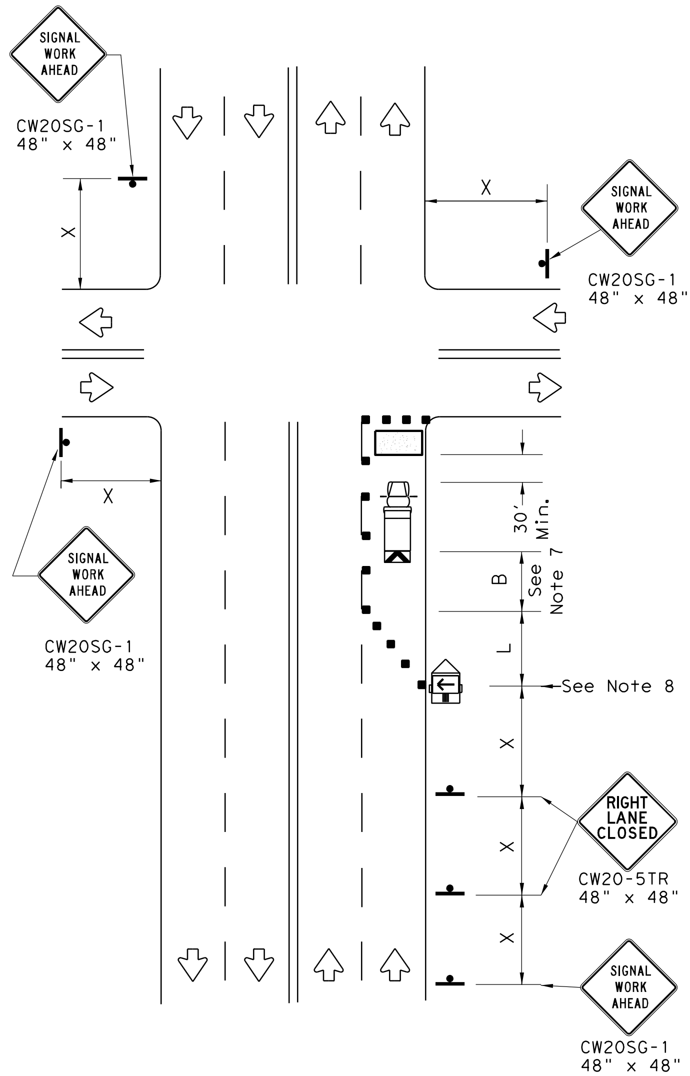
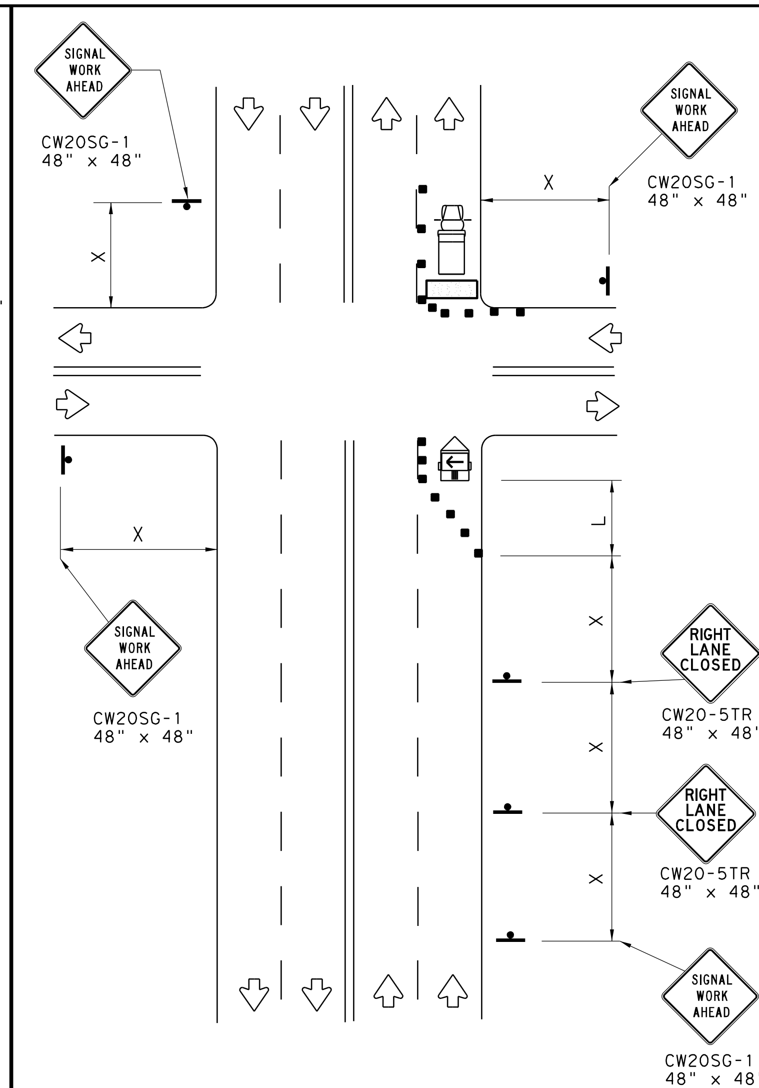


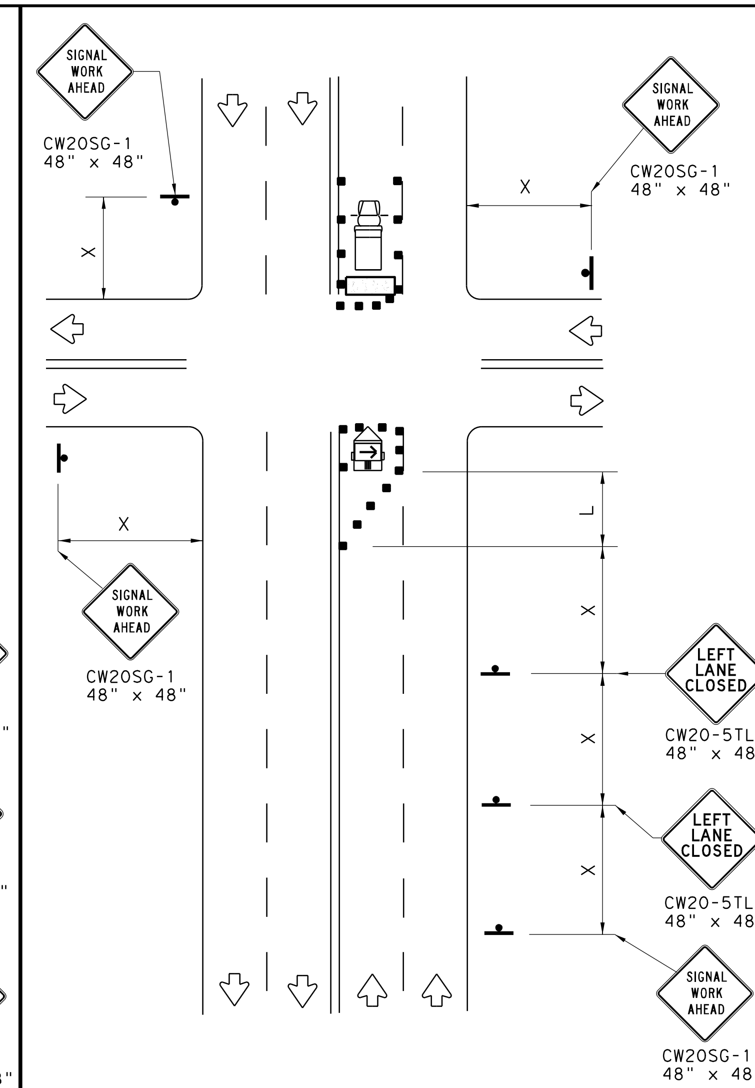
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY

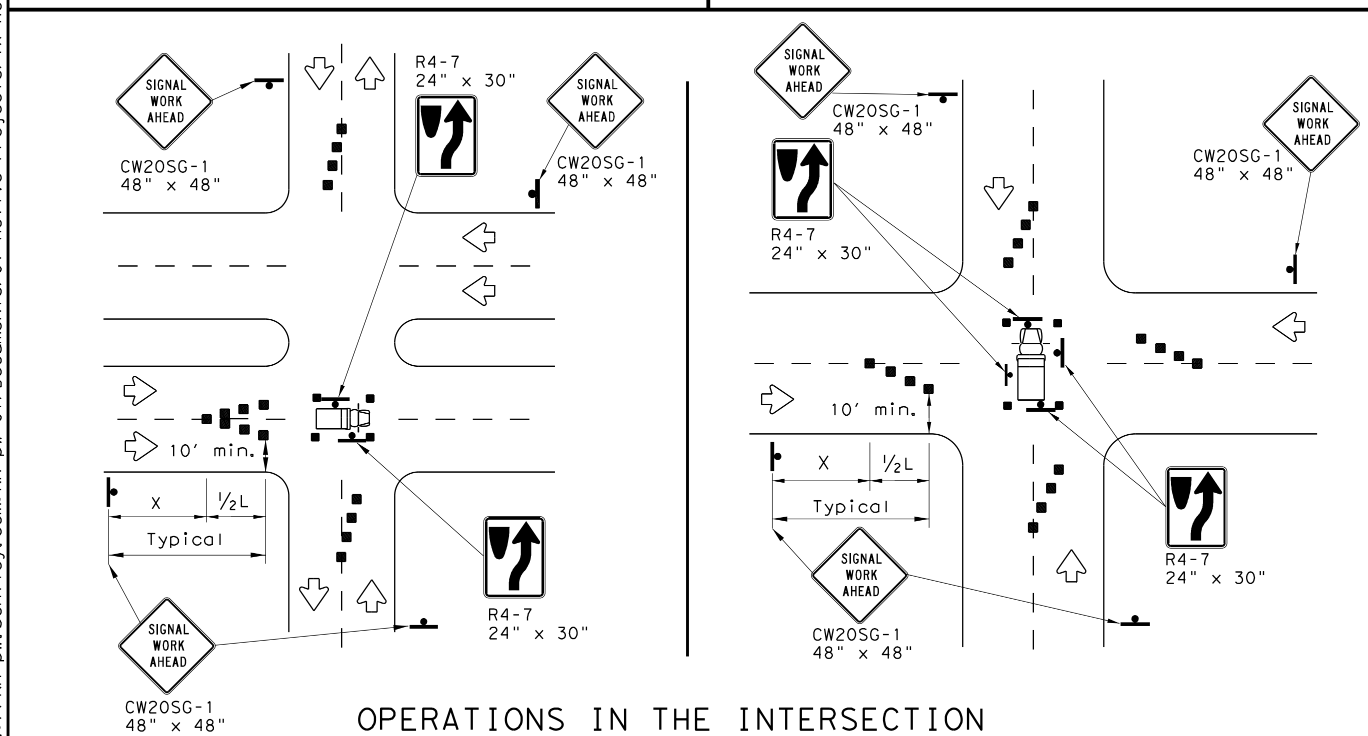
LEGEND

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

SHEET 1 OF 2

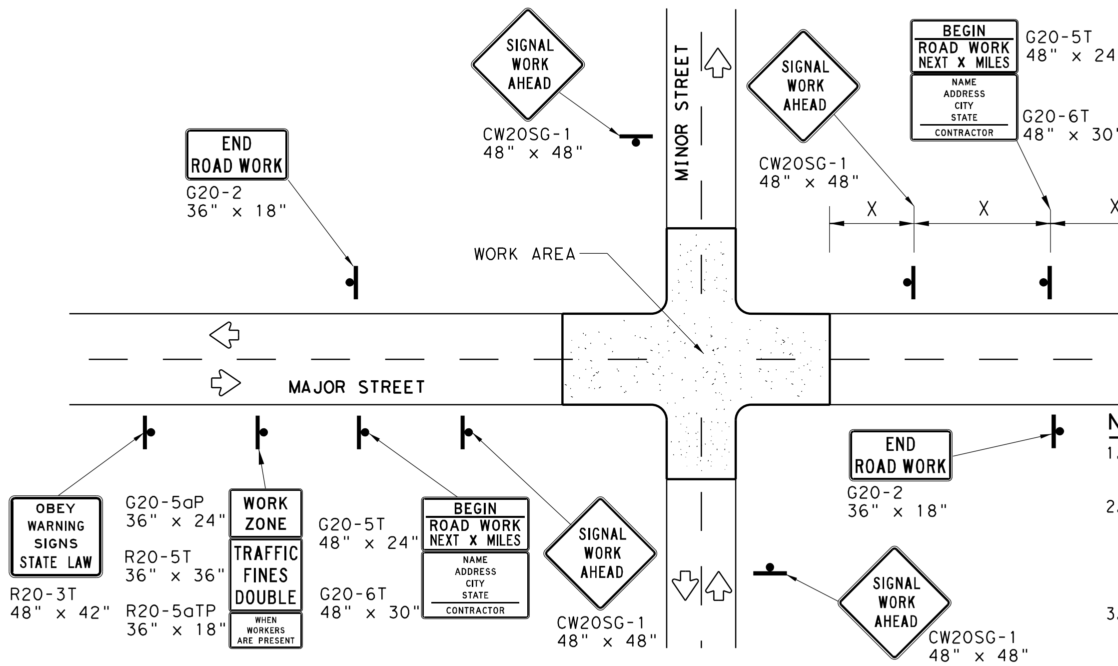
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT 0001	SECT 04	JOB 102,ETC.	HIGHWAY US62,ETC.
REVISIONS 2-98 10-99 7-13 4-98 3-03	DIST ELP		COUNTY ELP,ETC.	SHEET NO. 46

114



TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

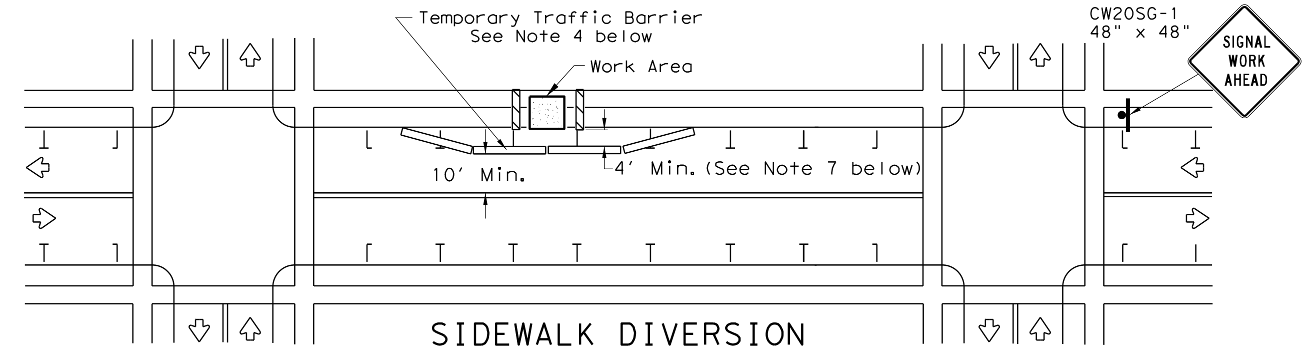
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

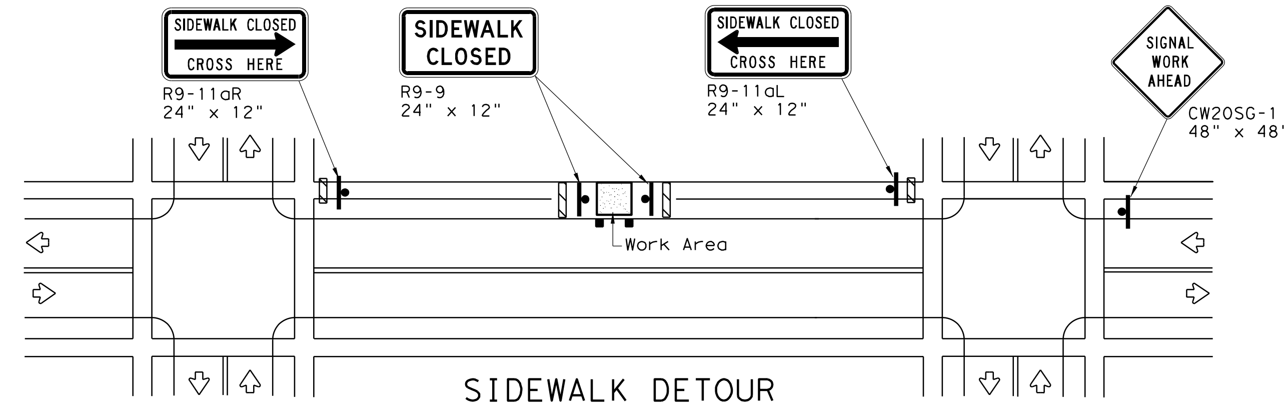
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

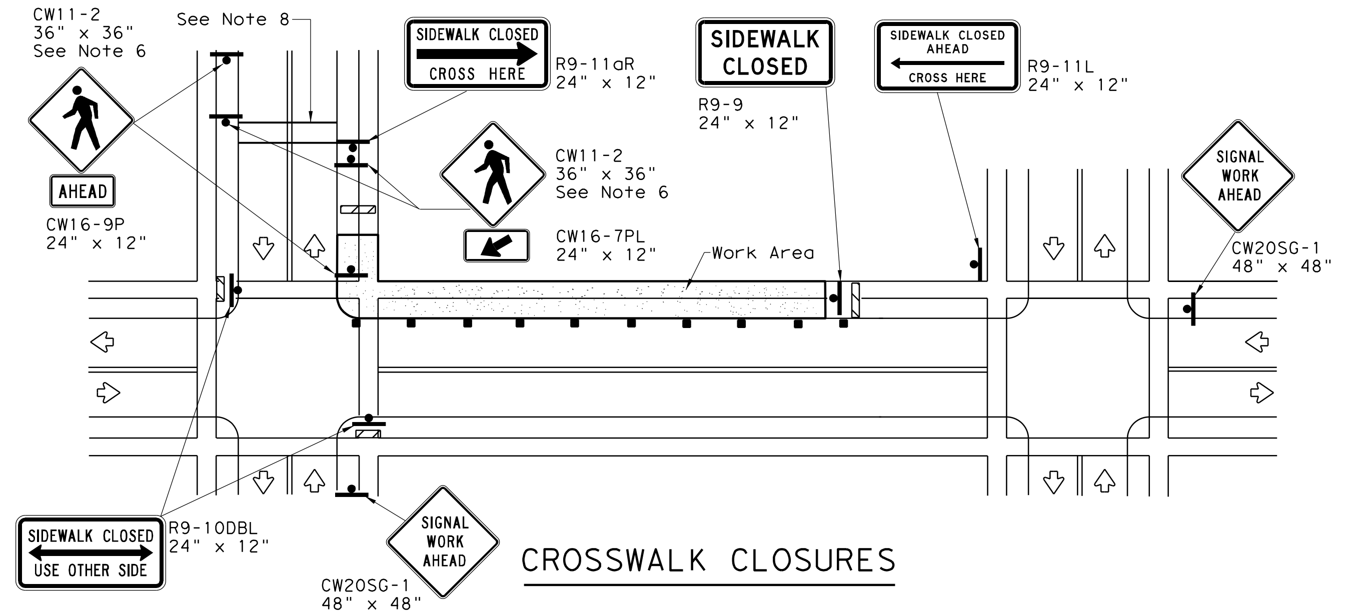
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
2-98 10-99 7-13	DIST		COUNTY	SHEET NO.
4-98 3-03	ELP		ELP, ETC.	47

NOTES:

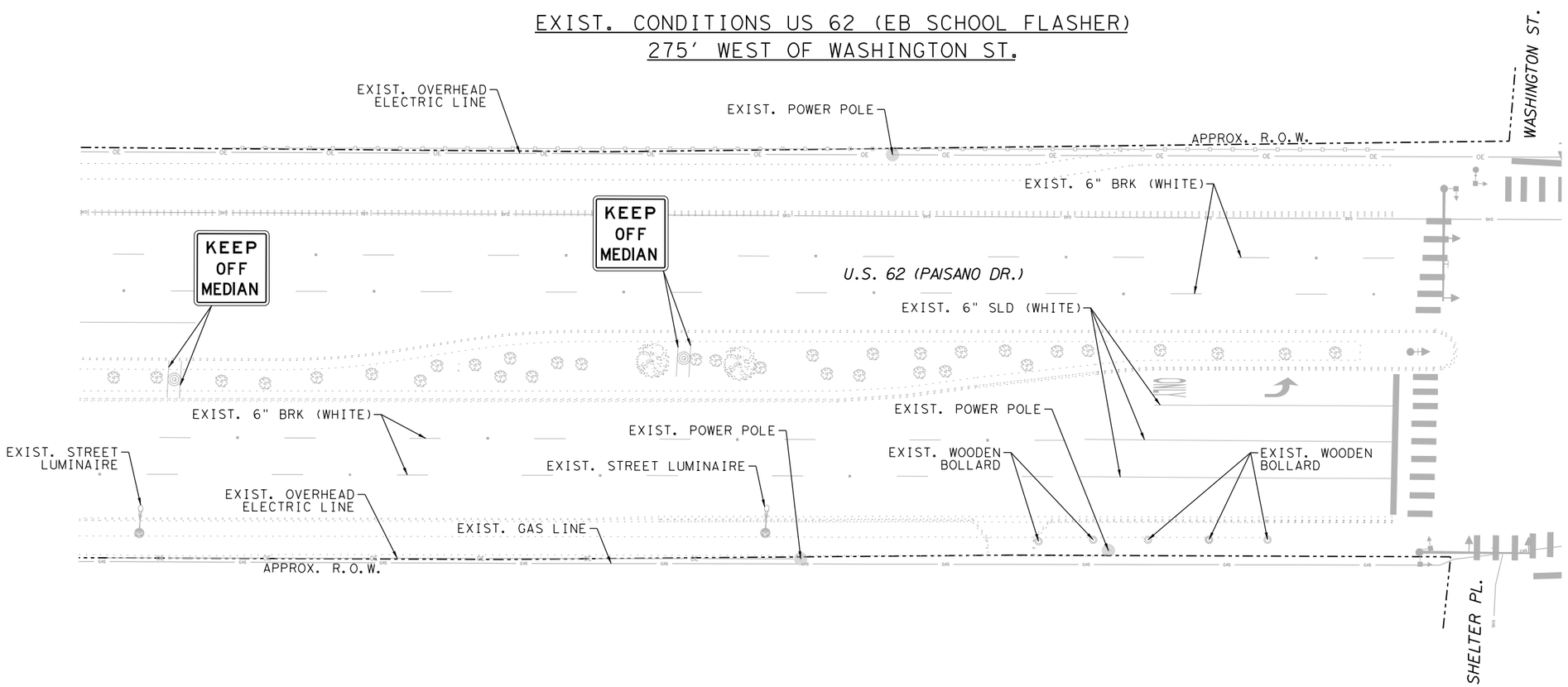
1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET LUMINAIRE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING VEGETATION
- EXISTING WOODEN BOLLARD

EXIST. CONDITIONS US 62 (EB SCHOOL FLASHER) 275' WEST OF WASHINGTON ST.



STATE OF TEXAS
MANUEL A. PALMA
127497
LICENSED
PROFESSIONAL ENGINEER
3/29/2024

cea group
813 N. Kansas St.
Suite 300
El Paso, TX 79902
915.544.5232
www.ceagroup.net
TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT WASHINGTON STREET

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP, ETC.	48
CHECK FC	CONTROL	SECTION	JOB	
	0001	04	102, ETC.	

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$$$SCALE$$$
BY: $USER$

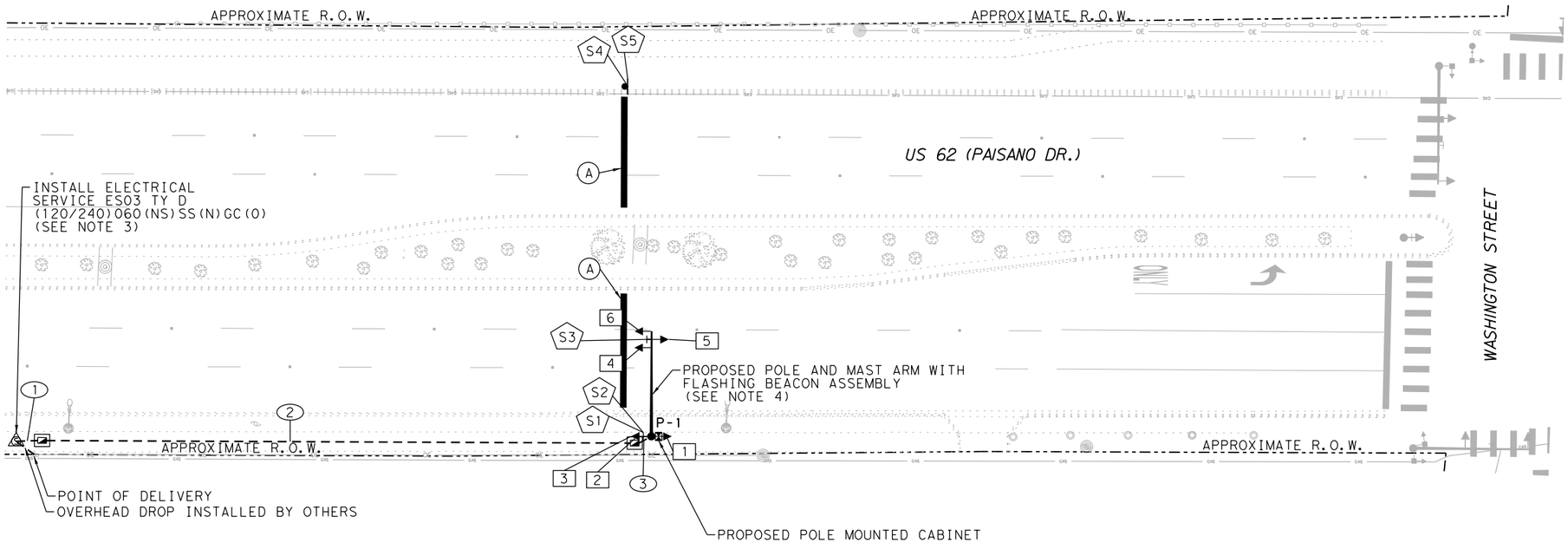
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

PROPOSED SIGNAL

H1

SH 1,2,3,4,5,6

PROPOSED CONDITIONS US 62 (EB SCHOOL FLASHER)
275' WEST OF WASHINGTON ST



LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH SCHOOL ZONE FLASHER AND SIGNAGE
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED POLE MOUNTED CABINET
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- (S1) SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS IS DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (RAPHAEL ZARAGOZA 915-412-5505) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. SEE SCHOOL FLASHER DETAIL SHEET FOR MORE INFORMATION.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	1
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	70
666	6230	PAVEMENT SEALER 24"	LF	70
678	6008	PAV SURF PREP FOR MRK (24")	LF	70

PROPOSED SIGNS

S5-1
SCHOOL
SPEED LIMIT 30 WHEN FLASHING
(24"x 48")
(S1)

S7-1T
CELL PHONE USE PROHIBITED UP TO $200 FINE
(36"x 18")
(S2)

S6-1T
SCHOOL
SPEED LIMIT 30 WHEN FLASHING
(84"x 36")
(S3)

R2-1
SPEED LIMIT 45
(24"x 30")
(S5)

S5-2
END SCHOOL ZONE
(24"x 30")
(S4)

3/29/2024
STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED PROFESSIONAL ENGINEER
Carlye Lide

Kimley»Horn F-928
2600 N Central Expy
Suite 400
Richardson, Texas 75080
Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SCHOOL FLASHER LAYOUT

US 62 AT WASHINGTON STREET

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS				
CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP, ETC.	
	CONTROL	SECTION	JOB	49
CHECK DL	0001	04	102, ETC.	

SIGNAL LAYOUT SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
618	6023	CONDT (PVC) (SCH 40) (2")	LF	200
620	6010	ELEC CONDR (NO.6) INSULATED	LF	600
624	6004	GROUND BOX TY B (122322) W/ APRON	EA	2
628	6149	ELC SRV TY D 120/240 060(NS)SS(N)GC(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
	*	POLE MOUNTED CONTROL CABINET	EA	1
	*	SIGN, SCHOOL SPEED LIMIT 30 WHEN FLASHING (24"x48") (S5-1)	EA	1
	*	SIGN, CELL PHONE USE PROHIBITED (36"x18") (S7-1T)	EA	1
	*	SIGN, SCHOOL SPEED LIMIT 30 WHEN FLASHING (84"x36") (S6-1T)	EA	1
	*	SCHOOL FLASHER CONTROLLER	EA	1
	*	GPS CLOCK	EA	1
	*	CELLULAR MODEM	EA	1
682	6003	VEH SIG SEC (12")LED(YEL)	EA	6
682	6021	BACK PLATE (12")(1 SEC)	EA	6
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	165
686	6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	1

* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)".

ES - 03 CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT		CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)			NO. 6 XHHW INSULATED (POWER)		NO. 6 XHHW INSULATED (GROUND)			
		Qty	Len		Qty	Len	Qty	Len		
1	I	1	10	I	2	20	1	10	10	1
2	I	1	180	I	2	360	1	180	180	2
3	I	1	10	I	2	20	1	10	10	3
TOTAL			200			400		200		

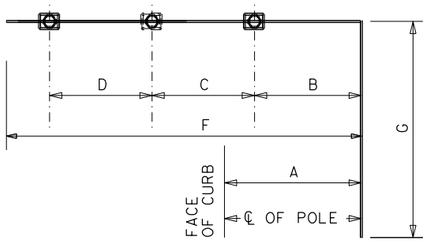
CONDUIT STATUS: I=INSTALL

CONDUCTOR FROM CABINET TO SIGNAL HEAD		
POLE NO.	SIGNAL HEAD NO.	TY A 5 CNDR NO. 14
P-1	1	5
P-1	2	5
P-1	3	15
P-1	4	45
P-1	5	45
P-1	6	50
	TOTAL (FT)	165

SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	F (FT)	G (FT)	NO. OF HEADS (EA)*	LUM	DRILLED SHAFT 30" DIA TYPE A ITEM 416	FDN TYPE WIND ZONE (80 MPH)
P-1	I	6.0	27	2.5	2.5	32	19	3	NO	11	30-A
								TOTAL:		11	

SIGNAL POLE STATUS: I=INSTALL
*DOES NOT INCLUDE VERTICAL SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS



SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	S5-1	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-1	24"x18"
S2	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-1	36"x18"
S3	S6-1T	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-1	84"x36"
S4	S5-2	END SCHOOL ZONE	I	*	P-1	24"x30"

*SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 680)

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION		
	SIGNAL HEAD TYPE	STATUS	LED SIGNAL LAMPS
			Y
			EA
1, 2, 3, 4, 5, 6	H1	I	6
TOTAL (NEW)			6

STATUS: I=INSTALL

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	LATITUDE	LONGITUDE	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES03 US 62 AT WASHINGTON ST	TY D (120/240) 060 (NS) SS (N) GC (O) 425' WEST OF WASHINGTON ST	31.767222°	-106.442222°	2"	3 / #4	N/A	2P / 60	N/A	100	EB FLASHER	1P / 20	10	1.2

** VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS.
ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

3/29/2024
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Carlye Lide

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TRAFFIC SAFETY IMPROVEMENTS

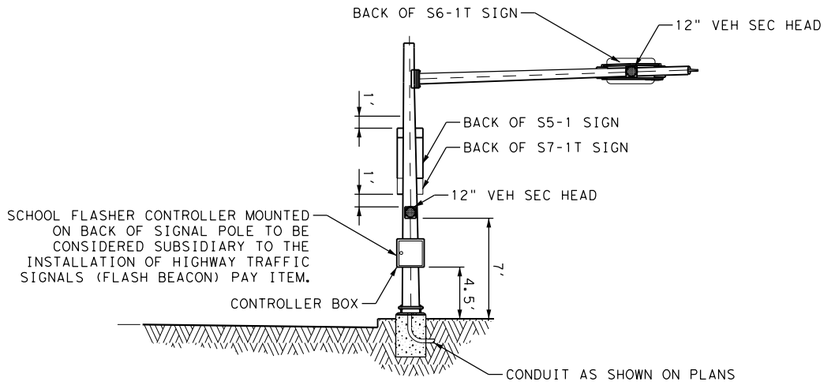
PROPOSED SCHOOL FLASHER LAYOUT

US 62 AT WASHINGTON STREET

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	50
CHECK DL	CONTROL 0001	SECTION 04	JOB 102,ETC.	

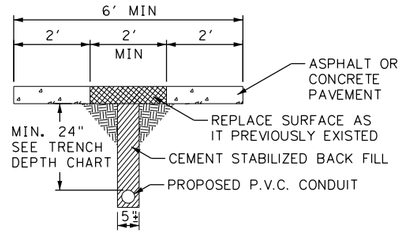
PLOTTED: 3/29/2024
FILENAME: pw:/kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.1B_PAISANO_AT_WASHINGTON



BACKSIDE OF SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

TRENCH DEPTH CHART	
SYSTEM	DEPTH (MIN)
SAFETY FLASHERS	24 INCHES

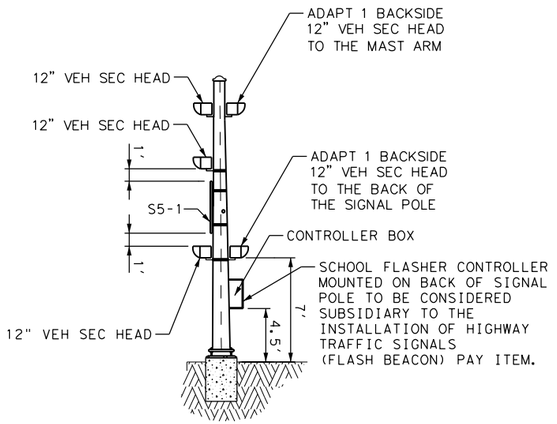


PAVEMENT

SCALE: NTS

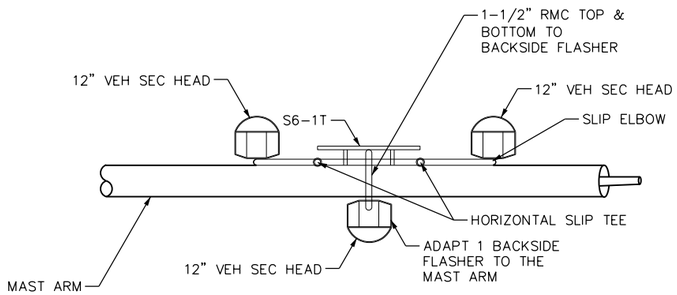
NOTES:

1. SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAILS AND DIMENSIONS ARE SHOWN AS EXAMPLES ONLY. OPTIONAL DESIGNS SHALL MEET ALL OTHER REQUIREMENTS FOR TRAFFIC SIGNAL POLE ASSEMBLIES AND SHALL BE APPROVED IN WRITING BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE.
2. SCHOOL SAFETY FLASHER BRACKET ASSEMBLIES AND ALL NECESSARY BOLTS, CLAMPS, NUTS, WASHERS, TEMPLATES, MATERIALS, LABOR, TOOLS AND EQUIPMENT NECESSARY TO COMPLETE THE INSTALLATION SHALL BE CONSIDERED SUBSIDIARY TO "TRAFFIC SIGNAL POLE ASSEMBLIES".
3. THE LOCATION OF THE SIGNAL POLE, AND FIXTURES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE TO ACCOMMODATE LOCAL CONDITIONS. EXACT LOCATION OF SIGNAL POLE, CONTROLLER, ETC. TO BE APPROVED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE IN THE FIELD.
4. PROPOSED SIGNS AND BRACKET ASSEMBLY MOUNTED ON SIGNAL MAST ARM/POLE SHALL BE BANDED. DRILLING THROUGH MAST ARM OR POLE WILL NOT BE ACCEPTED.
5. THE OUTSIDE EDGE OF THE DRILLED SHAFT SHALL BE A MINIMUM OF 3' FROM THE FACE OF CURB.
6. CONTRACTOR SHALL PROVIDE ONE CONTROLLER BOX OF SUFFICIENT DIMENSION TO HOUSE ONE CONTROLLER UNITS.
7. CONTRACTOR SHALL PROVIDE ALL FLASHER ASSEMBLIES AND CONTROLLERS FROM MANUFACTURERS PREQUALIFIED BY TXDOT.
8. CONTROLLER UNITS (TIME CLOCKS) SHALL BE PROGRAMMABLE, A MINIMUM OF TWO RELAY OUTPUTS, AND ALLOW FOR MULTIPLE PROGRAMS, ALTERNATE PROGRAM SCHEDULES, AND EXEMPTION PERIODS.



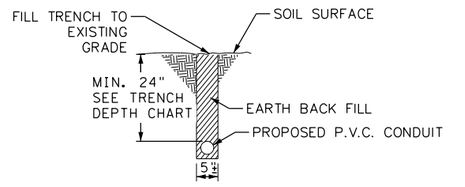
SIDE VIEW

SCALE: NTS



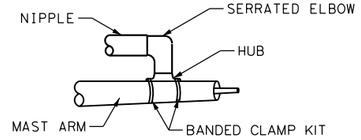
TOP VIEW

SCALE: NTS



OPEN SOIL TRENCH

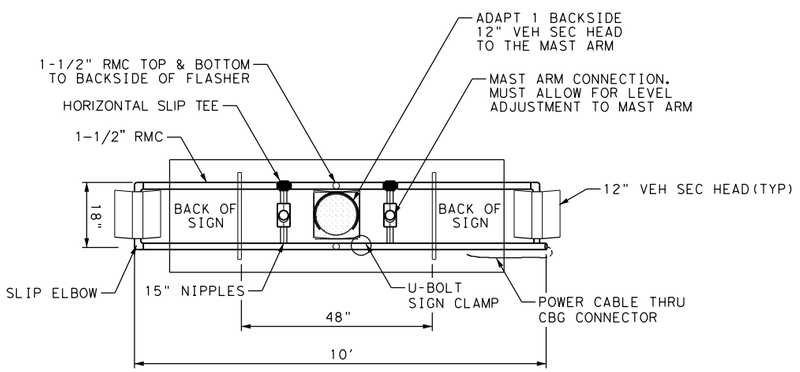
SCALE: NTS



MAST ARM CONNECTION DETAIL

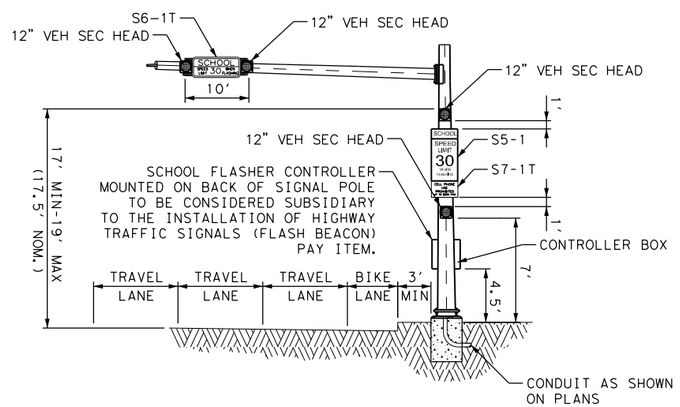
SCALE: NTS

TRENCH DETAILS



SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAIL - BACK VIEW

SCALE: NTS



SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

SCHOOL FLASHER DETAIL

US 62 AT
WASHINGTON STREET

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	51
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

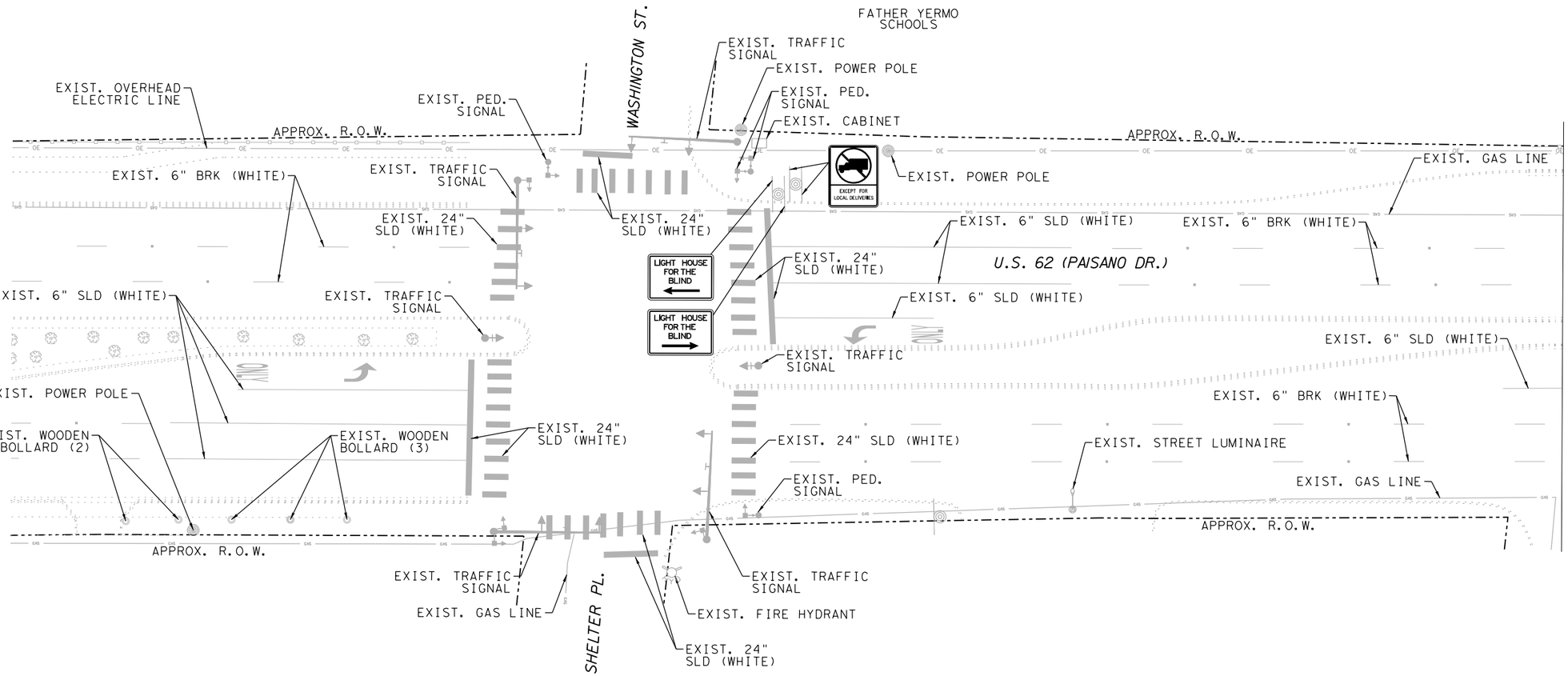
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.1C_PAISANO_AT_WASHINGTON

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

EXIST. CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON) 80' EAST OF TOBIN PL.



MATCHLINE B-A

LEGEND

- EXISTING TRAFFIC SIGNAL
- EXISTING PED. SIGNAL
- EXISTING STREET LUMINAIRE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING VEGETATION
- EXISTING FIRE HYDRANT

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TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT TOBIN PLACE

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP,ETC.	52
CHECK FC	CONTROL 0001	SECTION 04	JOB 102,ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.2A_TOBIN_EXISTING
BY: $USER$
$$$SCALE$$$

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

EXISTING BRIDGE STRUCTURE

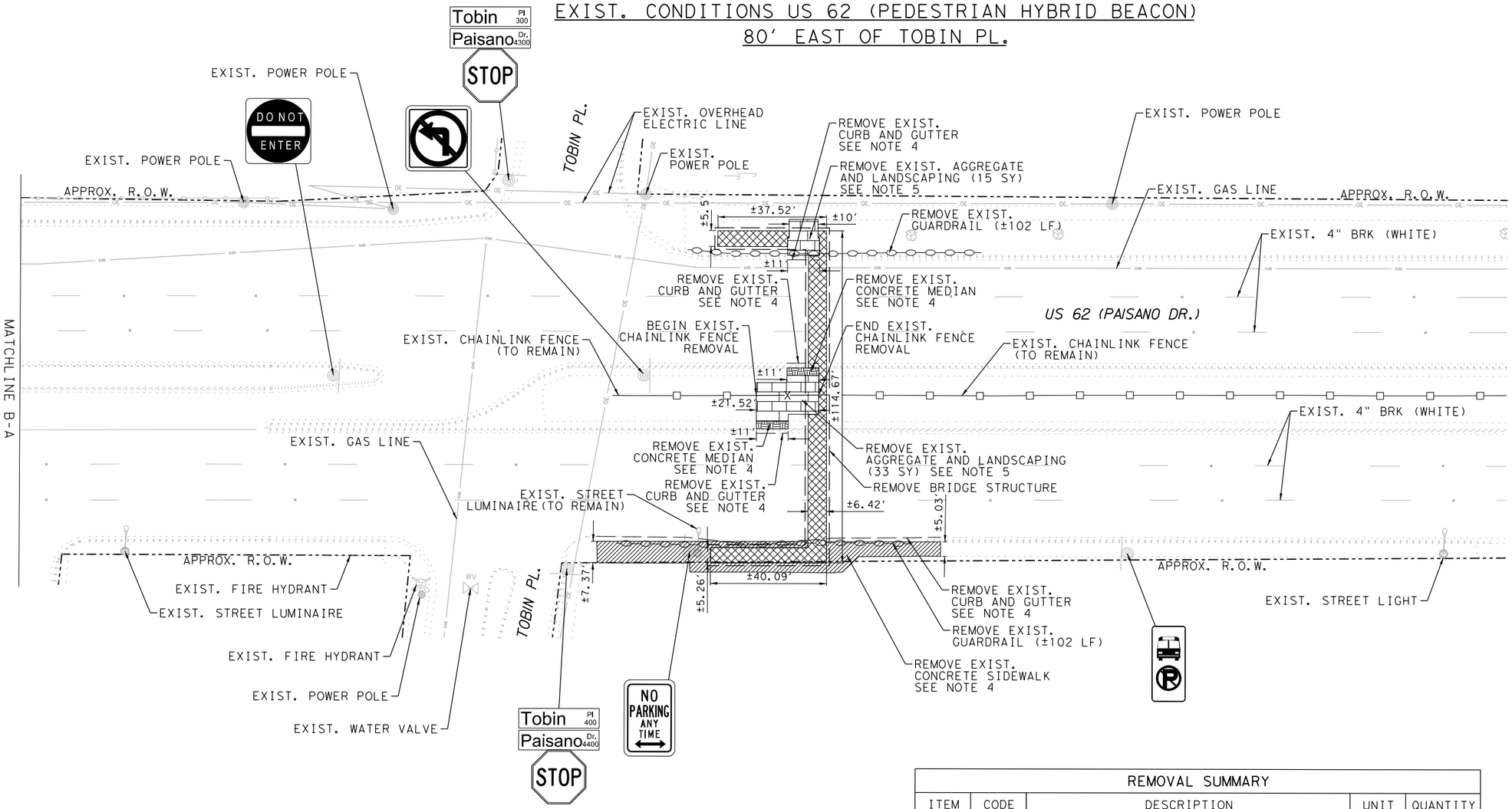
STEEL DIAMOND PLATE DECK
STEEL DIAMOND PLATE STEPS
STEEL I-BEAM BRIDGE
CHAINLINK FENCE ENCLOSURE
CONCRETE FOUNDATIONS
193'-0" OVERALL LENGTH
7'-0" OVERALL WIDTH
TO BE REMOVED BY CONTRACTOR

BRIDGE REMOVAL NOTES:

1. USE MECHANICAL METHODS (UNBOLTING, MECHANICAL SHEARING) TO DISMANTLE PAINTED STEEL STRUCTURAL COMPONENTS.
2. TORCH CUTTING, WELDING, BURNING, OR GRINDING ON STRUCTURE REQUIRES LEAD ABATEMENT AS COVERED UNDER ITEM 5115.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

EXIST. CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON) 80' EAST OF TOBIN PL.



REMOVAL SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6003	EXCAVATION (SPECIAL)	CY	1.2
496	6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	EA	1
542	6001	REMOVE METAL BEAM GUARD FENCE	LF	204
542	6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	4
550	6003	CHAIN LINK FENCE (REMOVE)	LF	22
5115	6002	LEAD PAINT REMOVAL	LF	21

LEGEND

- EXISTING STREET LUMINAIRE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING POWER POLE
- EXISTING SIGN
- REMOVE EXISTING CONCRETE SIDEWALK
- REMOVE EXISTING CONCRETE CURB AND GUTTER
- REMOVE EXISTING LANDSCAPING
- REMOVE EXISTING CONCRETE MEDIAN
- REMOVE EXISTING BRIDGE STRUCTURE
- REMOVE EXISTING CHAINLINK FENCE
- REMOVE EXISTING GUARDRAIL
- EXISTING CHAINLINK FENCE

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TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT TOBIN PLACE

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	ELP	ELP,ETC.	
CHECK MP	CONTROL	SECTION	JOB	53
CHECK AR PC	0001	04	102,ETC.	

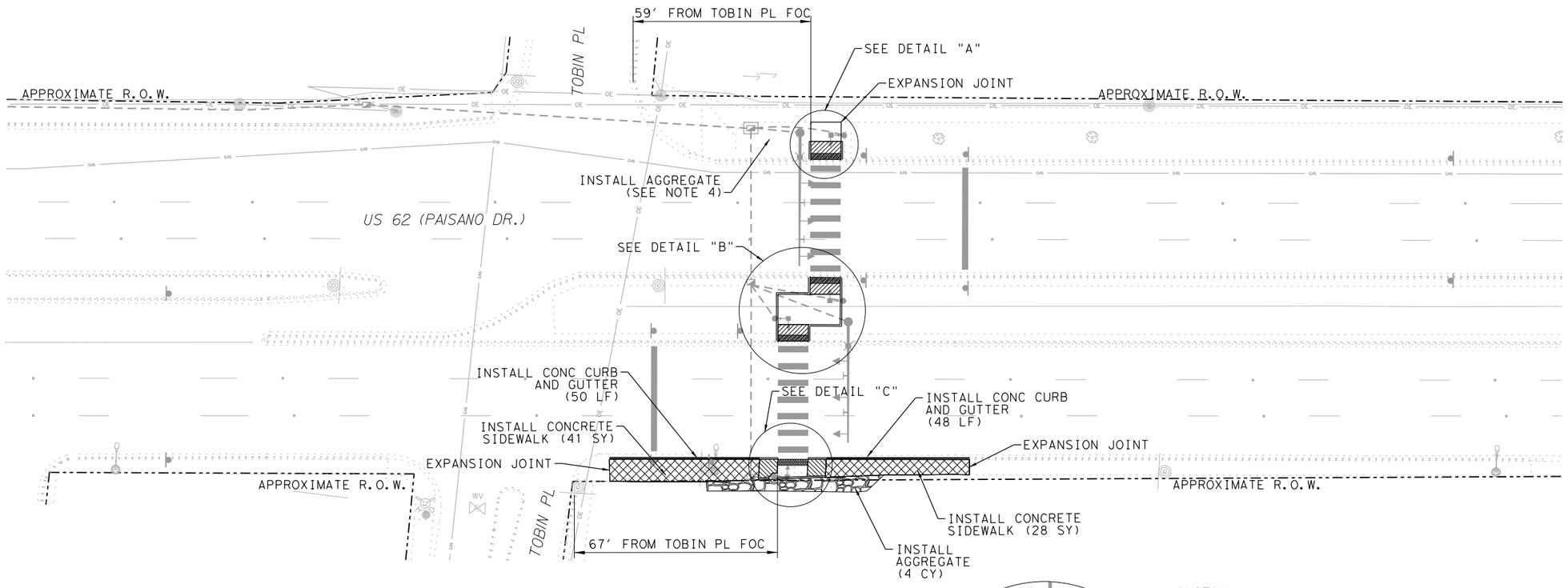
MATCHLINE B-A

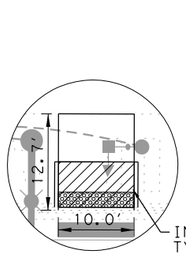
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.2B_TOBIN_EXISTING.dgn
$$$SCALE$$$
BY: $USER$

PEDESTRIAN RAMP / SIDEWALK SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
531	6005	CURB RAMPS (TY 2)	EA	1
531	6010	CURB RAMPS (TY 7)	EA	3

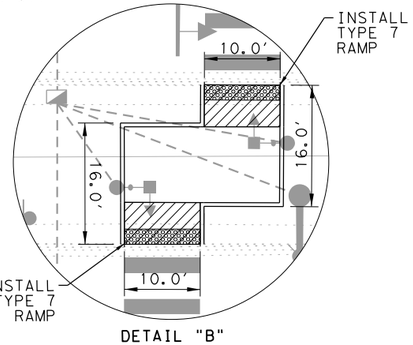
ROADWAY SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
529	6008	CONC CURB & GUTTER (TY II)	LF	98
531	6002	CONC SIDEWALKS (5")	SY	69
1005	6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY	4

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

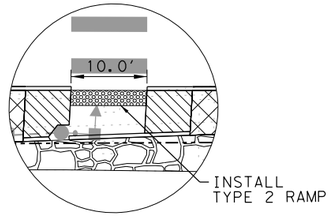




DETAIL "A"
1"=20'



DETAIL "B"
1"=20'



DETAIL "C"
1"=20'

NOTES:

1. INSTALLATION AND PAVEMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL, AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE.
4. BACKFILL BRIDGE REMOVAL WITH LOOSE AGGREGATE MATCHIN EXISTING LANDSCAPING. SEE GENERAL NOTES FOR MORE INFORMATION.

LEGEND

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- INSTALL CONCRETE SIDEWALK
- INSTALL AGGREGATE
- INSTALL CONCRETE CURB AND GUTTER

3/29/2024
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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RAMP LAYOUT

US 62 AT TOBIN PLACE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	54
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw:/kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.3_TOBIN_RAMP.dgn

NOTES:

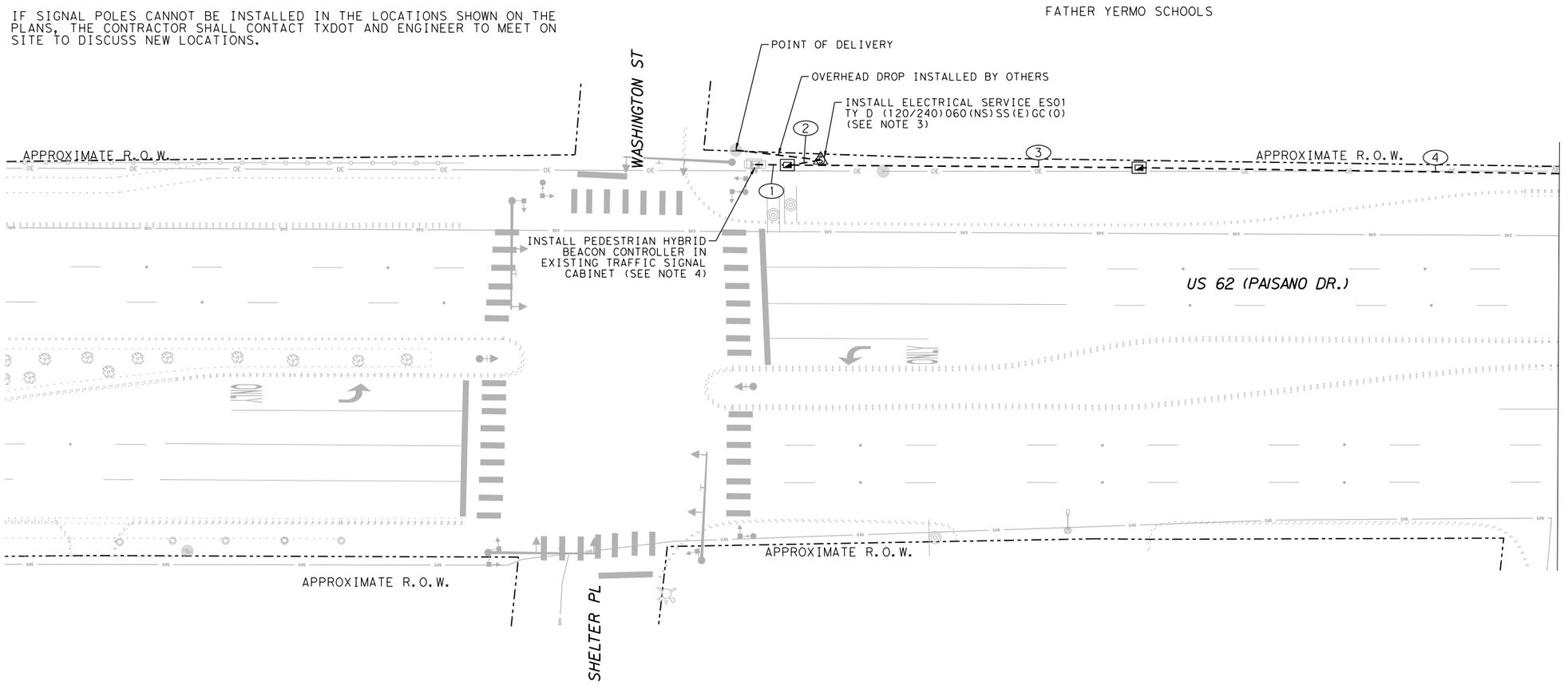
1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.

3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (ADOLFO DEL REAL 915-351-4238) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.

4. EXISTING TRAFFIC SIGNAL CONTROLLER TO REMAIN AT US 62 AND WASHINGTON STREET. INSTALL PEDESTRIAN HYBRID BEACON CONTROLLER INSIDE EXISTING TRAFFIC SIGNAL CABINET TO SERVE THE PEDESTRIAN HYBRID BEACON 530 FT EAST OF US 62 AND WASHINGTON STREET.

5. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.



PROPOSED CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON)
80' EAST OF TOBIN PL

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- (S) PROPOSED ELECTRICAL SERVICE

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

US 62 AT
TOBIN PLACE

SHEET 1 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	55
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.4_TOBIN_LAYOUT.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
4. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.
5. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.

PROPOSED SIGNALS

LED COUNTDOWN PEDESTRIAN SIGNAL

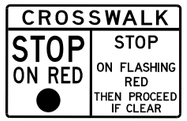
SH 1, 5, 6, 10

PEDESTRIAN HYBRID BEACON

SH 2, 3, 4, 7, 8, 9

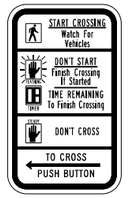
PROPOSED SIGNS

R10-23(MOD)



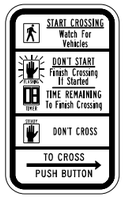
S2 S3 S6 S7

R10-3EL

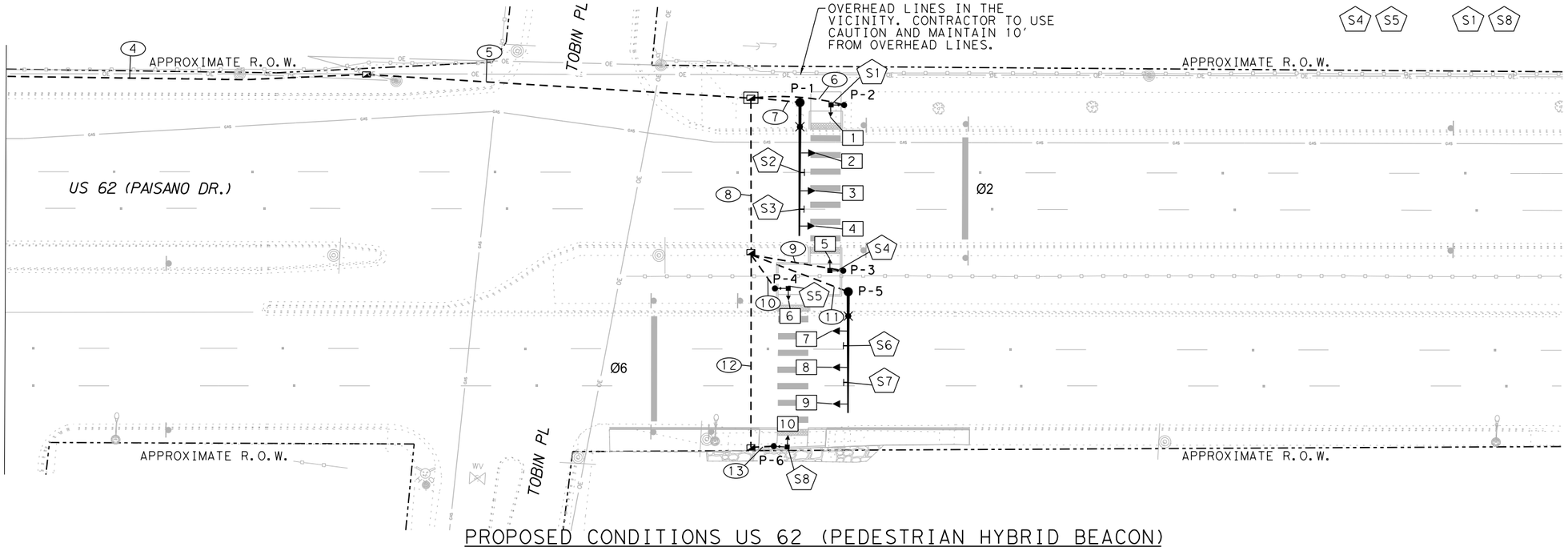


S4 S5

R10-3ER



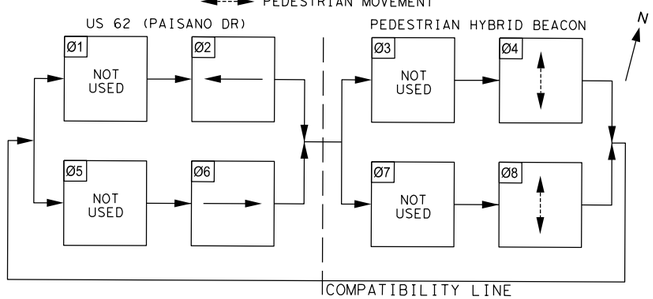
S1 S8

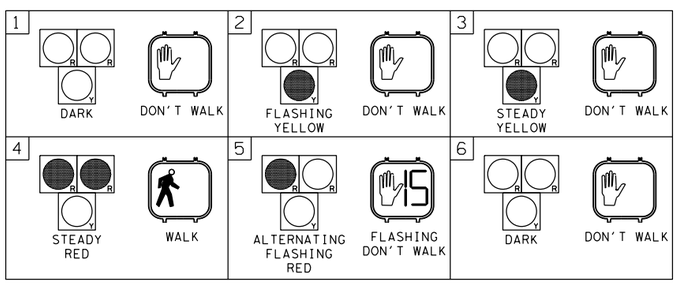


PROPOSED CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON) 80' EAST OF TOBIN PL

PHASE SEQUENCE

COMPATIBLE PHASES
PEDESTRIAN MOVEMENT





SEQUENCE FOR A PEDESTRIAN HYBRID BEACON SIGNAL

0 10 20 40
ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE (250W E.Q.), AND SIGNAGE
- PROPOSED PEDESTRIAN POLE WITH PEDESTRIAN SIGNAL AND PUSH BUTTON
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- PROPOSED TYPE B GROUND BOX
- PROPOSED TYPE B GROUND BOX W APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

US 62 AT TOBIN PLACE

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	56
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.5_TOBIN_LAYOUT.dgn

SIGNAL LAYOUT SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26
618	6023	CONDT (PVC) (SCH 40) (2")	LF	445
618	6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	180
618	6029	CONDT (PVC) (SCH 40) (3")	LF	540
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	245
620	6008	ELEC CONDR (NO.8) INSULATED	LF	1,290
620	6010	ELEC CONDR (NO.6) INSULATED	LF	1,410
624	6003	GROUND BOX TY B (122322)	EA	3
624	6004	GROUND BOX TY B (122322)W/APRON	EA	3
628	6142	ELC SRV TY D 120/240 060(NS)SS(E)GC(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
	*	SIGN, R10-23(MOD) (30"x 42")	EA	4
	*	ATC CONTROLLER IN EXISTING TRAFFIC SIGNAL CABINET	EA	1
	*	CAT6 ETHERNET CABLE	EA	1
682	6003	VEH SIG SEC (12")LED(YEL)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	12
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	6
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	2,445
684	6038	TRF SIG CBL (TY A)(14 AWG)(12 CONDR)	LF	1,275
684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	2,413
686	6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA	1
686	6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA	1

* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)".

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION					PED SIG SEC (LED) (COUNTDOWN)
	SIGNAL HEAD TYPE	STATUS	BACK PLATE (SPECIAL)	LED SIGNAL LAMPS		
			3 SEC	Y	R	
			EA	EA	EA	EA
1	PED	I				1
2	PHB	I	1	1	2	
3	PHB	I	1	1	2	
4	PHB	I	1	1	2	
5	PED	I				1
6	PED	I				1
7	PHB	I	1	1	2	
8	PHB	I	1	1	2	
9	PHB	I	1	1	2	
10	PED	I				1
TOTAL (NEW)			6	6	12	4

STATUS: I=INSTALL

CONDUCTOR FROM POLE BASE TO SIGNAL HEAD

POLE NO.	VEHICLE SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (12 CONDR)
P-1	2	40
	3	15
	4	15
P-5	7	35
	8	15
	9	15
TOTAL (FT)		135

ADA QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4
687	6001	PED POLE ASSEMBLY	EA	4
688	6001	PED DETECT PUSH BUTTON (APS)	EA	4
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3EL)	EA	2
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3ER)	EA	2
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1

** SUBSIDIARY TO ITEM 688

CONDUCTOR FROM POLE BASE TO LUMINAIRE

POLE NO.	NO. 8 XHHW WIRE
P-1	80
P-5	80
TOTAL (FT)	160

ES01 - CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT								CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 TRAFFIC SIGNAL CABLES						TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		3" PVC (BORED)			NO. 6 XHHW INSULATED (GROUND)		NO. 8 XHHW WIRE (POWER)		TY C 2 CNDR NO. 12		TY A 5 CNDR NO. 14		TY A 12 CNDR NO. 14			
		Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	I					1	15			I	1	15			4	60	4	60	2	30	15	1
2	I	1	15							I	1	15	2	30							15	2
3	I	1	115							I	1	115	2	230							115	3
	I					1	115			I	1	115			4	460	4	460	2	230	115	
4	I	1	260							I	1	260	2	520							260	4
	I					1	260			I	1	260			4	1040	4	1040	2	520	260	
5	I			1	125					I	1	125	2	250							125	5
	I							1	125	I	1	125			4	500	4	500	2	250	125	
6	I					1	35			I	1	35			1	35	1	35			35	6
7	I	1	20							I	1	20	4	80							20	7
	I					1	20			I	1	20							1	20	20	
8	I			1	55					I	1	55	2	110							55	8
	I							1	55	I	1	55			3	165	3	165	1	55	55	
9	I					1	35			I	1	35			1	35	1	35			35	9
10	I					1	15			I	1	15			1	15	1	15			15	10
11	I	1	35							I	1	35	2	70							35	11
	I					1	35			I	1	35							1	35	35	
12	I							1	65	I	1	65			1	65	1	65			65	12
13	I					1	10			I	1	10			1	10	1	10			10	13
TOTAL			445		180		540		245			1410		1290		2385		2385		1140		

CONDUCTOR FROM POLE BASE TO PEDESTRIAN PUSH BUTTON

POLE NO.	PED PUSH BUTTON NO.	TRF SIG CBL (12 AWG) (2 CONDR)
P-2	PB1	7
P-3	PB2	7
P-4	PB3	7
P-6	PB4	7
TOTAL (FT)		28

CONDUCTOR FROM POLE BASE TO PEDESTRIAN SIGNAL HEAD

POLE NO.	PED SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (5 CONDR)
P-2	1	15
P-3	5	15
P-4	6	15
P-6	10	15
TOTAL (FT)		60

4/2/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

US 62 AT
TOBIN PLACE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	57
CHECK DL	CONTROL	SECTION	JOB	
	0001	04	102,ETC.	

PLOTTED: 4/2/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.6_TOBIN_TABLES.dgn

SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-3ER	PED PUSH BUTTON	I	**	P-2	9"x 15"
S2	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-1	30"x 42"
S3	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-1	30"x 42"
S4	R10-3EL	PED PUSH BUTTON	I	**	P-3	9"x 15"
S5	R10-3EL	PED PUSH BUTTON	I	**	P-4	9"x 15"
S6	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-5	30"x 42"
S7	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-5	30"x 42"
S8	R10-3ER	PED PUSH BUTTON	I	**	P-6	9"x 15"

STATUS: I=INSTALL

* SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO 680)

** SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO 688)

APS MESSAGE CHART

POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-2	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS WESTBOUND PAISANO DRIVE.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-3	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS WESTBOUND PAISANO DRIVE AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-4	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS EASTBOUND PAISANO DRIVE AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-6	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS EASTBOUND PAISANO DRIVE.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.

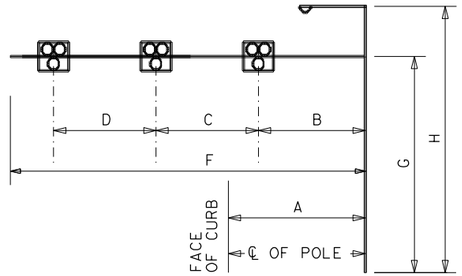
* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	F (FT)	G (FT)	H (FT)	NO. OF HEADS (EA)*	LUM	DRILLED SHAFT LENGTH (FT) 24" DIA SUB TO ITEM 687	DRILLED SHAFT LENGTH (FT) 36" DIA TYPE A ITEM 416	FDN. TYPE WIND ZONE (80 MPH)
P-1	I	9.0	16.6	12.5	11.6	44	19	30	3	YES	-	13	36-A
P-2	I	8.4	PEDESTRIAN SIGNAL POLE				10	-			6	-	24-A
P-3	I	8.4	PEDESTRIAN SIGNAL POLE				10	-			6	-	24-A
P-4	I	7.9	PEDESTRIAN SIGNAL POLE				10	-			6	-	24-A
P-5	I	6.7	12.9	12	12.1	40	19	30	3	YES	-	13	36-A
P-6	I	6.1	PEDESTRIAN SIGNAL POLE				10	-			6	-	24-A
									TOTAL:		24	26	

SIGNAL POLE STATUS: I=INSTALL

* - DOES NOT INCLUDE SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS



ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	LATITUDE	LONGITUDE	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
US 62 AT WASHINGTON ST	TY D (120/240) 060 (NS) SS (E) GC (O) US 62 (PAISANO DR) AT WASHINGTON ST	31.767722°	106.440583°	2"	3 / #4	N/A	2P / 60	30	100	PEDESTRIAN HYBRID BEACON LIGHTING	1P / 30 2P / 20	23 2	<3.3

** VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS.

ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

US 62 AT
TOBIN PLACE

SHEET 4 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP, ETC.	58
CHECK DL	CONTROL 0001	SECTION 04	JOB 102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_102.7_TOBIN_TABLES.dgn

PROPOSED SIGNS

R10-6L — STOP HERE ON RED (24"X36") — S3, S10

R10-6R — STOP HERE ON RED (24"X36") — S4, S8

W11-2 (18"X18") W16-7PR (24"X12") — S5, S7

W11-2 (18"X18") W16-7PL (24"X12") — S6, S9

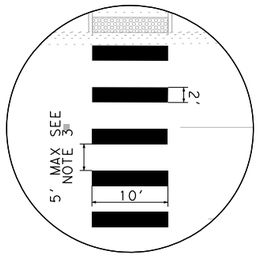
W11-2 (18"X18") W16-9P (24"X12") — AHEAD — S1, S2, S11, S12

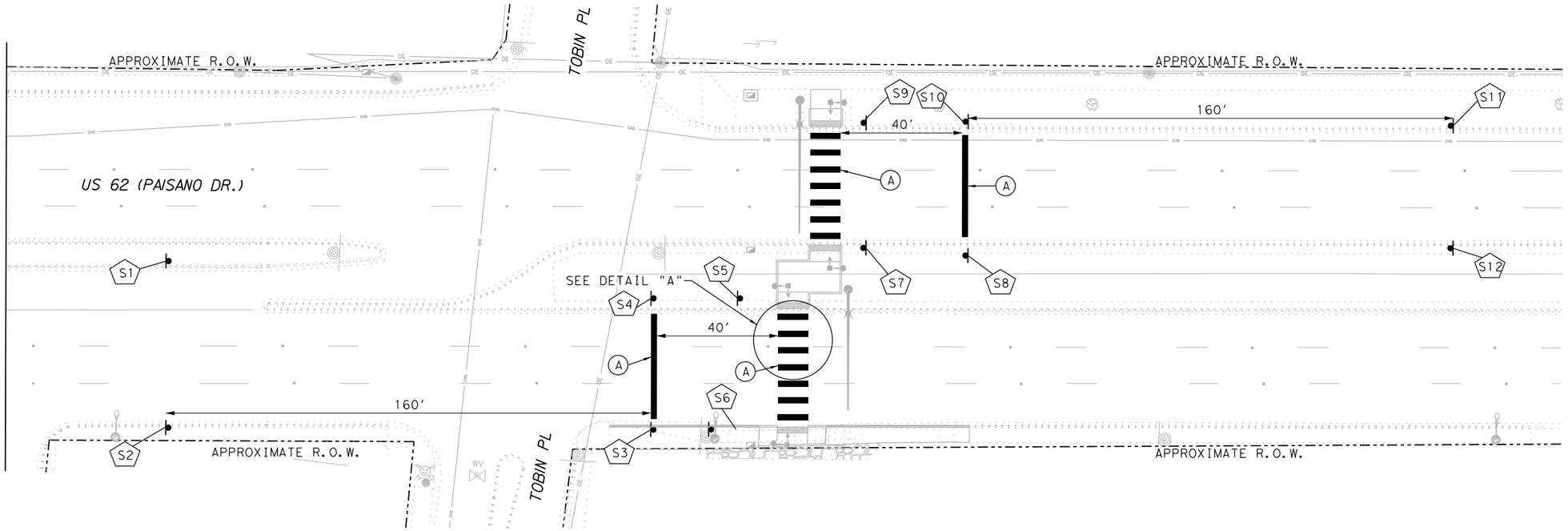
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND
PAVEMENT MARKING

- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)
- EXISTING SIGN
- PROPOSED SIGN
- (S1) SIGN LABEL

DETAIL "A"
1"=20'





NOTES:

1. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE.
2. ALL EXISTING SIGNS AND PAVEMENT MARKING TO REMAIN UNLESS OTHERWISE NOTED.
3. LONGITUDINAL CROSSWALK LINES SHOULD NOT BE PLACED IN THE WHEEL PATH OF VEHICLES. CENTER THE CROSSWALK LINES ON TRAVEL LANES AND LANE LINES.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	210
666	6230	PAVEMENT SEALER 24"	LF	210
678	6008	PAV SURF PREP FOR MRK (24")	LF	210

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SIGNING AND PAVEMENT MARKING LAYOUT

US 62 AT
TOBIN PLACE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	59
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

NOTES:

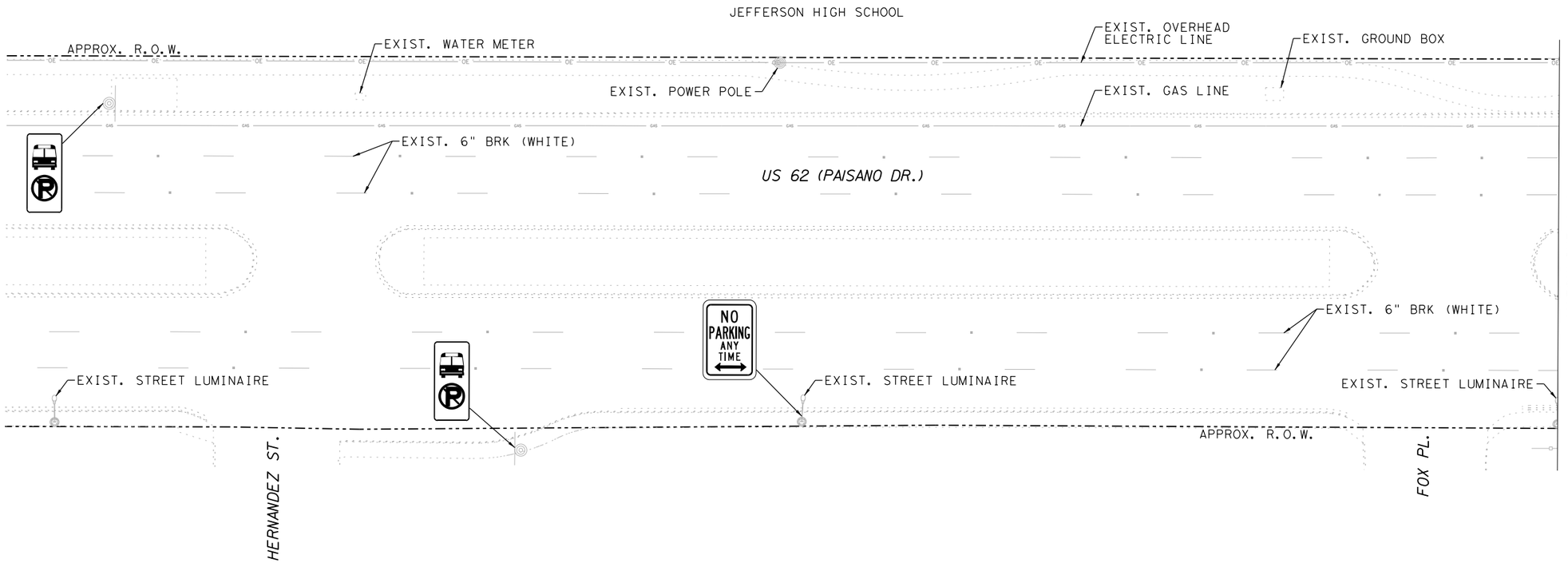
1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET LUMINAIRE
- EXISTING SIGN
- EXISTING POWER POLE

EXIST. CONDITIONS US 62 (SCHOOL FLASHERS)
100' WEST OF FOX PL. & 55' WEST OF HERNANDEZ ST.



STATE OF TEXAS
MANUEL A. PALMA
127497
LICENSED
PROFESSIONAL ENGINEER
3/29/2024

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TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS
AND REMOVALS

US 62 AT
FRANCIS STREET

SHEET 1 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP, ETC.	60
CHECK FC	CONTROL 0001	SECTION 04	JOB 102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.1_FRANCIS_EXISTING_KH.dgn
$$$SCALE$$$
BY: $USER$

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

EXISTING BRIDGE STRUCTURE

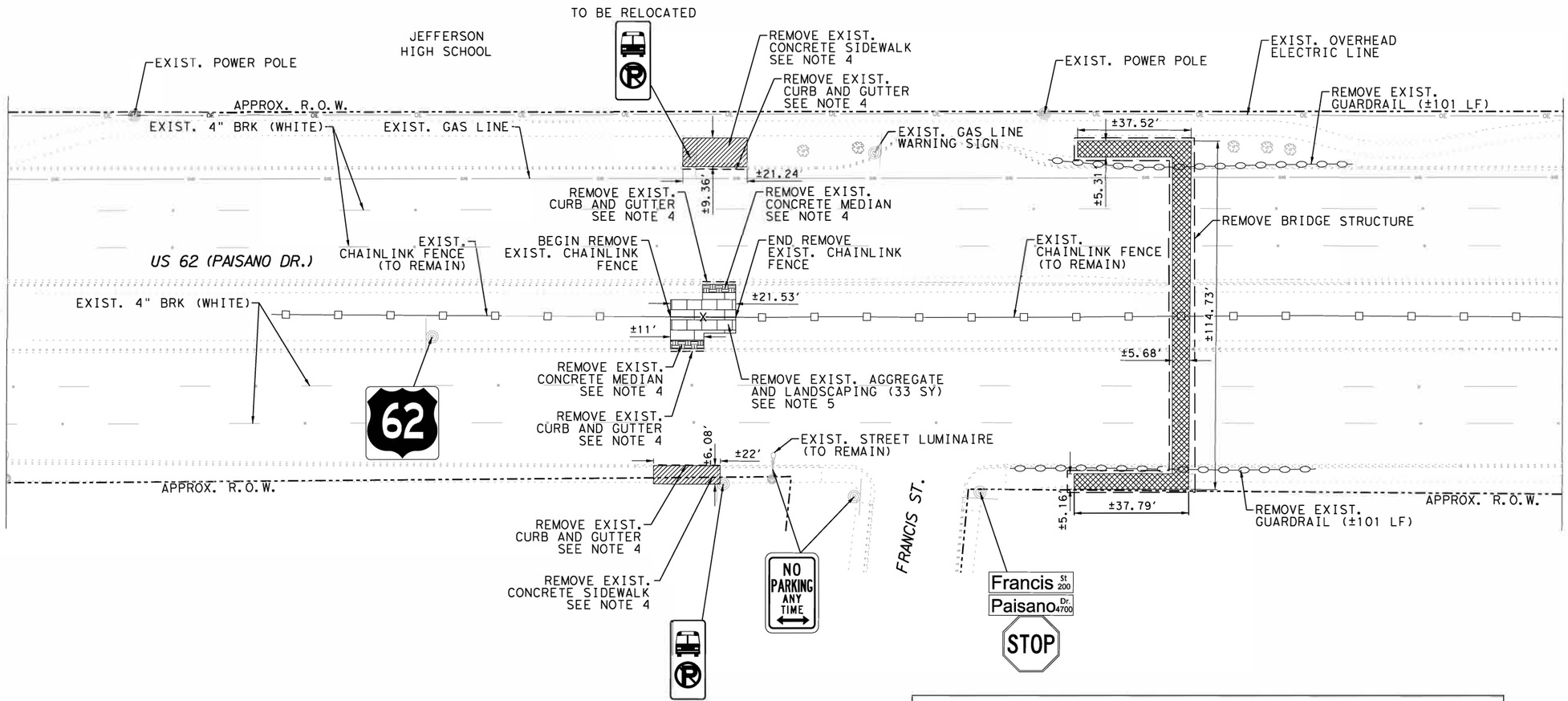
STEEL DIAMOND PLATE DECK
STEEL DIAMOND PLATE STEPS
STEEL I-BEAM BRIDGE
CHAINLINK FENCE ENCLOSURE
CONCRETE FOUNDATIONS
190'-0" OVERALL LENGTH
7'-0" OVERALL WIDTH
TO BE REMOVED BY CONTRACTOR

BRIDGE REMOVAL NOTES:

1. USE MECHANICAL METHODS (UNBOLTING, MECHANICAL SHEARING) TO DISMANTLE PAINTED STEEL STRUCTURAL COMPONENTS.
2. TORCH CUTTING, WELDING, BURNING, OR GRINDING ON STRUCTURE REQUIRES LEAD ABATEMENT AS COVERED UNDER ITEM 5115.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

EXIST. CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON & INTERMEDIATE SCHOOL FLASHERS) 70' WEST OF FRANCIS ST.



REMOVAL SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6003	EXCAVATION (SPECIAL)	CY	1.2
496	6010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	EA	1
542	6001	REMOVE METAL BEAM GUARD FENCE	LF	202
542	6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	4
550	6003	CHAIN LINK FENCE (REMOVE)	LF	22
5115	6002	LEAD PAINT REMOVAL	LF	18

LEGEND

- EXISTING STREET LUMINAIRE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING VEGETATION
- REMOVE EXISTING CONCRETE SIDEWALK
- REMOVE EXISTING CONCRETE CURB AND GUTTER
- REMOVE EXISTING LANDSCAPING
- REMOVE EXISTING CONCRETE MEDIAN
- REMOVE EXISTING BRIDGE STRUCTURE
- REMOVE EXISTING CHAINLINK FENCE
- REMOVE EXISTING GUARDRAIL
- EXISTING CHAINLINK FENCE

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TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT FRANCIS STREET

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP, ETC.	61
CHECK AB	CONTROL 0001	SECTION 04	JOB 102, ETC.	

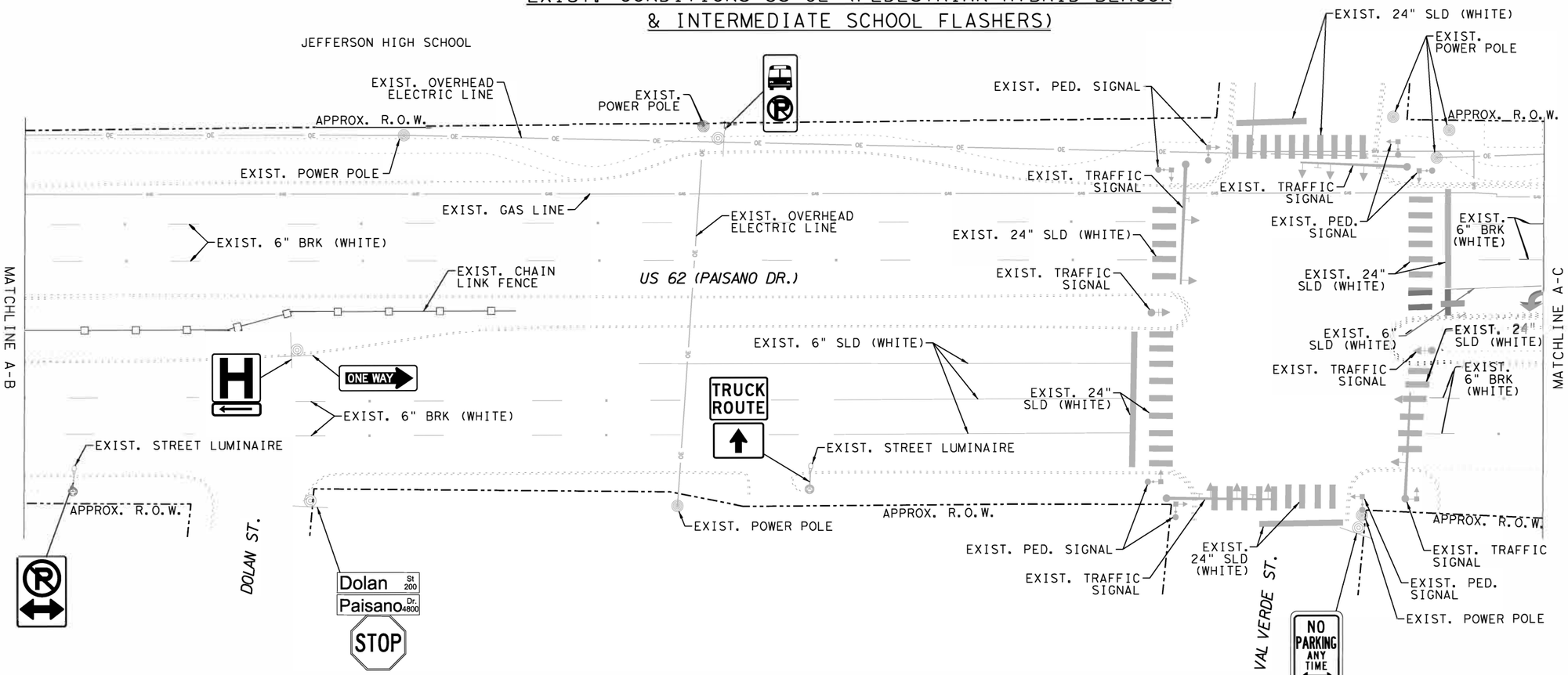
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8, Traffic/102_TRF_SGNL_103.1_FRANCIS_EXISTING.dgn
BY: $USER$
$$$SCALE$$$

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

EXIST. CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON & INTERMEDIATE SCHOOL FLASHERS)



LEGEND

- EXISTING TRAFFIC SIGNAL
- EXISTING PED. SIGNAL
- EXISTING STREET LUMINAIRE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING CHAINLINK FENCE

STATE OF TEXAS
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TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT FRANCIS STREET

SHEET 3 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP, ETC.	62
CHECK FC	CONTROL 0001	SECTION 04	JOB 102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.2_FRANCIS_EXISTING
BY: $USER$
$$SCALE$$

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
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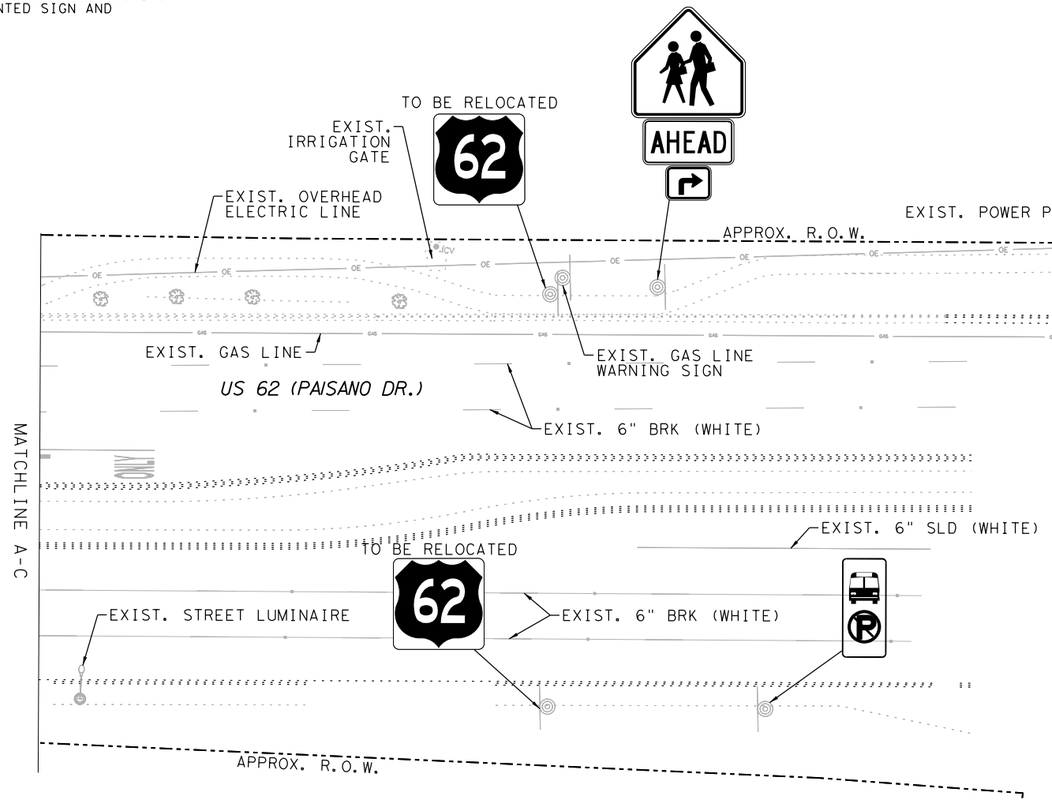
4. CURB RAMP, CURB AND GUTTER, MEDIAN, AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
5. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
6. ALL GROUND-MOUNTED SIGNS TO REMAIN UNLESS OTHERWISE NOTED. SEE SIGNING AND PAVEMENT MARKING LAYOUT FOR EXISTING GROUND MOUNTED SIGN AND ASSEMBLY RELOCATION QUANTITIES.



EXIST. CONDITIONS US 62 (WB SCHOOL FLASHER)
200' EAST OF VAL VERDE ST.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING TRAFFIC SIGNAL
- EXISTING PED. SIGNAL
- EXISTING STREET LUMINAIRE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING VEGETATION

STATE OF TEXAS
MANUEL A. PALMA
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TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

US 62 AT FRANCIS STREET

SHEET 4 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AR	TEXAS	ELP	ELP, ETC.	63
CHECK	CONTROL	SECTION	JOB	
MP	0001	04	102, ETC.	
CHECK				
FC				

PLOTTED: 3/29/2024
FILENAME: pw://knt-pw.bentley.com:knt-pw-01/Documents/01 Active Projects/TX-RGH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.1_FRANCIS_EXISTING_KH.dgn
$$$SCALE$$$
BY: $USER$

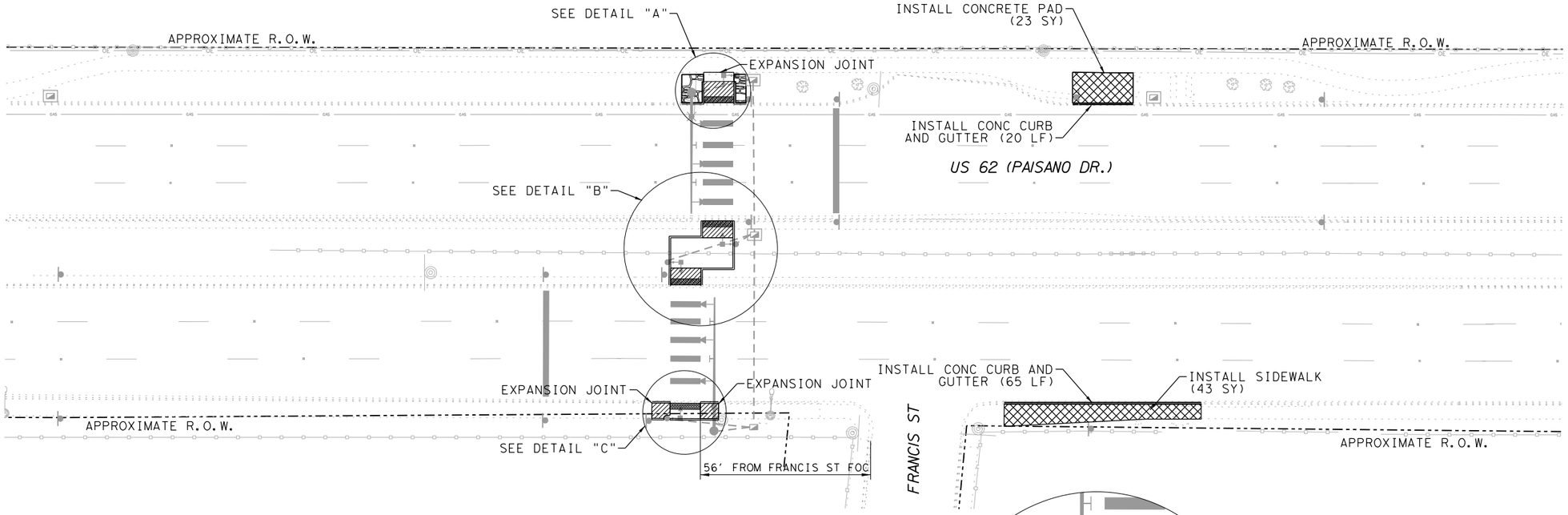
MEDIAN / ROADWAY SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
529	6008	CONC CURB & GUTTER (TY II)	LF	100
531	6002	CONC SIDEWALKS (5")	SY	66
1005	6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY	2

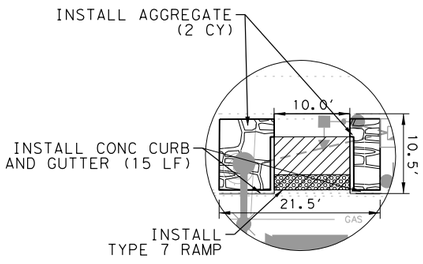
PEDESTRIAN RAMP / SIDEWALK SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
531	6005	CURB RAMPS (TY 2)	EA	1
531	6010	CURB RAMPS (TY 7)	EA	3

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

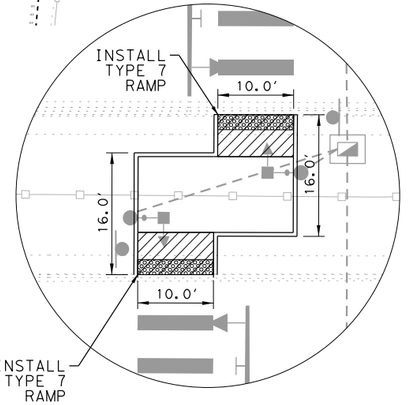
LEGEND

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- INSTALL CONCRETE SIDEWALK
- INSTALL CONCRETE CURB & GUTTER
- INSTALL AGGREGATE

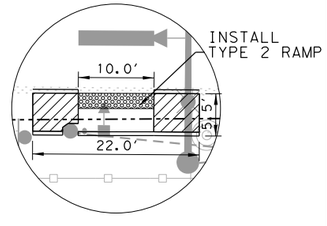




DETAIL "A"
1"=20'



DETAIL "B"
1"=20'



DETAIL "C"
1"=20'

NOTES:

1. INSTALLATION AND PAVEMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL, AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE.
4. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTIION OF ANY DAMAGED IRRIGATION EQUIPMENT.

3/29/2024
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CARLYE L. LIDE
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Carlye Lide

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RAMP LAYOUT

US 62 AT FRANCIS STREET

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP, ETC.	64
	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.3_FRANCIS_RAMP.dgn

NOTES:

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2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS A DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (RAPHAEL ZARAGOZA 915-412-5505) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. SEE SCHOOL FLASHER DETAIL SHEET FOR MORE INFORMATION.

PROPOSED SIGNS

S5-1

(24"x 48") S1 S4

S7-1T

(36"x 18") S2 S5

S6-1T

(84"x 36") S3 S6

PROPOSED SIGNAL

H-1

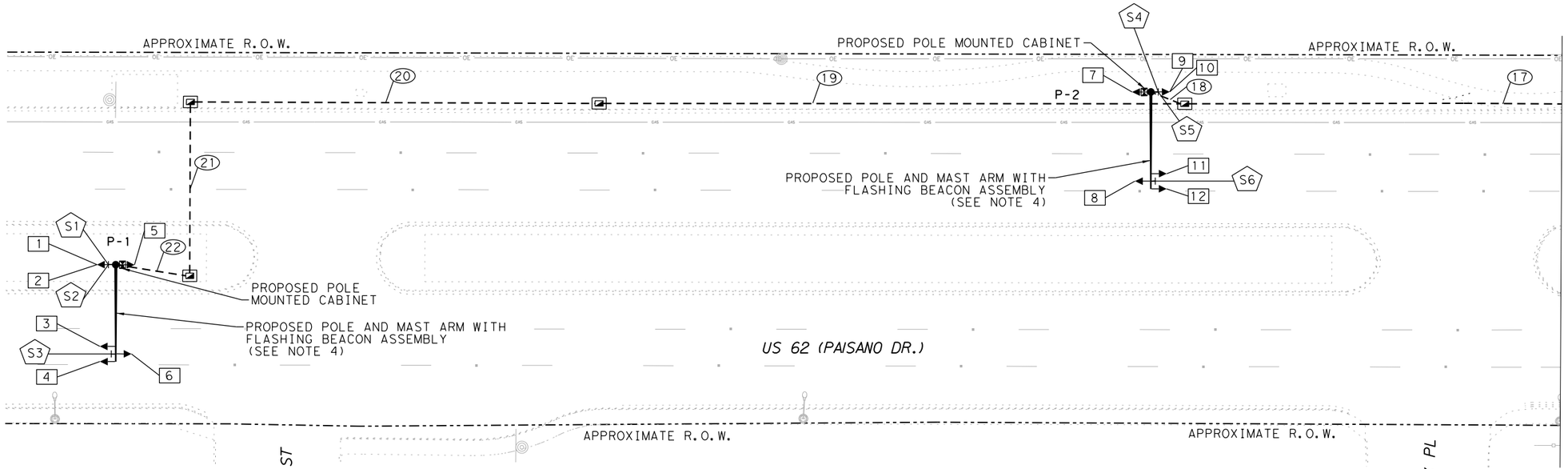
SH
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH SCHOOL ZONE FLASHER AND SIGNAGE
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED POLE MOUNTED CABINET
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- (S1) SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

JEFFERSON HIGH SCHOOL



PROPOSED CONDITIONS US 62 (INTERMEDIATE SCHOOL FLASHERS)
55' WEST OF HERNANDEZ ST & 100' WEST OF FOX PL

3/29/2024

STATE OF TEXAS
CARLYE L. LIDE
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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

US 62 AT
FRANCIS STREET

SHEET 1 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS / CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK / MK	TEXAS	ELP	ELP, ETC.	65
	CONTROL	SECTION	JOB	
CHECK / DL	0001	04	102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.9A_PAISANO_SCHOOL_FLASHER.dgn

NOTES:

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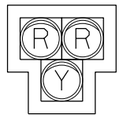
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, RADAR DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. EXISTING FOUNDATIONS AND GROUND BOXES SHALL BE REMOVED, AND SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING GROUND AND BACK FILLED WITH SIMILAR MATERIALS IN THE SURROUNDING AREA.
4. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.
5. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
6. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

PROPOSED SIGNALS

PEDESTRIAN HYBRID BEACON



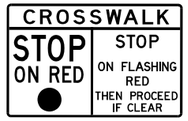
SH 14,15,16, 19,20,21

LED COUNTDOWN PEDESTRIAN SIGNAL

SH 13,17,18,22

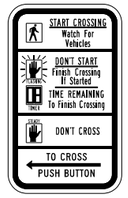
PROPOSED SIGNS

R10-23 (MOD)



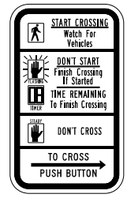
S8 S9 S12 S13

R10-3EL



S10 S11

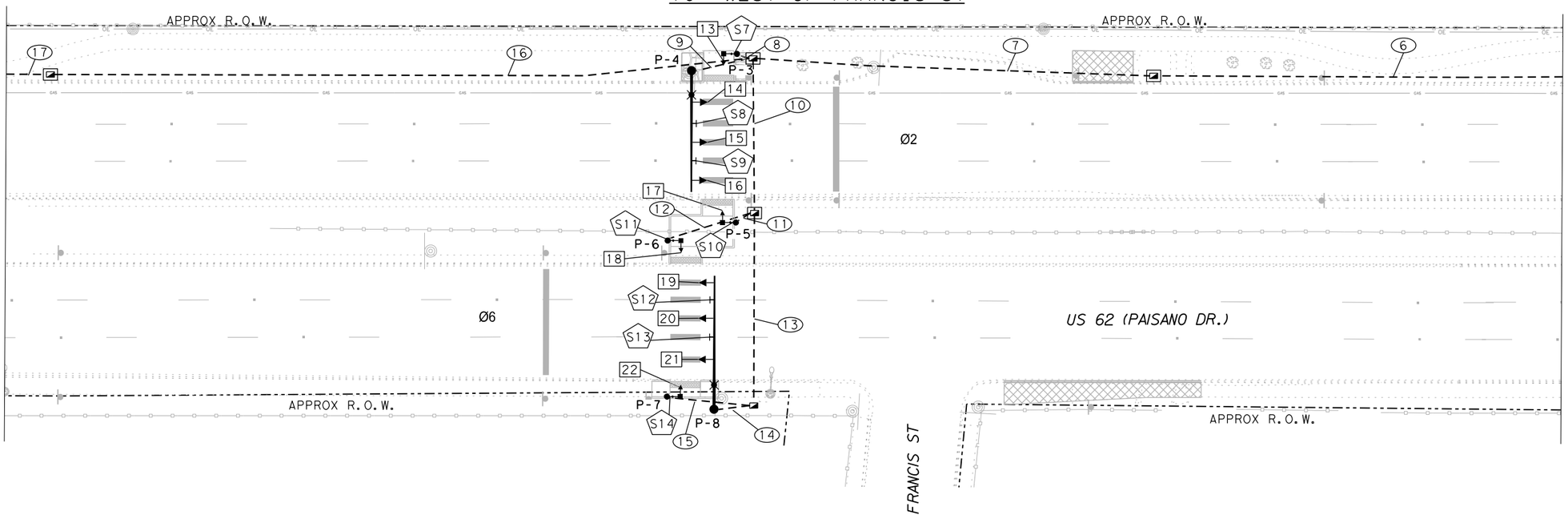
R10-3ER



S7 S14

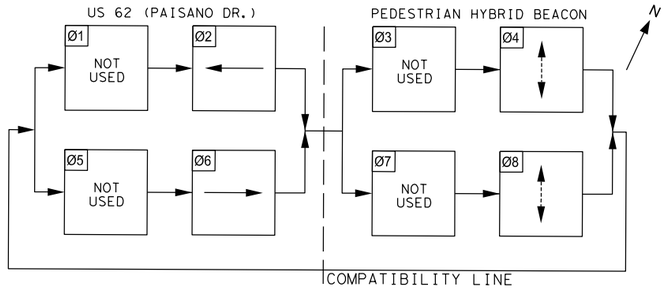
JEFFERSON HIGH SCHOOL

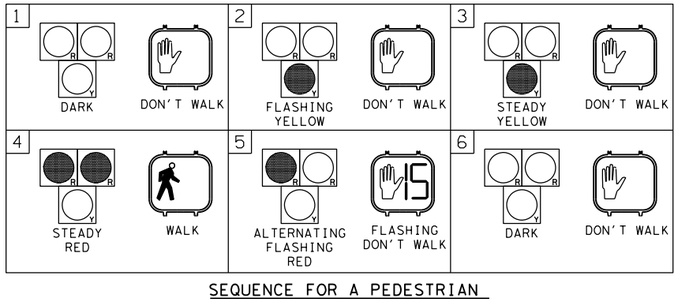
PROPOSED CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON & INTERMEDIATE SCHOOL FLASHERS) 70' WEST OF FRANCIS ST



PHASE SEQUENCE

COMPATIBLE PHASES
PEDESTRIAN MOVEMENT





SEQUENCE FOR A PEDESTRIAN HYBRID BEACON SIGNAL

0 10 20 40
ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE (250W E.Q.), AND SIGNAGE
- PROPOSED PEDESTRIAN POLE WITH PEDESTRIAN SIGNAL AND PUSH BUTTON
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- PROPOSED TYPE B GROUND BOX
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

3/29/2024

Carlye Lide

Kimley»Horn
F-928
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Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

US 62 AT FRANCIS STREET

SHEET 2 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	66
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.4_FRANCIS_LAYOUT.dgn

NOTES:

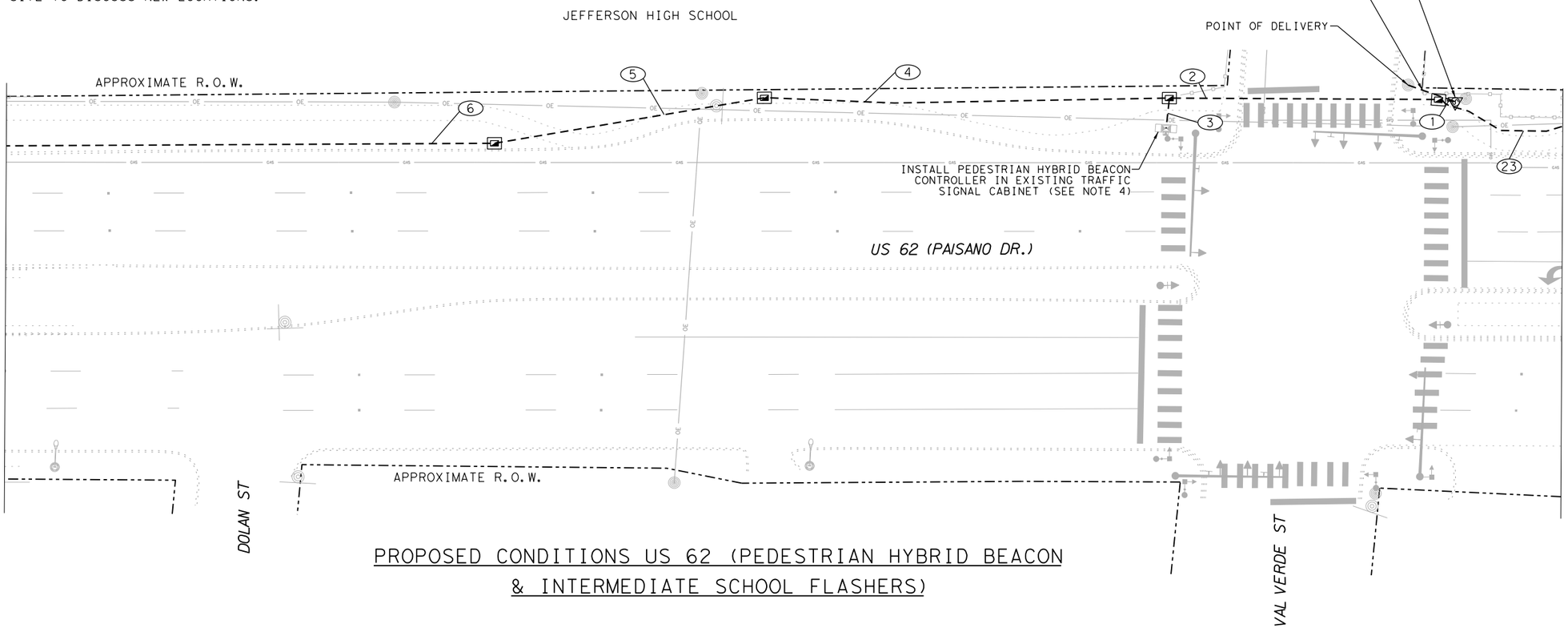
1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.

3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (KEVIN JAUREGUI 915-269-0025) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.

4. EXISTING TRAFFIC SIGNAL CABINET AND CONTROLLER AT US 62 AND VAL VERDE STREET TO REMAIN. INSTALL PEDESTRIAN HYBRID BEACON CONTROLLER INSIDE EXISTING TRAFFIC SIGNAL CABINET TO SERVE THE PEDESTRIAN HYBRID BEACON 675 FT WEST OF US 62 AND VAL VERDE STREET.

5. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.



PROPOSED CONDITIONS US 62 (PEDESTRIAN HYBRID BEACON & INTERMEDIATE SCHOOL FLASHERS)

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- (S) PROPOSED ELECTRICAL SERVICE

3/29/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

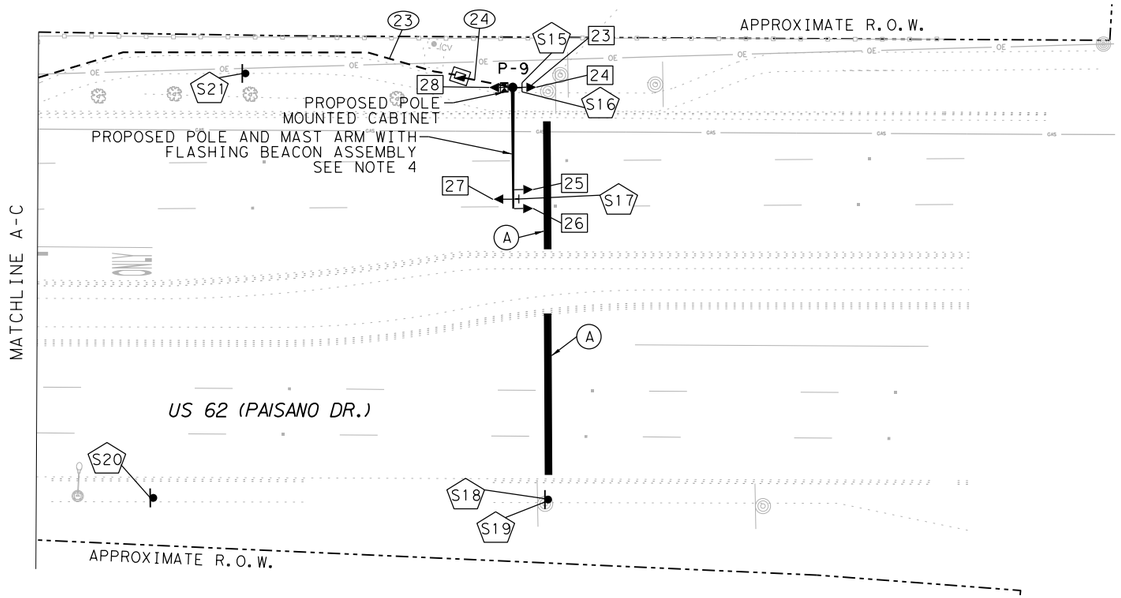
US 62 AT
FRANCIS STREET

SHEET 3 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	67
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.5_FRANCIS_LAYOUT.dgn

RELOCATED SIGNS



PROPOSED SIGNAL

H1

SH
23, 24, 25, 26, 27, 28

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH SCHOOL ZONE FLASHER AND SIGNAGE
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED POLE MOUNTED CABINET
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)

PROPOSED CONDITIONS US 62 (WB SCHOOL FLASHER) 200' EAST OF VAL VERDE ST

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS A DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (RAPHAEL ZARAGOZA 915-412-5505) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. SEE SCHOOL FLASHER DETAIL SHEET FOR MORE INFORMATION.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	LF	1
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	80
666	6230	PAVEMENT SEALER 24"	LF	80
678	6008	PAV SURF PREP FOR MRK (24")	LF	80

PROPOSED SIGNS

S5-1
SCHOOL
SPEED LIMIT 30 WHEN FLASHING
(24"x 48")
S15

S7-1T
CELL PHONE USE PROHIBITED UP TO $200 FINE
(36"x 18")
S16

S6-1T
SCHOOL
SPEED LIMIT 30 WHEN FLASHING
(84"x 36")
S17

R2-1
SPEED LIMIT 45
(24"x 30")
S19

S5-2
END SCHOOL ZONE
(24"x 30")
S18

3/29/2024
STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED PROFESSIONAL ENGINEER

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Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

US 62 AT
FRANCIS STREET

SHEET 4 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	68
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT								CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS						ITEM 684 TRAFFIC SIGNAL CABLES						TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		3" PVC (BORED)			NO. 6 XHHW INSULATED (POWER)		NO. 6 XHHW INSULATED (GROUND)		NO. 8 XHHW WIRE (POWER)		TY C 2 CNDR NO. 12		TY A 5 CNDR NO. 14		TY A 12 CNDR NO. 14			
		Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	I	1	10							I	6	60	1	10	4	40							10	1
2	I			1	90					I	4	360	1	90	4	360							90	2
3	I					1	10			I			1	10			4	40	4	40	2	20	10	3
4	I	1	135							I	4	540	1	135	4	540							135	4
	I					1	135			I			1	135			4	540	4	540	2	270	135	
5	I			1	95					I	4	380	1	95	4	380							95	5
	I							1	95	I			1	95			4	380	4	380	2	190	95	
6	I	1	300							I	4	1200	1	300	4	1200							300	6
	I					1	300			I			1	300			4	1200	4	1200	2	600	300	
7	I			1	135					I	4	540	1	135	4	540							135	7
	I							1	135	I			1	135			4	540	4	540	2	270	135	
8	I					1	10			I			1	10			1	10	1	10			10	8
9	I	1	20							I			1	20	2	40							20	9
	I					1	20			I			1	20							1	20	20	
10	I			1	50					I			1	50	2	100							50	10
	I							1	50	I			1	50			3	150	3	150	1	50	50	
11	I					1	10			I			1	10			1	10	1	10			10	11
12	I					1	30			I			1	30			1	30	1	30			30	12
13	I			1	65					I			1	65	2	130							65	13
	I							1	65	I			1	65			1	65	1	65	1	65	65	
14	I	1	15							I			1	15	2	30							15	14
	I					1	15			I			1	15							1	15	15	
15	I					1	30			I			1	30			1	30	1	30			30	15
16	I	1	235							I	4	940	1	235									235	16
17	I			1	135					I	4	540	1	135									135	17
18	I	1	15							I	2	30	1	15									15	18
19	I	1	195							I	2	390	1	195									195	19
20	I	1	135							I	2	270	1	135									135	20
21	I			1	60					I	2	120	1	60									60	21
22	I	1	25							I	2	50	1	25									25	22
23	I	1	160							I	2	320	1	160									160	23
24	I	1	15							I	2	30	1	15									15	24
TOTAL			1260		630		560		345			5770		2795		3360		2995		2995		1500		TOTAL

CONDUIT STATUS: I=INSTALL

SIGNAL LAYOUT SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	33
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26
618	6023	CONDT (PVC) (SCH 40) (2")	LF	1,260
618	6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	630
618	6029	CONDT (PVC) (SCH 40) (3")	LF	560
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	345
620	6008	ELEC CONDR (NO.8) INSULATED	LF	3,520
620	6010	ELEC CONDR (NO.6) INSULATED	LF	8,565
624	6003	GROUND BOX TY B (122322)	EA	1
624	6004	GROUND BOX TY B (122322)W/APRON	EA	13
628	6142	ELC SRV TY D 120/240 060(NS)SS(E)GC(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	4
	**	SIGN, R10-23(MOD) (30"x 42")	EA	4
	**	ATC CONTROLLER IN EXISTING TRAFFIC SIGNAL CABINET	EA	1
	*	POLE MOUNTED CONTROL CABINET	EA	3
	*	SIGN, SCHOOL SPEED LIMIT 30 WHEN FLASHING (24"x48") (S5-1)	EA	3
	*	SIGN, CELL PHONE USE PROHIBITED (36"x18") (S7-1T)	EA	3
	*	SIGN, 'SCHOOL SPEED LIMIT 30 WHEN FLASHING (84"x36") (S6-1T)	EA	3
	*	SCHOOL FLASHER CONTROLLER	EA	3
	*	GPS CLOCK	EA	3
	*	CELLULAR MODEM	EA	3
682	6003	VEH SIG SEC (12")LED(YEL)	EA	24
682	6005	VEH SIG SEC (12")LED(RED)	EA	12
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	6
684	6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	3,055
684	6017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	1,630
684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	3,023
686	6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	3
686	6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA	1
686	6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA	1

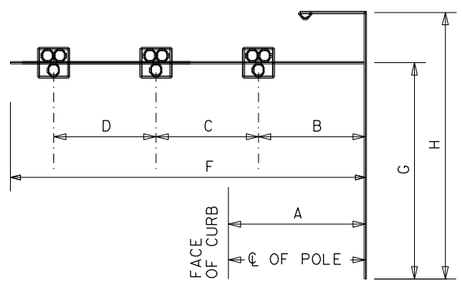
* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)" FOR SCHOOL FLASHER.
** SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)" FOR PEDESTRIAN HYBRID BEACON.

SIGNAL HEAD AND POLE PLACEMENT (FT)

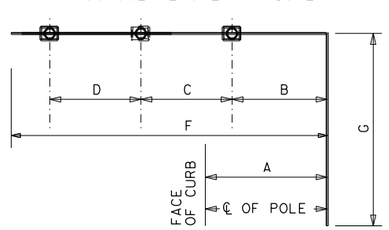
POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)	NO. OF HEADS (EA)*	LUM	DRILLED SHAFT LENGTH (FT)			FDN. TYPE WIND ZONE (80 MPH)
												24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 416	36" DIA TYPE A ITEM 416	
***P-1	I	6.0	27	2.5	2.5		32	19	-	3	NO	-	11	-	30-A
***P-2	I	6.0	27	2.5	2.5		32	19	-	3	NO	-	11		30-A
**P-3	I	9.7	PEDESTRIAN SIGNAL POLE					10	-	-	NO	6	-	-	24-A
**P-4	I	4.4	10.8	12.8	12.1	-	40	19	30	3	YES	-	-	13	36-A
**P-5	I	5.8	PEDESTRIAN SIGNAL POLE					10	-	-	NO	6	-	-	24-A
**P-6	I	5.4	PEDESTRIAN SIGNAL POLE					10	-	-	NO	6	-	-	24-A
**P-7	I	4.4	PEDESTRIAN SIGNAL POLE					10	-	-	NO	6	-	-	24-A
**P-8	I	9.03	16.2	13.2	11.8	-	44	19	30	3	YES	-	-	13	36-A
***P-9	I	6.0	27	2.5	2.5		32	19	-	3	NO	-	11	-	30-A
										TOTAL:		24	33	26	

SIGNAL POLE STATUS: I=INSTALL
* - DOES NOT INCLUDE SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS
** - REFERS TO PEDESTRIAN HYBRID BEACON TYPICAL
*** - REFERS TO SCHOOL FLASHER TYPICAL

PEDESTRIAN HYBRID BEACON TYPICAL



SCHOOL FLASHER TYPICAL



3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

US 62 AT
FRANCIS STREET

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	69
	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.6_FRANCIS_TABLES.dgn

SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	S5-1	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-1	24"x48"
S2	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-1	36"x18"
S3	S6-1T	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-1	84"x36"
S4	S5-1	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-2	24"x48"
S5	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-2	36"x18"
S6	S6-1T	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-2	84"x36"
S7	R10-3ER	PED PUSH BUTTON	I	**	P-3	9"x 15"
S8	R10-23	CROSSWALK STOP ON RED	I	*	P-4	30"x 42"
S9	R10-23	CROSSWALK STOP ON RED	I	*	P-4	30"x 42"
S10	R10-3EL	PED PUSH BUTTON	I	**	P-5	9"x 15"
S11	R10-3EL	PED PUSH BUTTON	I	**	P-6	9"x 15"
S12	R10-23	CROSSWALK STOP ON RED	I	*	P-8	30"x 42"
S13	R10-23	CROSSWALK STOP ON RED	I	*	P-8	30"x 42"
S14	R10-3ER	PED PUSH BUTTON	I	**	P-7	9"x 15"
S15	S5-1	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-9	24"x48"
S16	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-9	36"x18"
S17	S6-1T	SCHOOL SPEED LIMIT 20 WHEN FLASHING	I	*	P-9	84"x36"
S18	S5-2	END SCHOOL ZONE	I	*	GROUND	24"x 30"

STATUS:I = INSTALL

* SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 680)

** SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 688)

ADA QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4
687	6001	PED POLE ASSEMBLY	EA	4
688	6001	PED DETECT PUSH BUTTON (APS)	EA	4
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3EL)	EA	2
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3ER)	EA	2
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1

** SUBSIDIARY TO ITEM 688

APS MESSAGE CHART

POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-3	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS WESTBOUND PAISANO DRIVE.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-5	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS WESTBOUND PAISANO DRIVE AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-6	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS EASTBOUND PAISANO DRIVE AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-7	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS EASTBOUND PAISANO DRIVE.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	LATITUDE	LONGITUDE	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
PAISANO DR AT VAL VERDE ST	TY D (120/240) 060 (NS) SS (E) GC (O) PAISANO DR AT VAL VERDE ST.	31.768472?°	-106.432639?°	2"	3 / #4	N/A	2P / 60	30	100	LIGHTING	2P / 20	2	6.0
										FLASHER	1P / 30	23	
										FLASHER	1P / 30	23	

** VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION					PED SIG SEC (LED) (COUNTDOWN)
	SIGNAL HEAD TYPE	STATUS	BACK PLATE	LED SIGNAL LAMPS	LED SIGNAL LAMPS	
			3 SEC	Y	R	
			EA	EA	EA	EA
1,2,3,4,5,6	H1	I	NO	6		
7,8,9,10,11,12	H1	I	NO	6		
13,17,18,22	PED	I				4
14,15,16,19,20,21	PHB	I	6	6	12	
23,24,25,26,27,28	H1	I	NO	6		
TOTAL (NEW)			6	24	12	4

STATUS: I=INSTALL

CONDUCTOR FROM POLE BASE TO SIGNAL HEAD		
POLE NO.	VEHICLE SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (12 CONDR)
P-4	14	30
	15	15
	16	15
P-8	19	15
	20	15
	21	40
TOTAL (FT)		130

CONDUCTOR FROM POLE BASE TO PEDESTRIAN PUSH BUTTON		
POLE NO.	PED PUSH BUTTON NO.	TRF SIG CBL (12 AWG) (2 CONDR)
P-3	PB1	7
P-5	PB3	7
P-6	PB4	7
P-7	PB5	7
TOTAL (FT)		28

CONDUCTOR FROM POLE BASE TO PEDESTRIAN SIGNAL HEAD		
POLE NO.	PED SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (5 CONDR)
P-3	13	15
P-5	17	15
P-6	18	15
P-7	22	15
TOTAL (FT)		60

CONDUCTOR FROM POLE BASE TO LUMINAIRE	
POLE NO.	NO. 8 XHHW WIRE
P-4	80
P-8	80
TOTAL (FT)	160

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

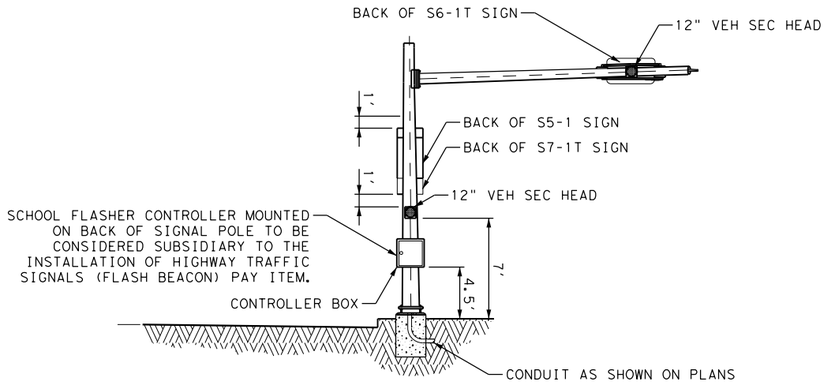
PROPOSED PEDESTRIAN HYBRID BEACON AND SCHOOL FLASHER LAYOUT

US 62 AT
FRANCIS STREET

SHEET 6 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	70
CHECK				
DL				

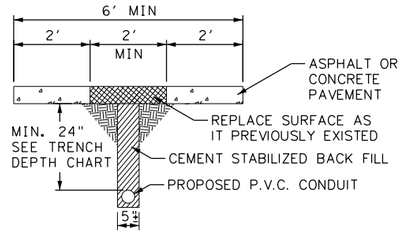
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.7_FRANCIS_TABLES.dgn



BACKSIDE OF SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

TRENCH DEPTH CHART	
SYSTEM	DEPTH (MIN)
SAFETY FLASHERS	24 INCHES

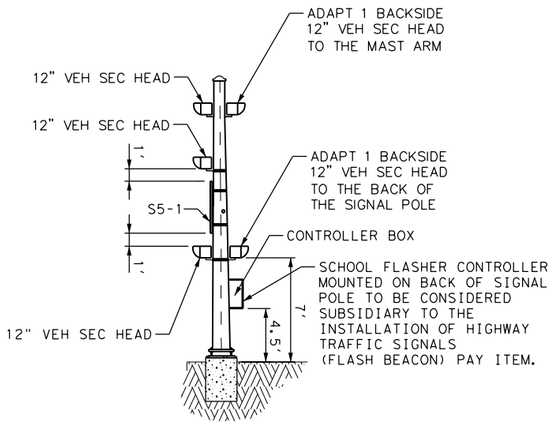


PAVEMENT

SCALE: NTS

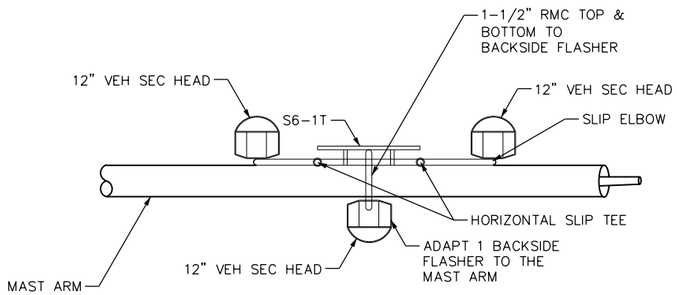
NOTES:

1. SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAILS AND DIMENSIONS ARE SHOWN AS EXAMPLES ONLY. OPTIONAL DESIGNS SHALL MEET ALL OTHER REQUIREMENTS FOR TRAFFIC SIGNAL POLE ASSEMBLIES AND SHALL BE APPROVED IN WRITING BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE.
2. SCHOOL SAFETY FLASHER BRACKET ASSEMBLIES AND ALL NECESSARY BOLTS, CLAMPS, NUTS, WASHERS, TEMPLATES, MATERIALS, LABOR, TOOLS AND EQUIPMENT NECESSARY TO COMPLETE THE INSTALLATION SHALL BE CONSIDERED SUBSIDIARY TO "TRAFFIC SIGNAL POLE ASSEMBLIES".
3. THE LOCATION OF THE SIGNAL POLE, AND FIXTURES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE TO ACCOMMODATE LOCAL CONDITIONS. EXACT LOCATION OF SIGNAL POLE, CONTROLLER, ETC. TO BE APPROVED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE IN THE FIELD.
4. PROPOSED SIGNS AND BRACKET ASSEMBLY MOUNTED ON SIGNAL MAST ARM/POLE SHALL BE BANDED. DRILLING THROUGH MAST ARM OR POLE WILL NOT BE ACCEPTED.
5. THE OUTSIDE EDGE OF THE DRILLED SHAFT SHALL BE A MINIMUM OF 3' FROM THE FACE OF CURB.
6. CONTRACTOR SHALL PROVIDE ONE CONTROLLER BOX OF SUFFICIENT DIMENSION TO HOUSE ONE CONTROLLER UNITS.
7. CONTRACTOR SHALL PROVIDE ALL FLASHER ASSEMBLIES AND CONTROLLERS FROM MANUFACTURERS PREQUALIFIED BY TXDOT.
8. CONTROLLER UNITS (TIME CLOCKS) SHALL BE PROGRAMMABLE, A MINIMUM OF TWO RELAY OUTPUTS, AND ALLOW FOR MULTIPLE PROGRAMS, ALTERNATE PROGRAM SCHEDULES, AND EXEMPTION PERIODS.



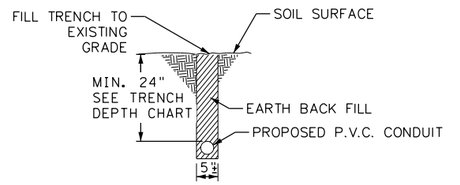
SIDE VIEW

SCALE: NTS



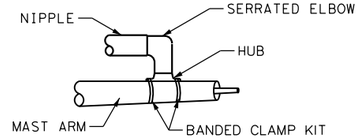
TOP VIEW

SCALE: NTS



OPEN SOIL TRENCH

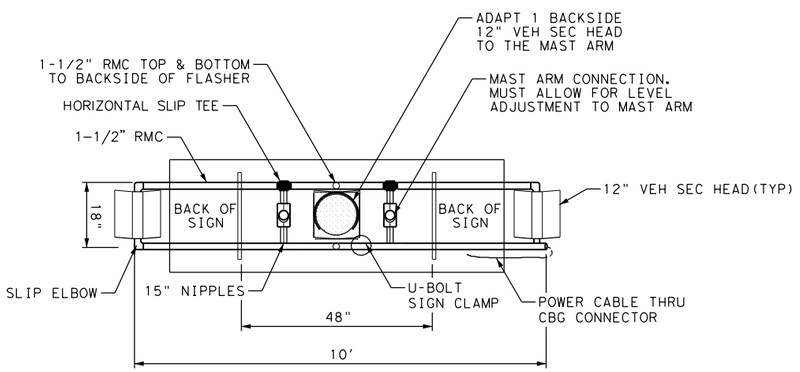
SCALE: NTS



MAST ARM CONNECTION DETAIL

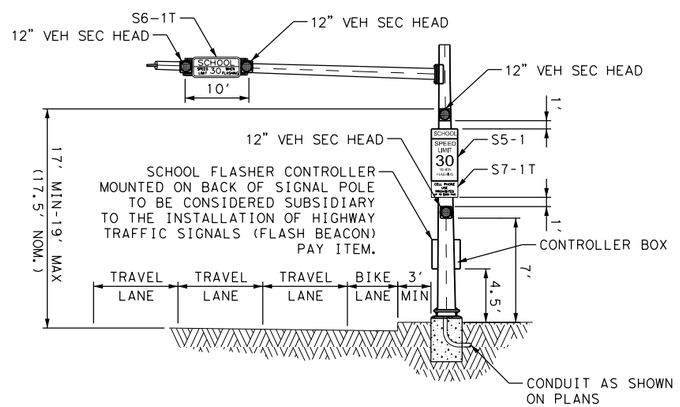
SCALE: NTS

TRENCH DETAILS



SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAIL - BACK VIEW

SCALE: NTS



SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

3/29/2024

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Texas Department of Transportation
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TRAFFIC SAFETY IMPROVEMENTS

SCHOOL FLASHER DETAIL

US 62 AT
FRANCIS STREET

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	71
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_103.11_PAISANO_FLASHERS_DETA

PROPOSED SIGNS

W11-2 (18"X18") W16-9P (24"X12")

S1 S2 S11 S12

R10-6L

(24"X36")

S4 S9

R10-6R

(24"X36")

S3 S10

W11-2 (18"X18") W16-7PL (24"X12")

S8 S6

W11-2 (18"X18") W16-7PR (24"X12")

S5 S7

EXISTING SIGNS TO BE RELOCATED

R7-107A (12"x24")

S13 S14

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

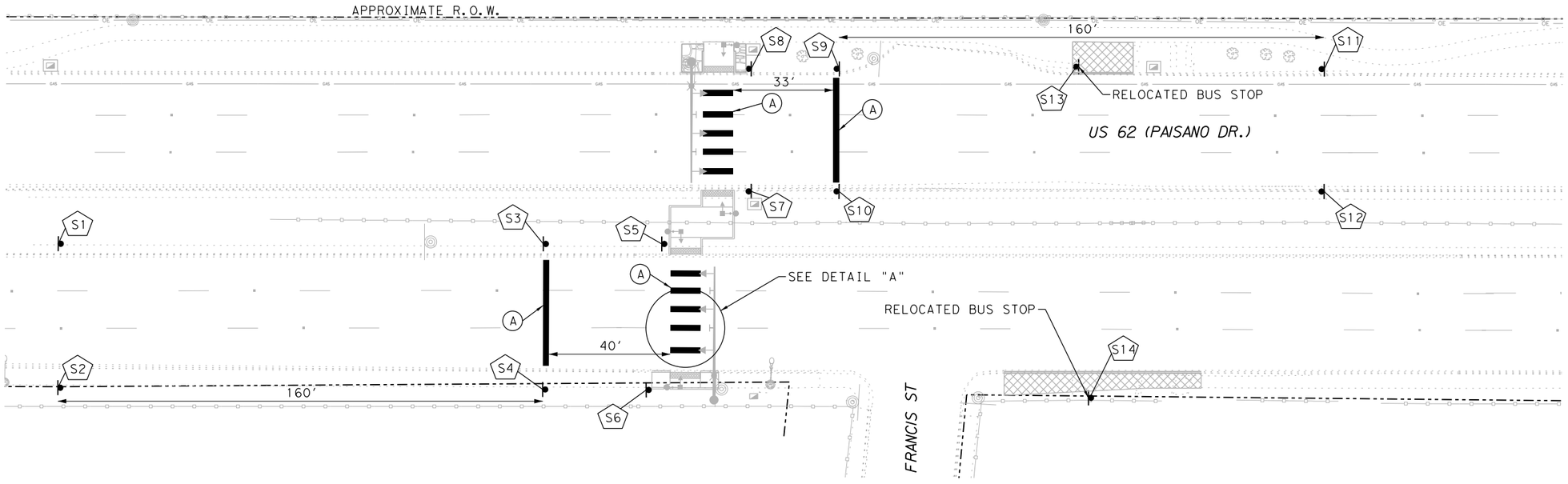
PAVEMENT MARKING

(A) REFL PAV MRK TY II (W)24"(SLD)(90MIL)

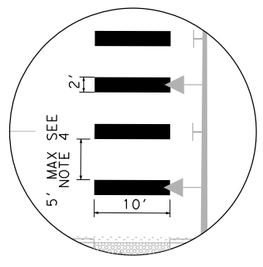
EXISTING SIGN

PROPOSED SIGN

S1 SIGN LABEL



DETAIL "A"
1"=20'



NOTES:

1. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE.
2. ALL EXISTING SIGNS AND PAVEMENT MARKING TO REMAIN UNLESS OTHERWISE NOTED.
3. ELIMINATE EXISTING PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
4. LONGITUDINAL CROSSWALK LINES SHOULD NOT BE PLACED IN THE WHEEL PATH OF VEHICLES. CENTER THE CROSSWALK LINES ON TRAVEL LANES AND LANE LINES.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	170
666	6230	PAVEMENT SEALER 24"	LF	170
678	6008	PAV SURF PREP FOR MRK (24")	LF	170

3/29/2024

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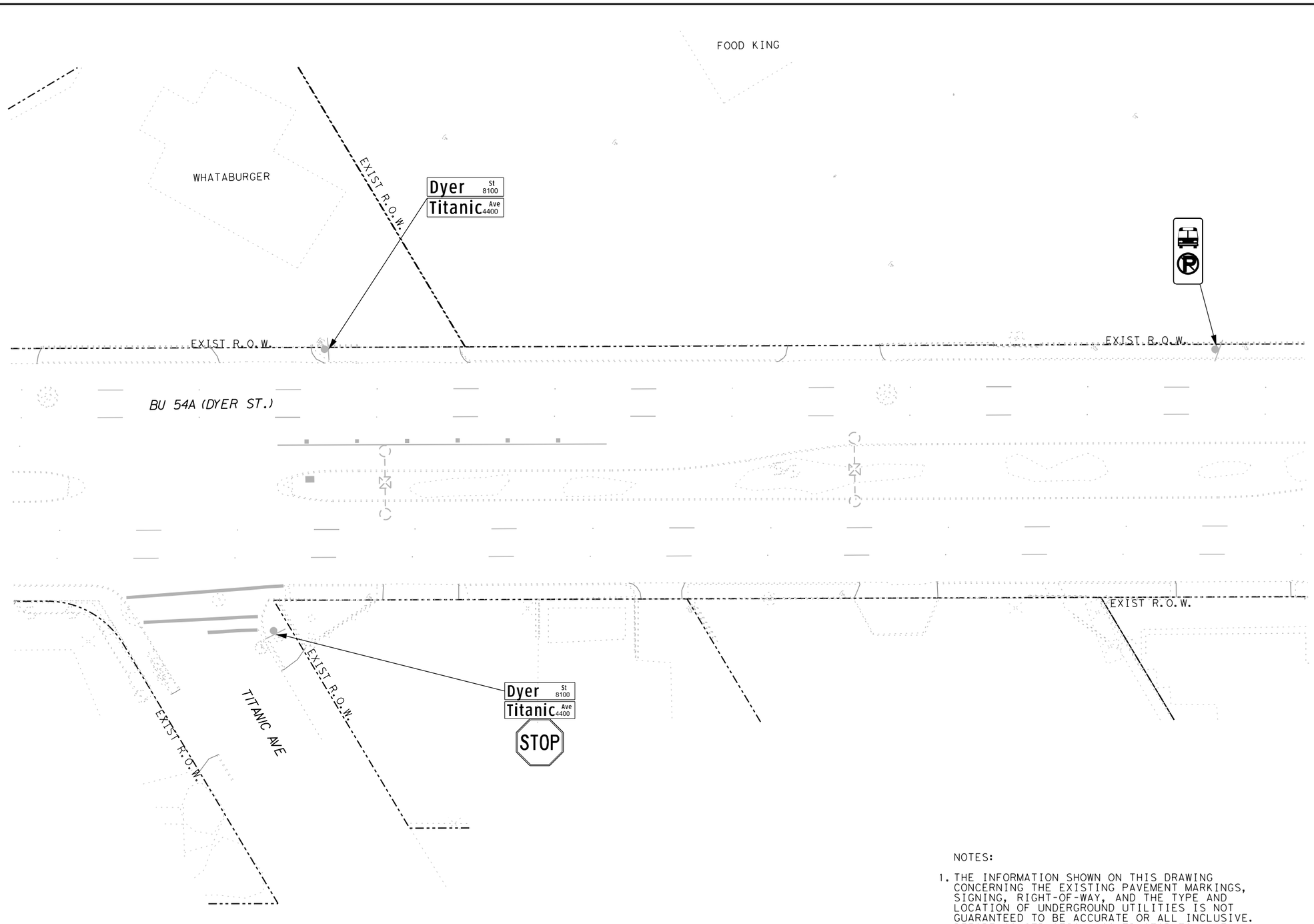
TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SIGNING AND PAVEMENT MARKING LAYOUT

US 62 AT FRANCIS STREET

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	72
	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	



0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET LAMP
- EXISTING GROUND BOX
- EXISTING SIGN

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.

3/29/2024

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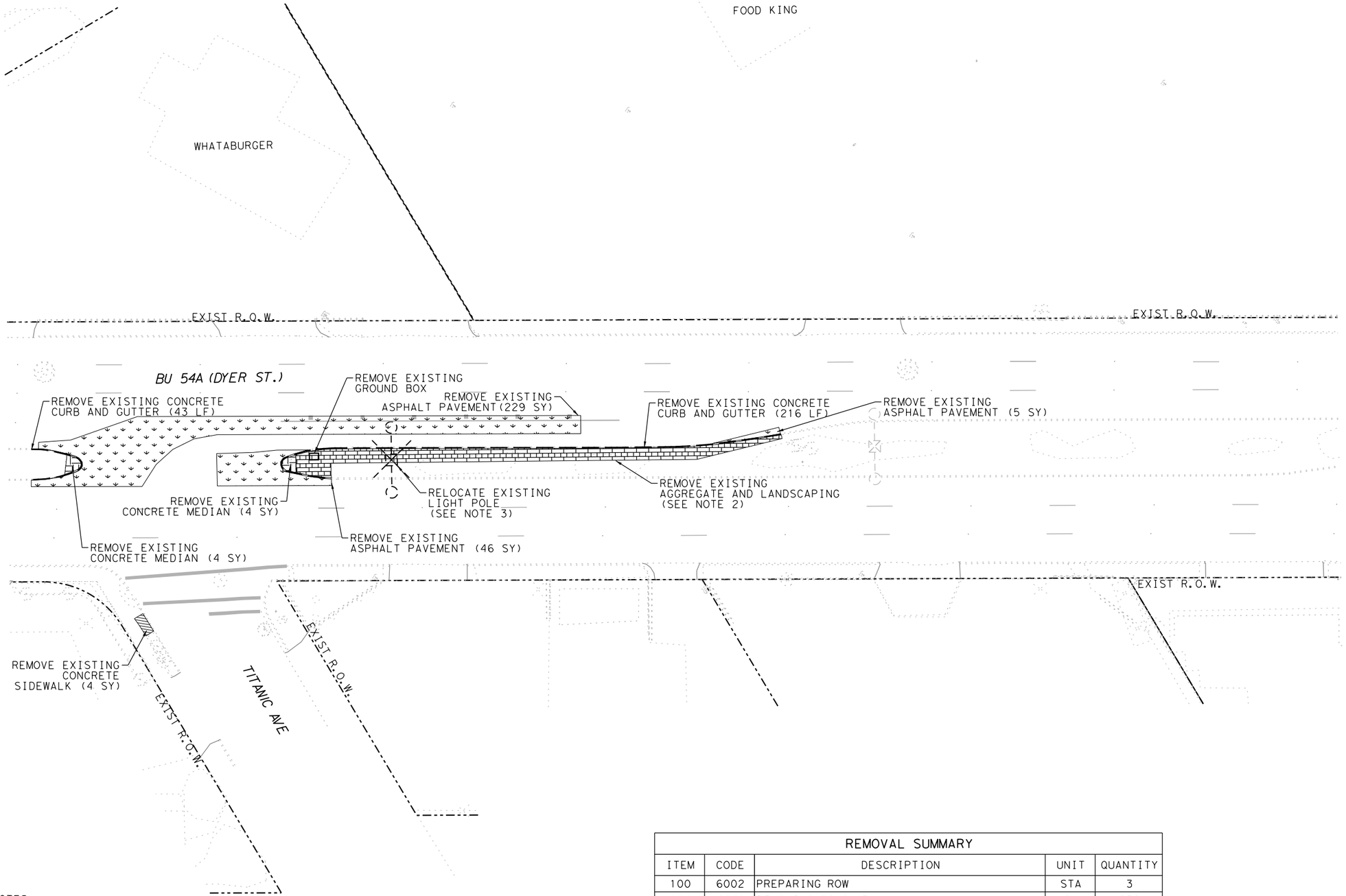
TRAFFIC SAFETY IMPROVEMENTS
EXISTING CONDITIONS

BU 54A AT
TITANIC AVENUE

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	73
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.1_TITANIC_EXISTING.dgn



0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- REMOVE EXISTING CONCRETE CURB AND GUTTER
- REMOVE EXISTING ASPHALT PAVEMENT
- REMOVE EXISTING LANDSCAPING
- REMOVE EXISTING CONCRETE MEDIAN
- EXISTING RDWY ILL ASSEMBLY TO REMAIN
- EXISTING RDWY ILL ASSEMBLY TO BE RELOCATED
- EXISTING ILLUM GROUND BOX TO BE REMOVED

NOTES:

1. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE PROPOSED RAMP LAYOUT).
2. REMOVAL OF EXISTING AGGREGATE IS SUBSIDIARY TO ITEM 104.
3. CONTRACTOR SHALL NOTIFY STREET LIGHTS DEPARTMENT AND FOLLOW THE REMOVAL AND RELOCATION PROCESS. SEE ILLUMINATION PLAN FOR LIGHT POLE RELOCATION DETAILS.

REMOVAL SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
100	6002	PREPARING ROW	STA	3
104	6001	REMOVING CONC (PAV)	SY	259
104	6011	REMOVING CONC (MEDIANS)	SY	113
104	6015	REMOVING CONC (SIDEWALKS)	SY	4
104	6029	REMOVING CONC (CURB OR CURB & GUTTER)	LF	259
105	6091	REMOVING STAB BASE & ASPH PAV (8"-12")	SY	280
110	6003	EXCAVATION (SPECIAL)	CY	0.6
624	6028	REMOVE GROUND BOX	EA	1

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TRAFFIC SAFETY IMPROVEMENTS

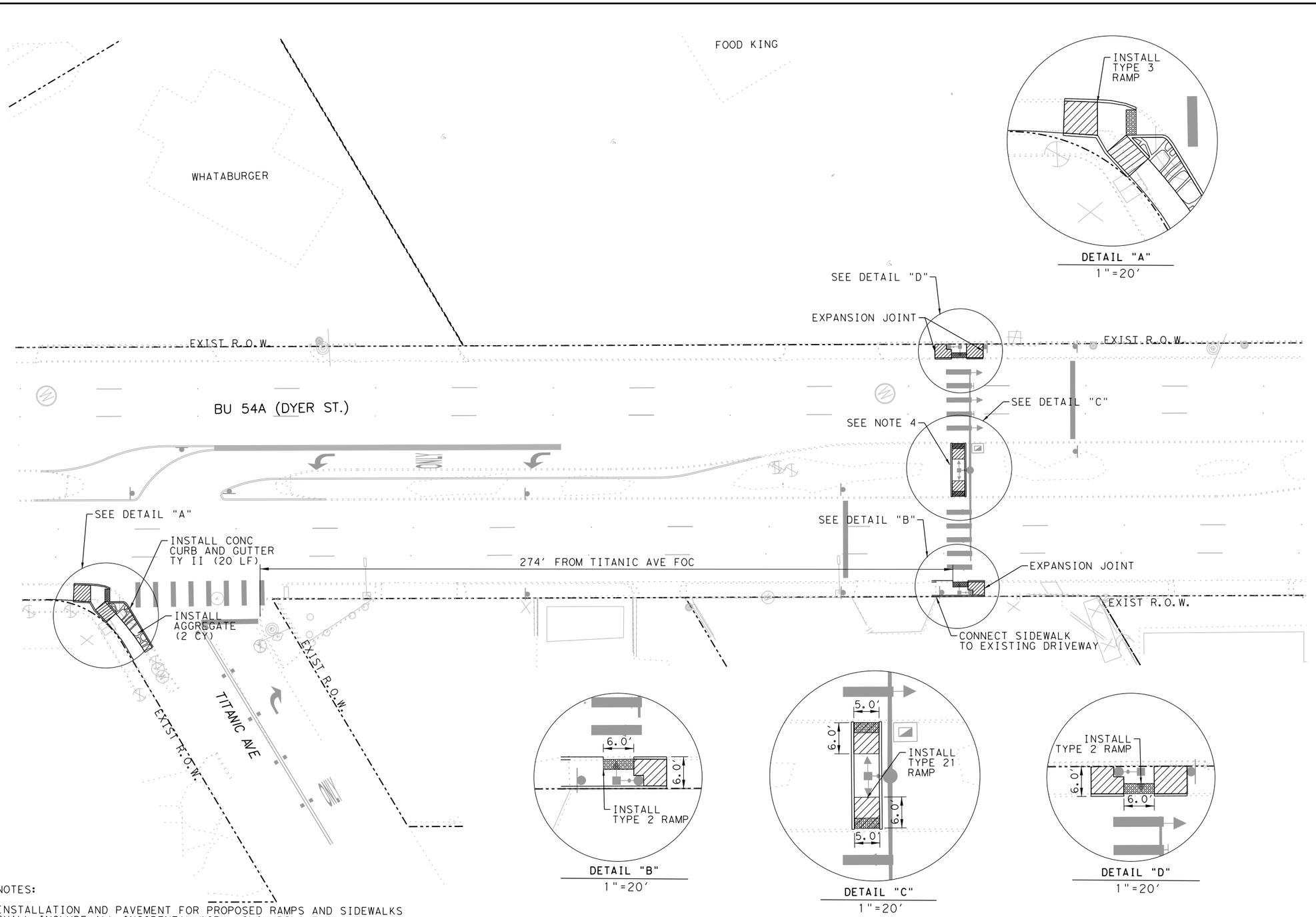
REMOVAL LAYOUT

BU 54A AT
TITANIC AVENUE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	
CHECK	CONTROL	SECTION	JOB	74
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8, Traffic/102_TRF_SGNL_101.2_TITANIC_REMOVAL.dgn



NOTES:

1. INSTALLATION AND PAVEMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL, AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE.
4. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTIION OF ANY DAMAGED IRRIGATION EQUIPMENT.

PEDESTRIAN RAMP / SIDEWALK SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
529	6008	CONC CURB & GUTTER (TY II)	LF	20
531	6002	CONC SIDEWALKS (5")	SY	10
531	6005	CURB RAMPS (TY 2)	EA	2
531	6006	CURB RAMPS (TY 3)	EA	1
531	6016	CURB RAMPS (TY 21)	EA	1
1005	6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY	2

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RAMP LAYOUT

BU 54A AT TITANIC AVENUE

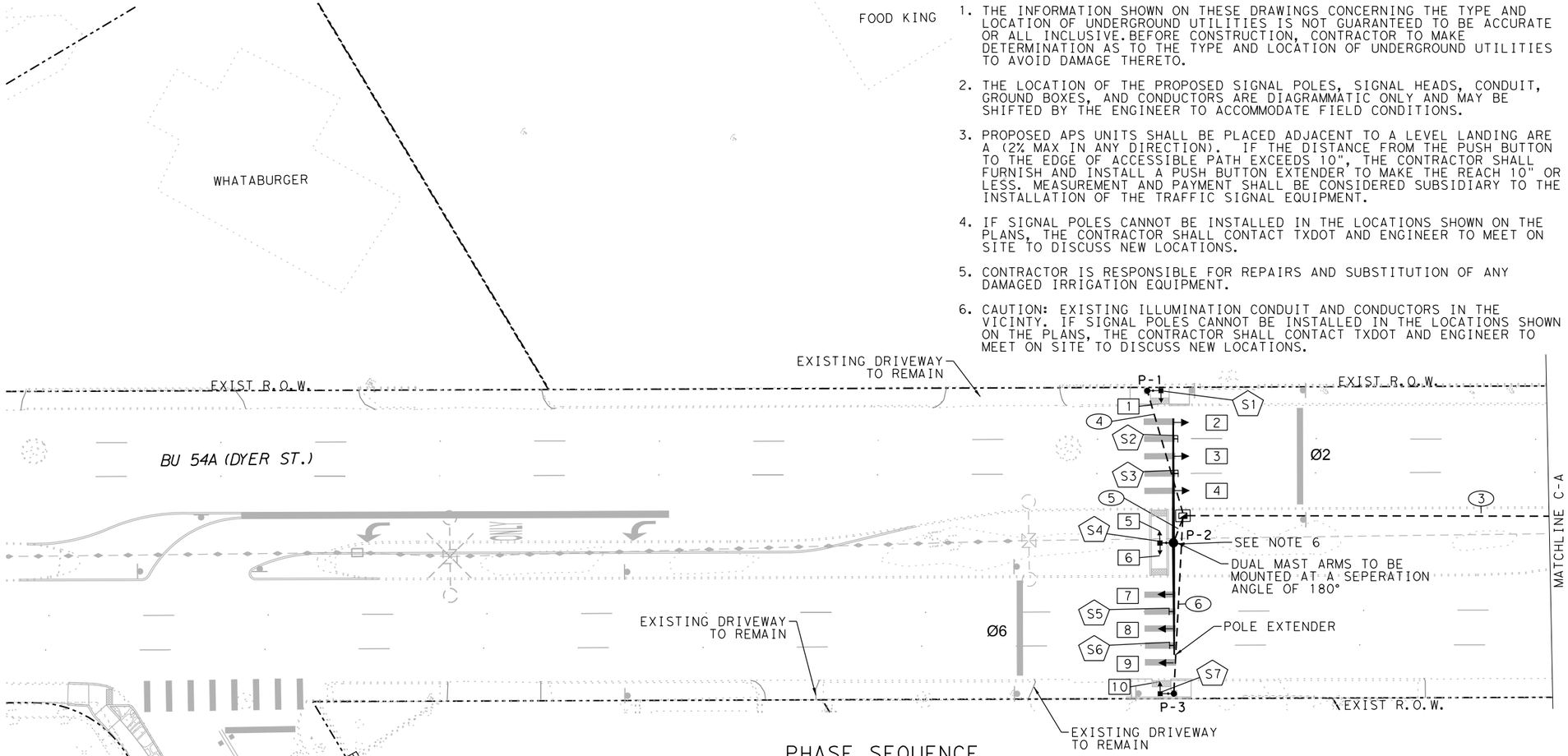
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	75
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw:/kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.3_TITANIC_RAMP.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING ARE A (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
4. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.
5. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.
6. CAUTION: EXISTING ILLUMINATION CONDUIT AND CONDUCTORS IN THE VICINITY. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.



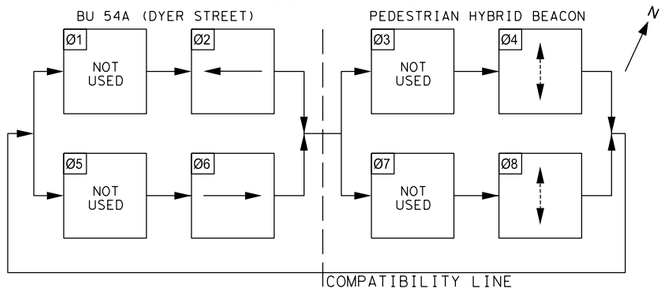
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

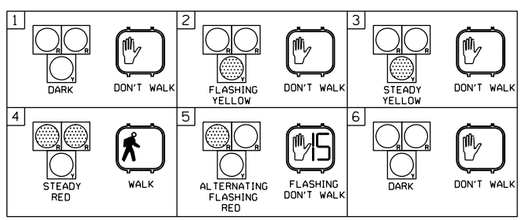
LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE (250W E.Q.), AND SIGNAGE
- PROPOSED PEDESTRIAN POLE WITH PEDESTRIAN SIGNAL AND PUSH BUTTON
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

PHASE SEQUENCE

COMPATIBLE PHASES
PEDESTRIAN MOVEMENT

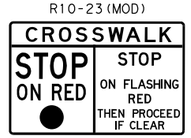




SEQUENCE FOR A PEDESTRIAN HYBRID BEACON SIGNAL

PROPOSED SIGNS

R10-23(MOD)



S2 S3 S5 S6

R10-3EL

S1 S7

R10-3E

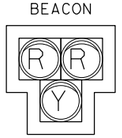
S4

PROPOSED SIGNALS

LED COUNTDOWN PEDESTRIAN SIGNAL

SH 1, 5, 6, 10

PEDESTRIAN HYBRID BEACON



SH 2, 3, 4, 7, 8, 9

3/29/2024

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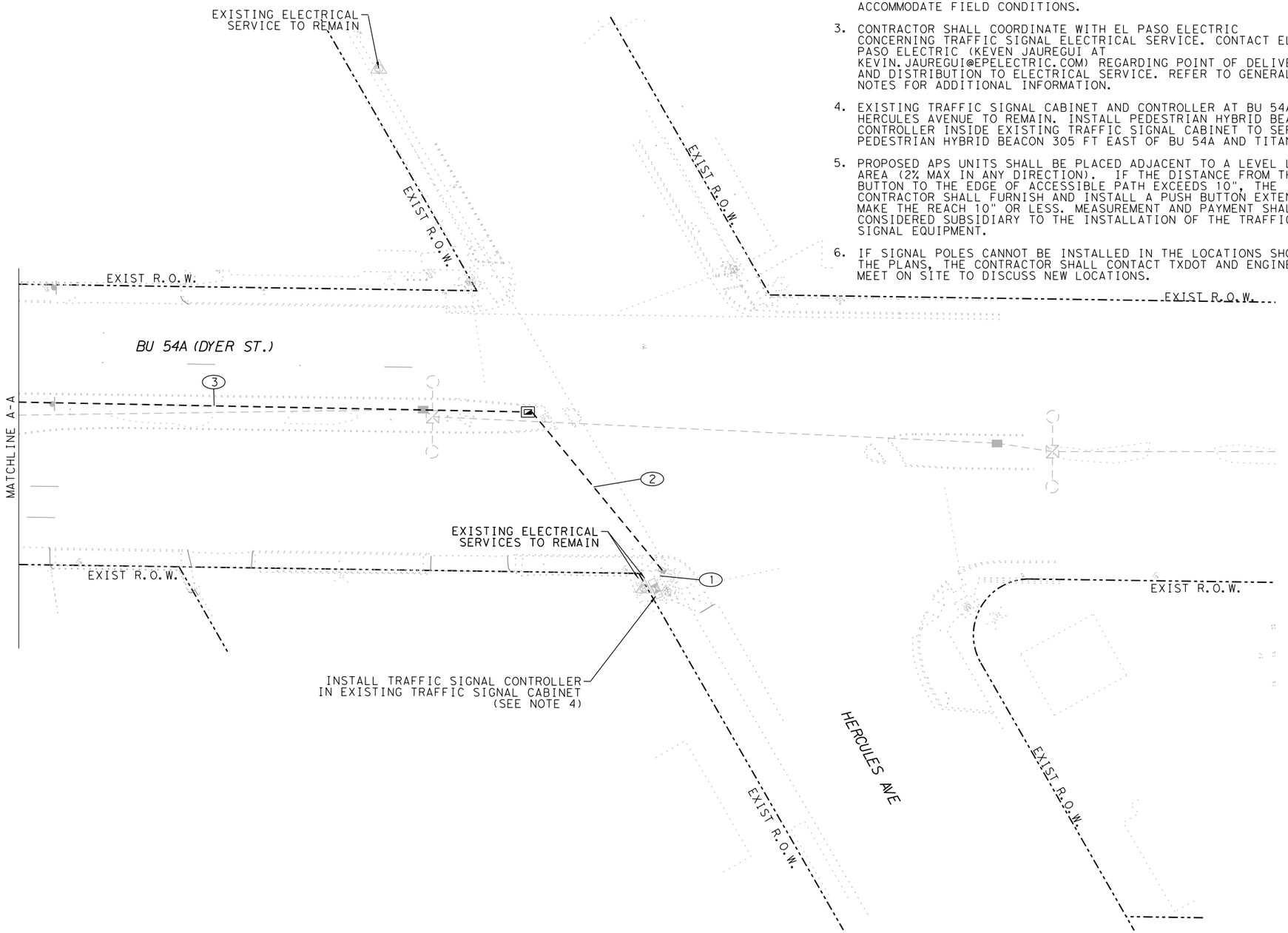
TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

BU 54A AT TITANIC AVENUE

SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	
CHECK	CONTROL	SECTION	JOB	76
MK				
CHECK	0001	04	102, ETC.	
DL				



NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, RADAR DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC (KEVEN JAUREGUI AT KEVIN.JAUREGUI@EPELECTRIC.COM) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. EXISTING TRAFFIC SIGNAL CABINET AND CONTROLLER AT BU 54A AND HERCULES AVENUE TO REMAIN. INSTALL PEDESTRIAN HYBRID BEACON CONTROLLER INSIDE EXISTING TRAFFIC SIGNAL CABINET TO SERVE THE PEDESTRIAN HYBRID BEACON 305 FT EAST OF BU 54A AND TITANIC AVENUE.
5. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
6. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT TXDOT AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD
- EXISTING GROUND BOX
- EXISTING CONDUIT
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- (S) EXISTING ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

BU 54A AT TITANIC AVENUE

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	77
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.5_TITANIC_LAYOUT.dgn

SIGNAL LAYOUT SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13
618	6029	CONDT (PVC) (SCH 40) (3")	LF	350
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	180
620	6010	ELEC CONDR (NO.6) INSULATED	LF	540
624	6004	GROUND BOX TY B (122322)W/APRON	EA	2
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
	*	SIGN, R10-23(MOD) (30"x 42")	EA	4
	*	ATC CONTROLLER IN EXISTING TRAFFIC SIGNAL CABINET	EA	1
	*	CAT6 ETHERNET CABLE (CONNECT PHB CONTROLLER TO EXISTING CELLULAR MODEM)	EA	1
682	6003	VEH SIG SEC (12")LED(YEL)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	12
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM	EA	6
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	1,885
684	6038	TRF SIG CBL (TY A)(14 AWG)(12 CONDR)	LF	1,010
684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	1,411
686	6147	INS TRF SIG PL AM(S)2 ARM(40-36')LUM	EA	1
6027	6003	CONDUIT (PREPARE)	LF	10
6027	6008	GROUND BOX (PREPARE)	EA	1

* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)".

ADA QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4
687	6001	PED POLE ASSEMBLY	EA	2
688	6001	PED DETECT PUSH BUTTON (APS)	EA	3
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3EL)	EA	1
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3ER)	EA	1
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3E)	EA	1
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1

** SUBSIDIARY TO ITEM 688

CONDUCTOR FROM POLE BASE TO PEDESTRIAN SIGNAL HEAD		
POLE NO.	PED SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (5 CONDR)
P-1	1	15
P-2	5	15
	6	15
P-3	10	15
TOTAL (FT)		60

CONDUCTOR FROM POLE BASE TO PEDESTRIAN PUSH BUTTON		
POLE NO.	PED PUSH BUTTON NO.	TRF SIG CBL (12 AWG) (2 CONDR)
P-1	PB1	7
P-2	PB2	7
P-3	PB3	7
TOTAL (FT)		21

CONDUCTOR FROM POLE BASE TO SIGNAL HEAD		
POLE NO.	VEHICLE SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (12 CONDR)
P-2 *	2	15
	3	15
	4	40
P-2 **	7	40
	8	15
	9	15
TOTAL (FT)		140

* INDICATES THE NORTHWEST ARM OF P-2

** INDICATES THE SOUTHEAST ARM OF P-2

CONDUIT AND CABLE CHART WIRE SIZE AND TYPE															
RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT				CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS		ITEM 684 TRAFFIC SIGNAL CABLES						TOTAL LENGTH OF RUN	RUN NO
		3" PVC (TRENCHED)		3" PVC (BORED)			NO. 6 XHHW INSULATED (GROUND)		TY C 2 CNDR NO. 12		TY A 5 CNDR NO. 14		TY A 12 CNDR NO. 14			
		Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	E					I	1	10	3	30	4	40	2	20	10	1
2	I			1	75	I	1	75	3	225	4	300	2	150	75	2
3	I	1	340			I	1	340	3	1020	4	1360	2	680	340	3
4	I			1	45	I	1	45	1	45	1	45			45	4
5	I	1	10			I	1	10	1	10	2	20	2	20	10	5
6	I			1	60	I	1	60	1	60	1	60			60	6
TOTAL			350		180			540		1390		1825		870		

CONDUIT STATUS: I=INSTALL

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

BU 54A AT TITANIC AVENUE

SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	78
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.6_TITANIC_TABLES.dgn
$$$SCALE$$$
BY: $USER$

APS MESSAGE CHART

POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-2	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-2	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-3	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-3EL	PED PUSH BUTTON	I	**	P-1	9"x 15"
S2	R10-23	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S3	R10-23	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S4	R10-3E	PED PUSH BUTTON	I	**	P-2	9"x 15"
S5	R10-23	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S6	R10-23	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S7	R10-3ER	PED PUSH BUTTON	I	**	P-3	9"x 15"

STATUS: I=INSTALL

*SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB ITEM 680)

**SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB ITEM 688)

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION					PED SIG SEC (LED) (COUNTDOWN)
	SIGNAL HEAD TYPE	STATUS	BACK PLATE (HYBRID)	LED SIGNAL LAMPS		
			3 SEC	Y	R	
			EA	EA	EA	EA
1	PED	I				1
2	PHB	I	1	1	2	
3	PHB	I	1	1	2	
4	PHB	I	1	1	2	
5	PED	I				1
6	PED	I				1
7	PHB	I	1	1	2	
8	PHB	I	1	1	2	
9	PHB	I	1	1	2	
10	PED	I				1
TOTAL (NEW)			6	6	12	4

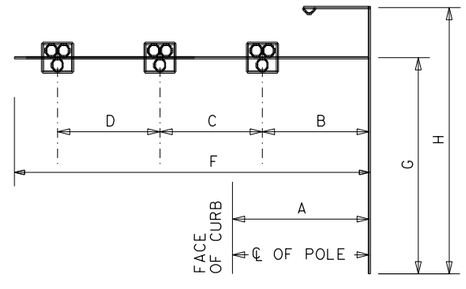
STATUS: I=INSTALL

SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	F (FT)	G (FT)	H (FT)	NO. OF HEADS (EA)*	LUM	DRILLED SHAFT LENGTH (FT)		FDN. TYPE WIND ZONE (80 MPH)
											24" DIA SUB TO ITEM 687	36" DIA TYPE A ITEM 416	
P-1	I	4.9	PEDESTRIAN SIGNAL POLE				10	-	-	-	6	-	24-A
P-2	I	11.0	16.8	11.0	10.8	40	19	30	3	NO	-	13	36-A
	I		16.6	11.1	10.9	36	19	30	3				
P-3	I	4.7	PEDESTRIAN SIGNAL POLE				10	-	-	-	6	-	24-A
									TOTAL:		12	13	

SIGNAL POLE STATUS: I=INSTALL

*- DOES NOT INCLUDE SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS



3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

BU 54A AT TITANIC AVENUE

SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	79
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.7_TITANIC_TABLES.dgn
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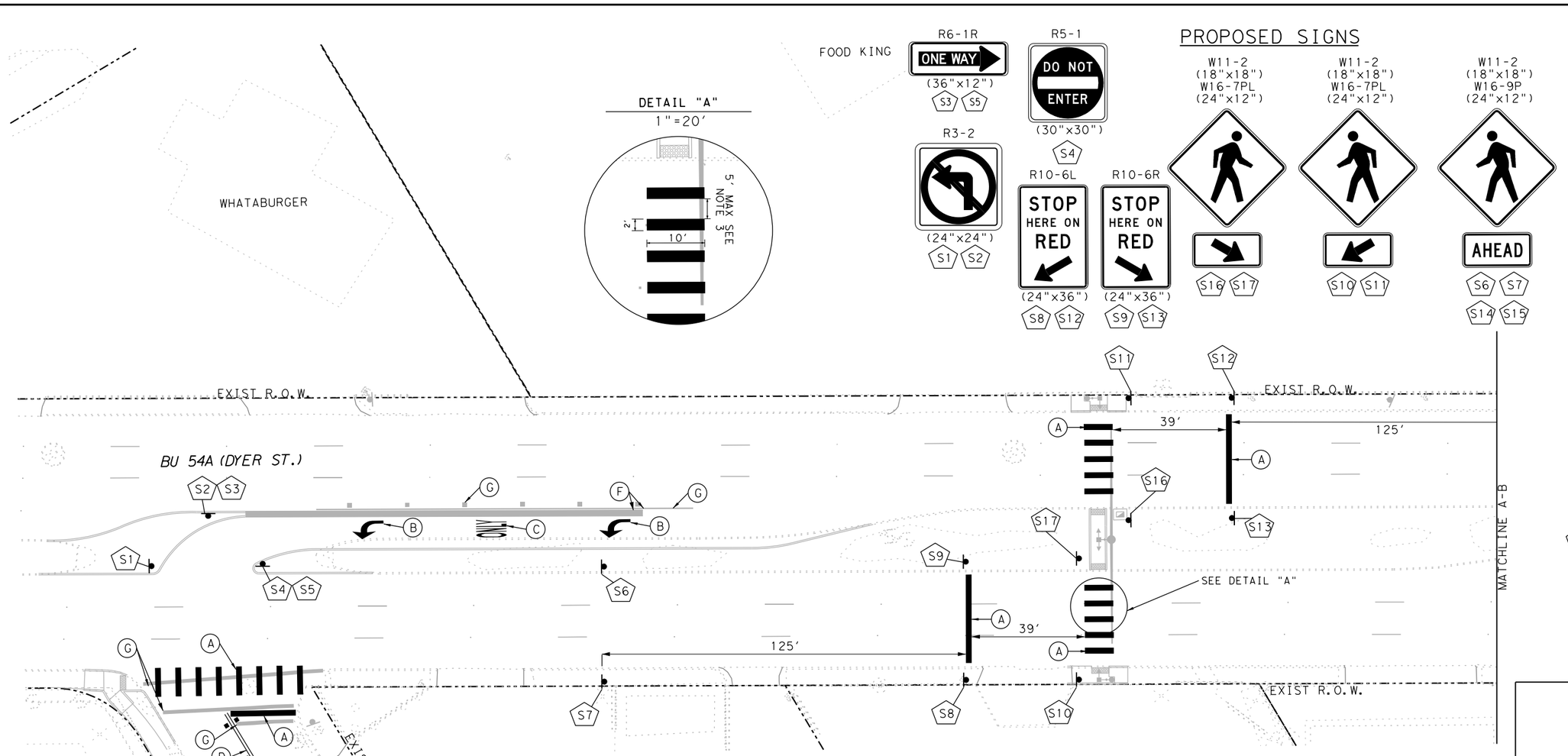
BY: $USER$



DETAIL "A"
1"=20'

PROPOSED SIGNS

LEGEND

PAVEMENT MARKING

- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)
- (B) REFL PAV MRK TY I (W)(ARROW)(90MIL)
- (C) REFL PAV MARK TY I (W)(WORD)(90MIL)
- (D) RE PM W/RET REQ TY I (Y)6"(SLD)(90MIL)
- (E) REFL PAV MRK TY II A-A
- (F) REFL PAV MRK TY I (Y) (MED NOSE) (90MIL)
- (G) ELIM EXT PAV MRK & MRKS
- EXISTING SIGN
- PROPOSED SIGN
- (S1) SIGN LABEL

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

NOTES:

1. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE.
2. ALL EXISTING SIGNS AND PAVEMENT MARKING TO REMAIN UNLESS OTHERWISE NOTED.
3. ELIMINATE EXISTING PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
4. LONGITUDINAL CROSSWALK LINES SHOULD NOT BE PLACED IN THE WHEEL PATH OF VEHICLES. CENTER THE CROSSWALK LINES ON TRAVEL LANES AND LANE LINES.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	13
644	6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	2
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	265
666	6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	EA	3
666	6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	EA	2
666	6155	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	EA	1
666	6225	PAVEMENT SEALER 6"	LF	200
666	6230	PAVEMENT SEALER 24"	LF	265
666	6231	PAVEMENT SEALER (ARROW)	EA	3
666	6232	PAVEMENT SEALER (WORD)	EA	2
666	6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	200
672	6009	REFL PAV MRKR TY II-A-A	EA	10
677	6003	ELIM EXT PAV MRK & MRKS (8")	LF	17
677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	110
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	20
678	6002	PAV SURF PREP FOR MRK (6")	LF	200
678	6008	PAV SURF PREP FOR MRK (24")	LF	265
678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	3
678	6016	PAV SURF PREP FOR MRK (WORD)	EA	2

3/29/2024
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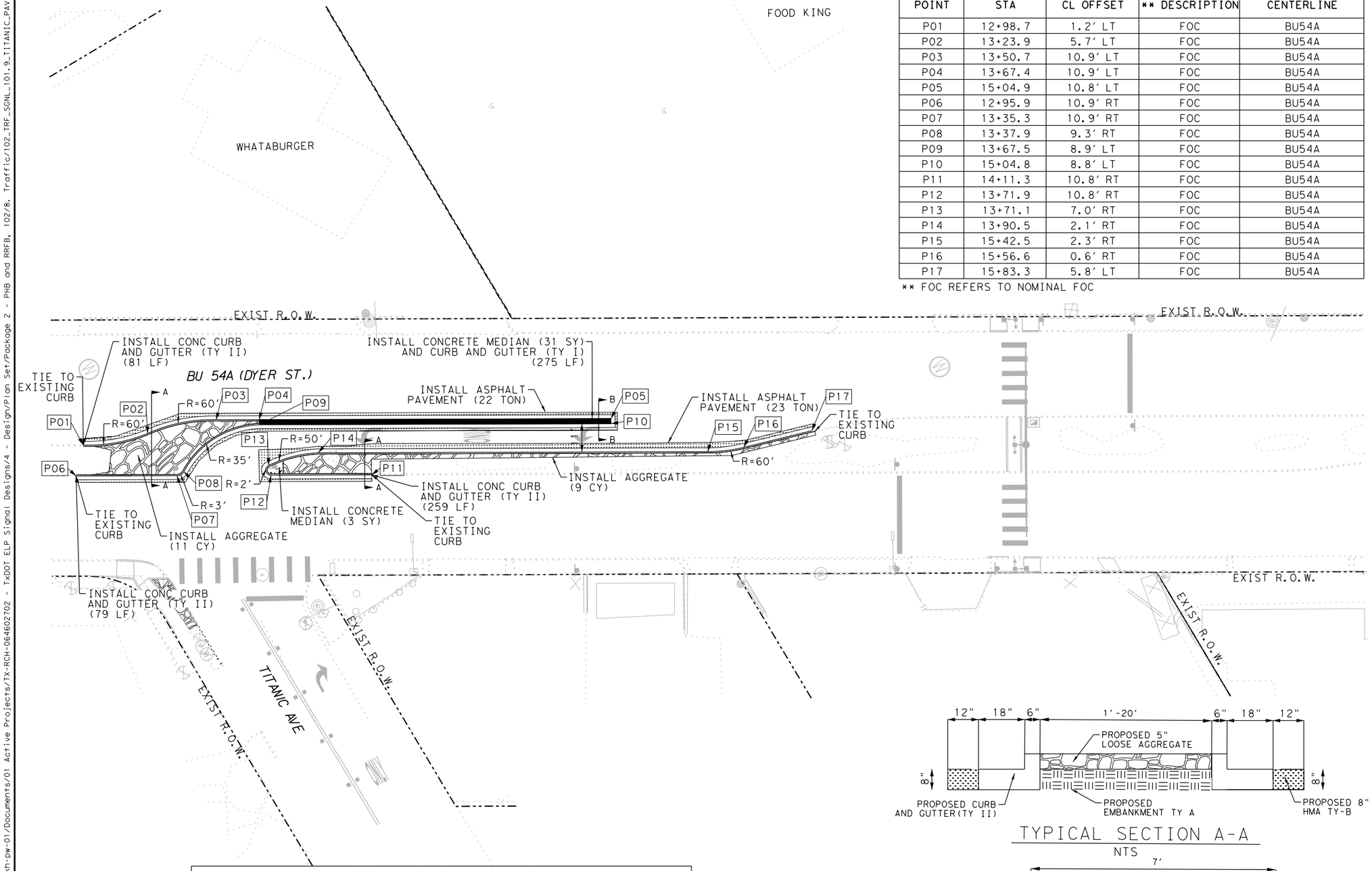
TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SIGNING AND PAVEMENT MARKING LAYOUT

BU 54A AT TITANIC AVENUE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	80
CHECK DL	CONTROL 0001	SECTION 04	JOB 102,ETC.	



POINT	STA	CL OFFSET	** DESCRIPTION	CENTERLINE
P01	12+98.7	1.2' LT	FOC	BU54A
P02	13+23.9	5.7' LT	FOC	BU54A
P03	13+50.7	10.9' LT	FOC	BU54A
P04	13+67.4	10.9' LT	FOC	BU54A
P05	15+04.9	10.8' LT	FOC	BU54A
P06	12+95.9	10.9' RT	FOC	BU54A
P07	13+35.3	10.9' RT	FOC	BU54A
P08	13+37.9	9.3' RT	FOC	BU54A
P09	13+67.5	8.9' LT	FOC	BU54A
P10	15+04.8	8.8' LT	FOC	BU54A
P11	14+11.3	10.8' RT	FOC	BU54A
P12	13+71.9	10.8' RT	FOC	BU54A
P13	13+71.1	7.0' RT	FOC	BU54A
P14	13+90.5	2.1' RT	FOC	BU54A
P15	15+42.5	2.3' RT	FOC	BU54A
P16	15+56.6	0.6' RT	FOC	BU54A
P17	15+83.3	5.8' LT	FOC	BU54A

** FOC REFERS TO NOMINAL FOC

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- INSTALL CONCRETE SIDEWALK
- INSTALL CONCRETE CURB AND GUTTER
- INSTALL ASPHALT PAVEMENT
- INSTALL AGGREGATE
- INSTALL CONCRETE MEDIAN
- INSTALL EMBANKMENT

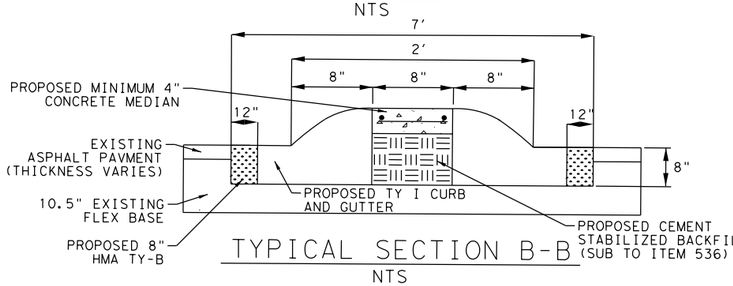
NOTES:

1. REFER TO EXISTING CONDITIONS AND REMOVALS SHEETS FOR ADDITIONAL INFORMATION.
2. REFER TO PROPOSED CONDITION SHEETS FOR ADDITIONAL INFORMATION.

MEDIAN / ROADWAY SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
132	6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	30
310	6001	PRIME COAT (MULTI OPTION)	GAL	45
529	6008	CONC CURB & GUTTER (TY II)	LF	419
536	6002	CONC MEDIAN	SY	34
	*	CONC CURB & GUTTER (TY I)	LF	275
1005	6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY	20
3076	6079	D-GR HMA TY-C PG70-22 (EXEMPT)	TON	45

* SUSIDIARY TO ITEM 536

TYPICAL SECTION A-A
NTS



TYPICAL SECTION B-B
NTS

3/29/2024

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Texas Department of Transportation
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TRAFFIC SAFETY IMPROVEMENTS
PROPOSED PAVING DETAILS

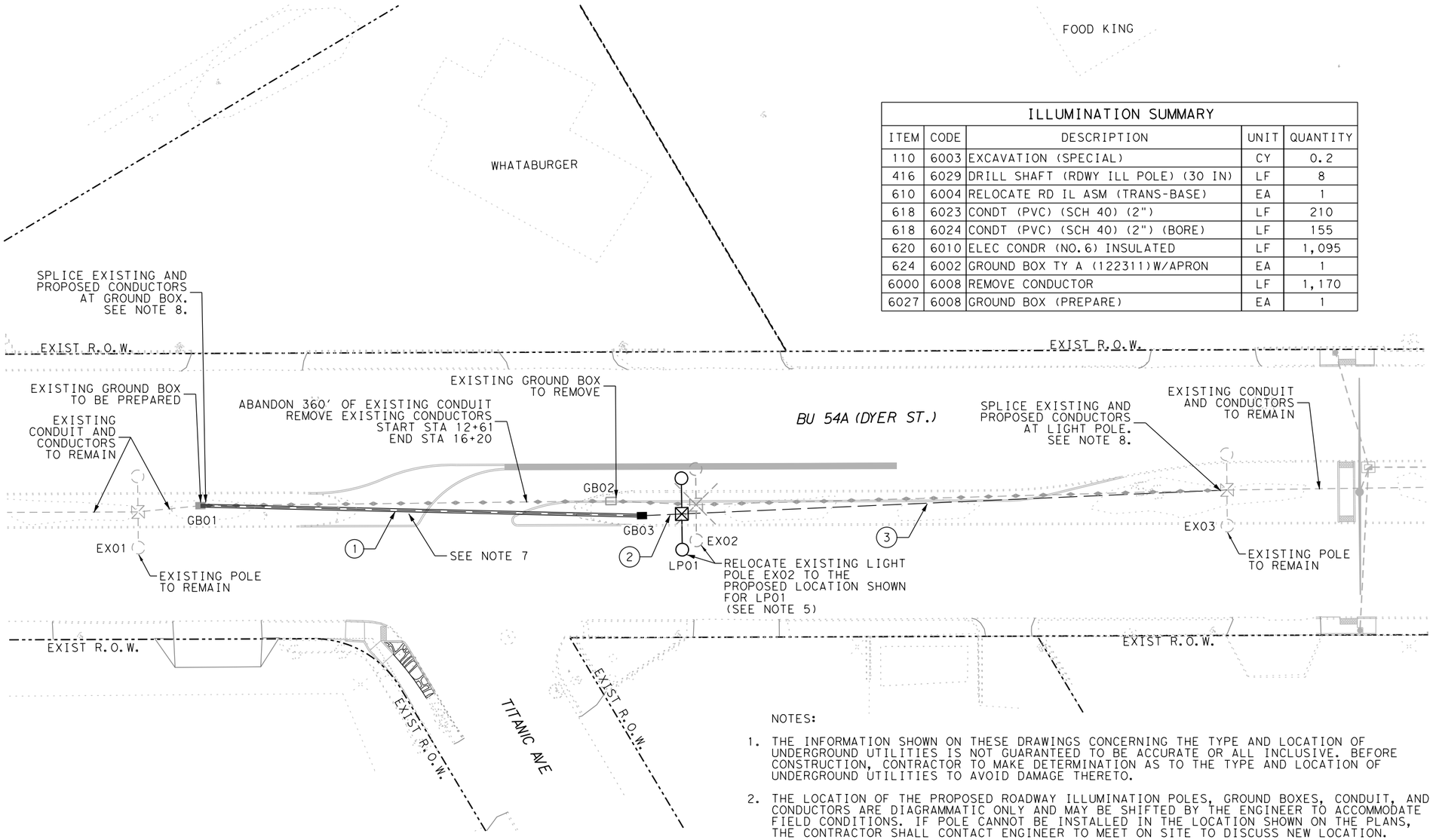
BU 54A AT
TITANIC AVENUE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	81
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102,ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_101.9_TITANIC_PAVING.dgn

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'



ILLUMINATION SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6003	EXCAVATION (SPECIAL)	CY	0.2
416	6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	8
610	6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	1
618	6023	CONDT (PVC) (SCH 40) (2")	LF	210
618	6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	155
620	6010	ELEC CONDR (NO.6) INSULATED	LF	1,095
624	6002	GROUND BOX TY A (122311)W/APRON	EA	1
6000	6008	REMOVE CONDUCTOR	LF	1,170
6027	6008	GROUND BOX (PREPARE)	EA	1

LEGEND

- EXISTING RDWY ILL ASSEMBLY TO REMAIN
- EXISTING RDWY ILL ASSEMBLY TO BE RELOCATED
- RELOCATED RDWY ILL ASSEMBLY
- EXISTING ILLUM GROUND BOX TO REMAIN
- EXISTING ILLUM GROUND BOX TO BE REMOVED
- PROPOSED GROUND BOX TY A (W/APRON)
- EXISTING CONDUIT & CABLE TO REMAIN
- EXISTING CONDUIT & CABLE TO BE REMOVED
- PROPOSED CONDUIT (TRENCHED)
- PROPOSED CONDUIT (BORE)
- (1) CONDUIT RUN NUMBER

CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT				CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)		2" PVC (BORED)			NO. 6 XHHW INSULATED (GROUND)		NO. 6 XHHW INSULATED (POWER)			
		Qty	Len	Qty	Len		Qty	Len	Qty	Len		
1	I			1	155	I	1	155	2	310	155	1
2	I	1	15			I	1	15	2	30	15	2
3	I	1	195			I	1	195	2	390	195	3
TOTAL			210		155			365		730		TOTAL

CONDUIT STATUS: I=INSTALL

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED ROADWAY ILLUMINATION POLES, GROUND BOXES, CONDUIT, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS. IF POLE CANNOT BE INSTALLED IN THE LOCATION SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATION.
3. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL EXISTING ILLUMINATION INFRASTRUCTURE. EXISTING CONDUCTORS BEING REMOVED SHALL BE CONFIRMED AND MATCHING SIZE TO BE INSTALLED IN PROPOSED CONDUIT. FOR ANY REMOVAL OR RELOCATION OF A STREETLIGHT, THE CONTRACTOR SHALL NOTIFY STREET LIGHTS DEPARTMENT AND FOLLOW THE REMOVAL AND RELOCATION PROCESS.
4. THERE WILL BE NO EXTRA COMPENSATION IF THE CONTRACTOR CHOOSES TO BORE CONDUIT RATHER THAN TRENCH.
5. REMOVE AND STORE EXISTING POLE EX02 AT THE BEGINNING OF CONSTRUCTION. INSTALL EX02 ONTO PROPOSED FOUNDATION LP01 BEFORE RESTORING POWER TO THE ILLUMINATION CIRCUIT.
6. THE LIGHT POLE FOUNDATION FOR EX02 SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE PROPOSED PAVING DETAILS SHEET FOR BU 54A AT TITANIC AVENUE FOR MORE DETAILS. THIS WORK IS SUBSIDIARY TO ITEM 610.
7. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTION OF ANY DAMAGED IRRIGATION EQUIPMENT.
8. SPLICING BETWEEN GB01 AND EX03 IS SUBSIDIARY TO THE INSTALLATION OF THE CONDUCTORS.
9. EXISTING ILLUMINATION ELECTRICAL SERVICE IS LOCATED AT BU 54A AND HERCULES AVENUE. CONTRACTOR SHALL COORDINATE WITH TXDOT (OR ENGINEER SEE GENERAL NOTES) REGARDING TURNING OFF THE CIRCUIT BREAKER TO INSTALL LP01.

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TRAFFIC SAFETY IMPROVEMENTS
PROPOSED ILLUMINATION PLAN

BU 54A AT
TITANIC AVENUE

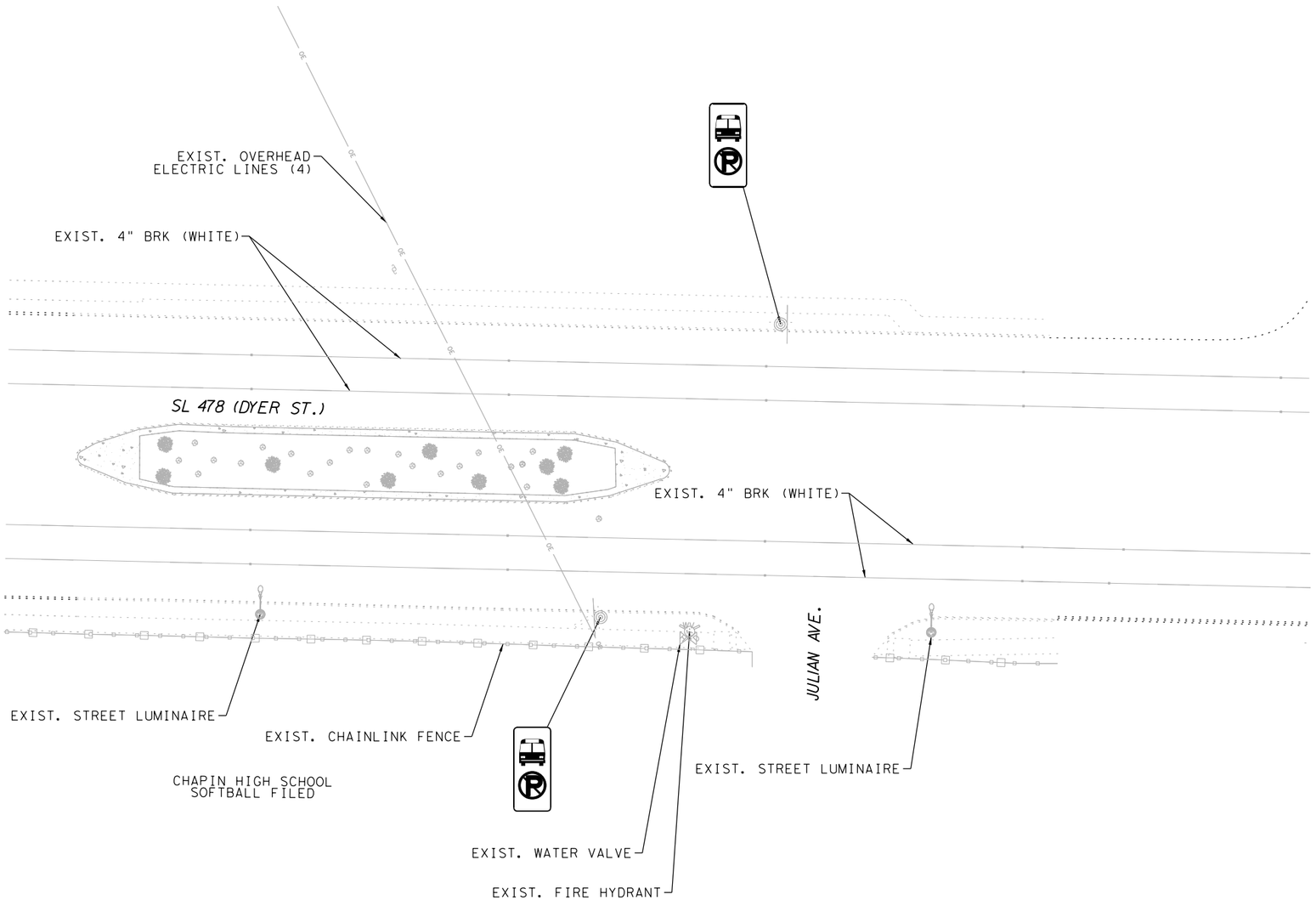
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	82
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.



0 10 20 40

ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET SIGN
- EXISTING WATER METER
- EXISTING STORM SEWER MANHOLE
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING STREET LUMINAIRE
- EXISTING VEGETATION
- EXISTING STAMPED CONCRETE
- EXISTING CHAINLINK FENCE

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TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS
EXISTING CONDITIONS

DYER STREET AT
JULIAN AVENUE

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AR	TEXAS	ELP	ELP, ETC.	83
CHECK	CONTROL	SECTION	JOB	
MP	0001	04	102, ETC.	
CHECK				
FC				

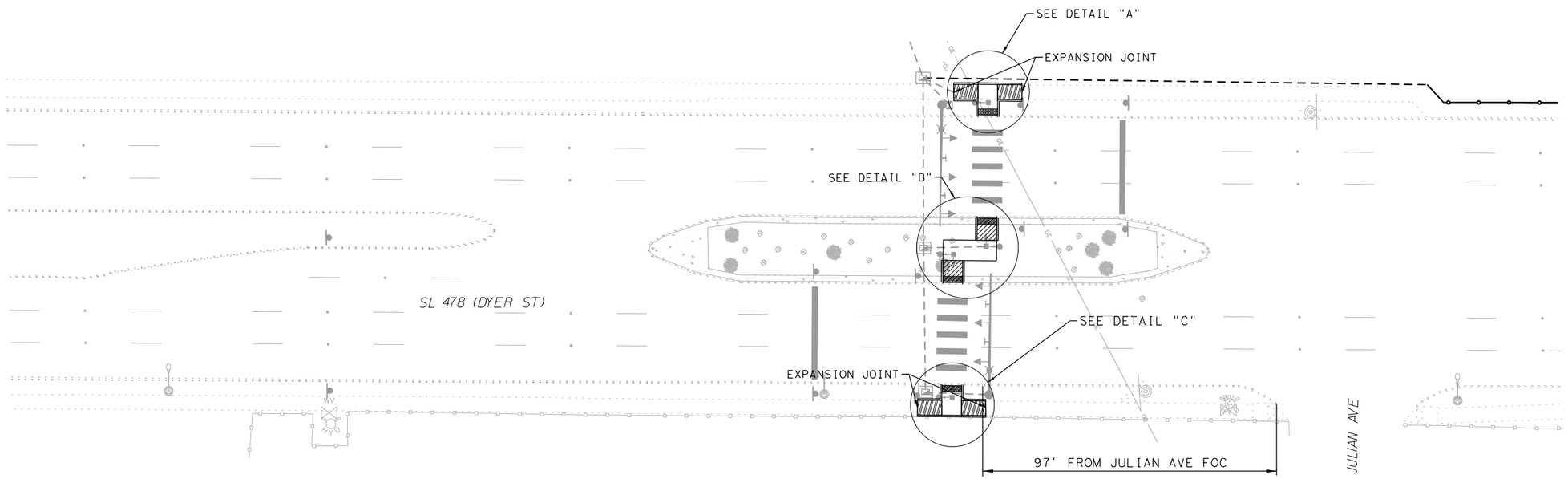
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.1_CHAPIN_EXISTING.dgn
$$$SCALE$$$
BY: $USER$

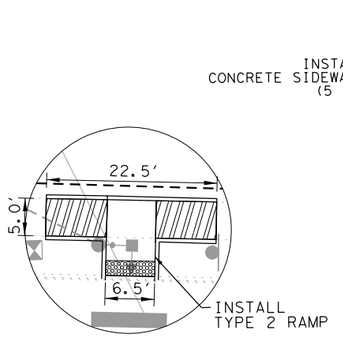
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

PEDESTRIAN RAMP / SIDEWALK SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
531	6002	CONC SIDEWALKS (5")	SY	5
531	6005	CURB RAMPS (TY 2)	EA	2
531	6010	CURB RAMPS (TY 7)	EA	2

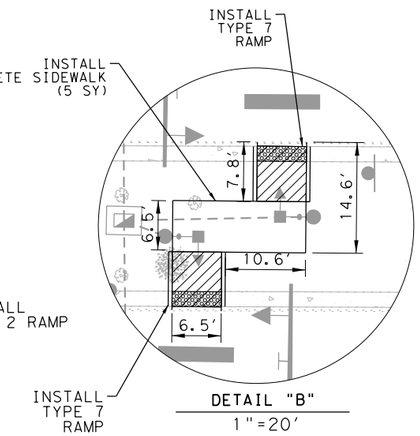
LEGEND

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- 5% MAX RUNNING SLOPE 2% MAX CROSS SLOPE

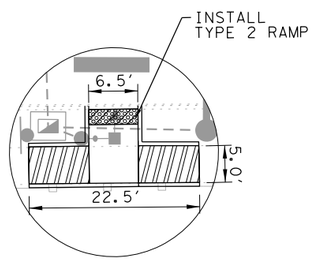




DETAIL "A"
1"=20'



DETAIL "B"
1"=20'



DETAIL "C"
1"=20'

NOTES:

1. INSTALLATION AND PAVEMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL, AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE.

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RAMP LAYOUT

SL 478 AT
JULIAN AVENUE

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	84
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, RADAR DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH RIO GRANDE ELECTRIC CO-OP (JESSE GUERRERO JGUERRERO@RGEC.COOP) CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.
5. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
6. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE CITY AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

PROPOSED SIGNALS

PEDESTRIAN HYBRID BEACON — SH 2, 3, 4, 7, 8, 9

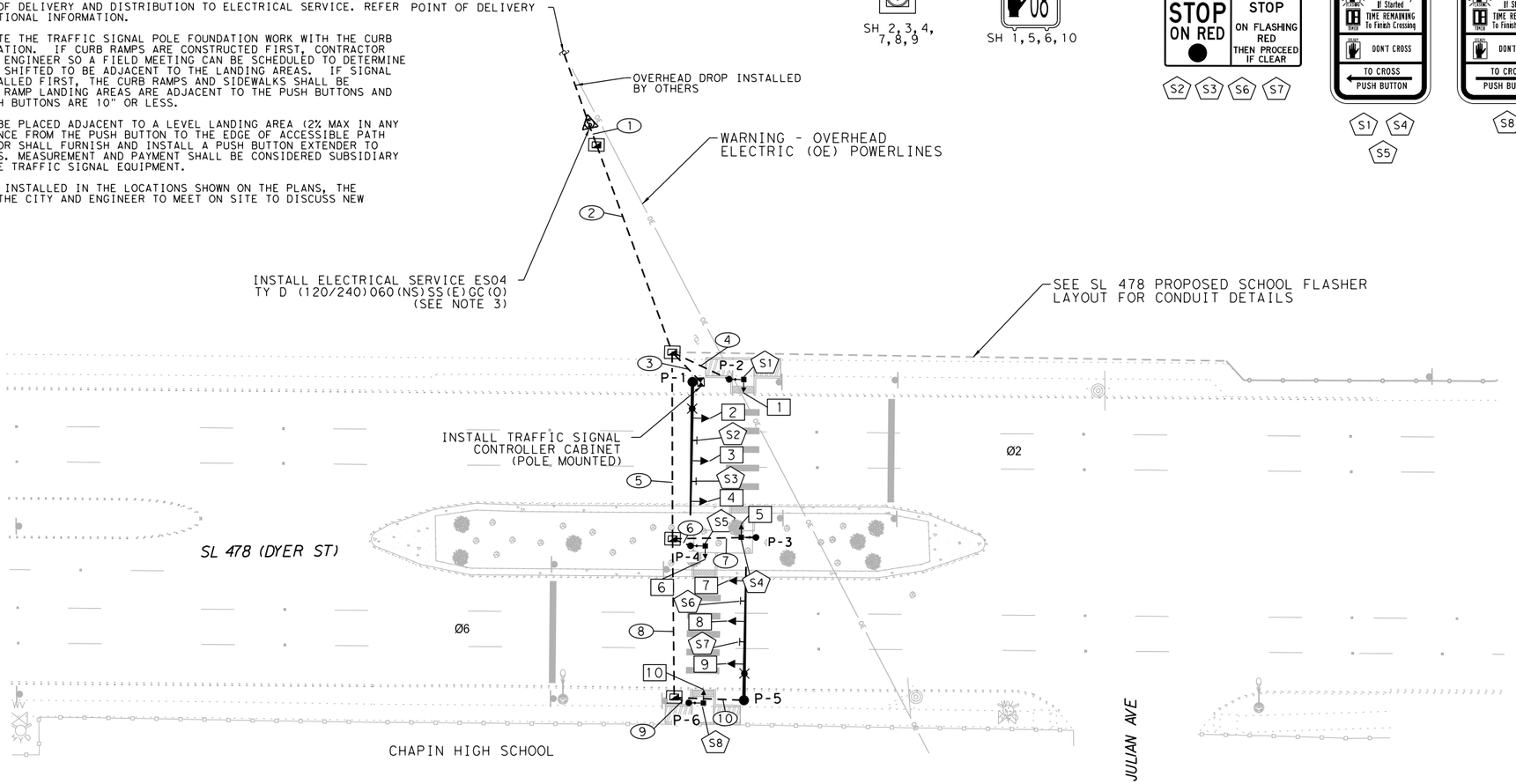
LED COUNTDOWN PEDESTRIAN SIGNAL — SH 1, 5, 6, 10

PROPOSED SIGNS

R10-23 (MOD) — S2 S3 S6 S7

R10-3EL — S1 S4 S5

R10-3ER — S8



LEGEND

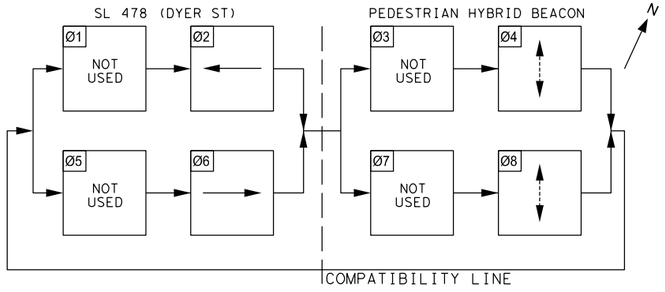
- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE (250W E.Q.), AND SIGNAGE
- PROPOSED PEDESTRIAN POLE WITH PEDESTRIAN SIGNAL AND PUSH BUTTON
- TRAFFIC SIGNAL CONTROLLER CABINET (POLE MOUNTED)
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER

0 10 20 40
ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

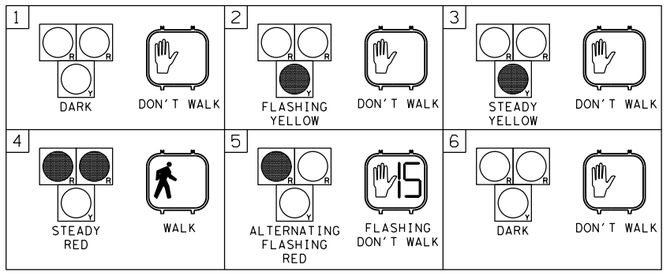
PROPOSED CONDITIONS SL 478 (PEDESTRIAN HYBRID BEACON) 125' WEST OF JULIAN AVE

PHASE SEQUENCE

COMPATIBLE PHASES
PEDESTRIAN MOVEMENT



SEQUENCE FOR A PEDESTRIAN HYBRID BEACON SIGNAL



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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

SL 478 AT JULIAN AVENUE

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	85
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.3_CHAPIN_LAYOUT.dgn

SIGNAL LAYOUT SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6003	EXCAVATION (SPECIAL)	CY	1.2
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26
618	6023	CONDT (PVC) (SCH 40) (2")	LF	160
618	6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	70
618	6029	CONDT (PVC) (SCH 40) (3")	LF	215
618	6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	70
620	6008	ELEC CONDR (NO.8) INSULATED	LF	640
620	6010	ELEC CONDR (NO.6) INSULATED	LF	865
624	6004	GROUND BOX TY B (122322)W/APRON	EA	5
628	6142	ELC SRV TY D 120/240 060(NS)SS(E)GC(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
	*	SIGN, R10-23(MOD) (30"x 42")	EA	4
	*	INSTALL OF CONTROL CABINET(POLE MNT)	EA	1
	*	CELLULAR MODEM	EA	1
	*	ATC CONTROLLER	EA	1
682	6003	VEH SIG SEC (12")LED(YEL)	EA	6
682	6005	VEH SIG SEC (12")LED(RED)	EA	12
682	6051	BACKPLATE W/REFL BRDR(3 SEC)ALUM (SPECIAL)	EA	6
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	635
684	6038	TRF SIG CBL (TY A)(14 AWG)(12 CONDR)	LF	430
684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	603
686	6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA	2

* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)".

CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

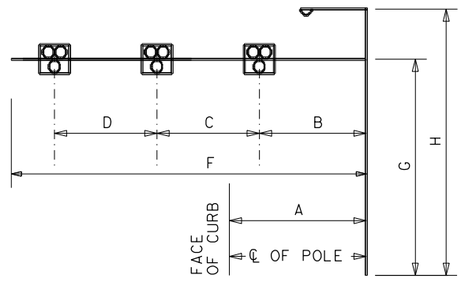
RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT								CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS						ITEM 684 TRAFFIC SIGNAL CABLES						TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		3" PVC (BORED)			NO. 6 XHHW INSULATED (POWER)		NO. 6 XHHW INSULATED (GROUND)		NO. 8 XHHW WIRE (POWER)		TY C 2 CNDR NO. 12		TY A 5 CNDR NO. 14		TY A 12 CNDR NO. 14			
		Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
*1	I	1	10							I	4	40	1	10	4	40							10	1
*2	I			1	70					I	4	280	1	70	2	140							70	2
								1	70	I			1	70			4	280	4	280	2	140		
3	I	1	15							I	2	30	1	15	2	30							15	3
						1	15			I			1	15							1	15		
4	I					1	20			I			1	20			1	20	1	20			20	4
5	I	1	60							I			1	60	2	120							60	5
						1	60			I			1	60			3	180	3	180	1	60		
6	I					1	10			I			1	10			1	10	1	10			10	6
7	I					1	25			I			1	25			1	25	1	25			25	7
8	I	1	50							I			1	50	2	100							50	8
						1	50			I			1	50			1	50	1	50	1	50		
9	I					1	10			I			1	10			1	10	1	10			10	9
10	I	1	25							I			1	25	2	50							25	10
						1	25			I			1	25							1	25		
TOTAL			160		70		215		70			350		515		480		575		575		290		

CONDUIT STATUS: I=INSTALL

* CONDUIT RUN 1 AND 2 CONTAIN POWER CABLE FOR THE WB SCHOOL FLASHERS.

CONDUCTOR FROM POLE BASE TO SIGNAL HEAD		
POLE NO.	VEHICLE SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (12 CONDR)
P-1	2	15
	3	15
	4	40
P-5	7	40
	8	15
	9	15
TOTAL (FT)		140

CONDUCTOR FROM POLE BASE TO PEDESTRIAN PUSH BUTTON		
POLE NO.	PED PUSH BUTTON NO.	TRF SIG CBL (12 AWG) (2 CONDR)
P-2	PB1	7
P-3	PB2	7
P-4	PB3	7
P-6	PB4	7
TOTAL (FT)		28



CONDUCTOR FROM POLE BASE TO PEDESTRIAN SIGNAL HEAD		
POLE NO.	PED SIGNAL HEAD NO.	TRF SIG CBL (14 AWG) (5 CONDR)
P-2	1	15
P-3	5	15
P-4	6	15
P-6	10	15
TOTAL (FT)		60

CONDUCTOR FROM POLE BASE TO LUMINAIRE	
POLE NO.	NO. 8 XHHW WIRE
P-1	80
P-5	80
TOTAL (FT)	160

SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)	NO. OF HEADS (EA) *	LUM	DRILLED SHAFT LENGTH (FT)		FDN. TYPE WIND ZONE (80 MPH)
												24" DIA SUB TO ITEM 687	36" DIA TYPE A ITEM 416	
P-1	I	3.8	10.8	12.8	12.1	-	40	19	30	3	YES	-	13	36-A
P-2	I	4.7	PEDESTRIAN SIGNAL POLE					10	-	-	-	6	-	24-A
P-3	I	9.9	PEDESTRIAN SIGNAL POLE					10	-	-	-	6	-	24-A
P-4	I	9.9	PEDESTRIAN SIGNAL POLE					10	-	-	-	6	-	24-A
P-5	I	3.5	10.8	12.8	12.1	-	40	19	30	3	YES	-	13	36-A
P-6	I	5.0	PEDESTRIAN SIGNAL POLE					10	-	-	-	6	-	24-A
										TOTAL:		24	26	

SIGNAL POLE STATUS: I=INSTALL

*- DOES NOT INCLUDE SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

SL 478 AT
JULIAN AVENUE

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	86
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.4_CHAPIN_TABLES.dgn

APS MESSAGE CHART

POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-2	Phase 4	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-2	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET AT MEDIAN.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.
P-3	Phase 8	BUTTON PUSH ON DW	WAIT.
		EXTENDED BUTTON PUSH	WAIT TO CROSS DYER STREET.
		LOCATOR TONE	SLOW TICK.
		WALK INDICATION*	RAPID TICK.

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-3EL	PED PUSH BUTTON	I	**	P-1	9"x 15"
S2	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S3	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-2	30"x 42"
S4	R10-3EL	PED PUSH BUTTON	I	**	P-3	9"x 15"
S5	R10-3EL	PED PUSH BUTTON	I	**	P-4	9"x 15"
S6	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-5	30"x 42"
S7	R10-23 (MOD)	CROSSWALK STOP ON RED	I	*	P-5	30"x 42"
S8	R10-3ER	PED PUSH BUTTON	I	**	P-6	9"x 15"

STATUS: I=INSTALL

*SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 680)

**SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 688)

ADA QUANTITIES

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	4
687	6001	PED POLE ASSEMBLY	EA	4
688	6001	PED DETECT PUSH BUTTON (APS)	EA	4
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3EL)	EA	3
	**	PEDESTRIAN PUSH BUTTON (9"x 15") (R10-3ER)	EA	1
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1

** SUBSIDIARY TO ITEM 688

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION					PED SIG SEC (LED) (COUNTDOWN)
	SIGNAL HEAD TYPE	STATUS	BACK PLATE (SPECIAL)	LED SIGNAL LAMPS		
			3 SEC	Y	R	
			EA	EA	EA	EA
1	PED	I				1
2	PHB	I	1	1	2	
3	PHB	I	1	1	2	
4	PHB	I	1	1	2	
5	PED	I				1
6	PED	I				1
7	PHB	I	1	1	2	
8	PHB	I	1	1	2	
9	PHB	I	1	1	2	
10	PED	I				1
TOTAL (NEW)			6	6	12	4

STATUS: I=INSTALL

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	LATITUDE	LONGITUDE	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES04 SL 478 AT JULIAN AVENUE	TY D (120/240) 060 (NS) SS (E) GC (O) 290' SOUTHWEST OF LEO STREET	31.846417°	-106.444083°	2"	3 / #4	N/A	2P / 60	30	100	PEDESTRIAN HYBRID BEACON LIGHTING WB FLASHER	1P / 30 2P / 20 1P / 30	23 2 23	5.8

** VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

3/29/2024

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CARLYE L. LIDE
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Carlye Lide

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED PEDESTRIAN HYBRID BEACON LAYOUT

SL 478 AT JULIAN AVENUE

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	87
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PROPOSED SIGNS

W11-2 (18"x18")
W16-9P (24"x12")

S1 S2 S11

R10-6L

(24"x36")
S4 S9

R10-6R

(24"x36")
S3 S10

W11-2 (18"x18")

S8 S6

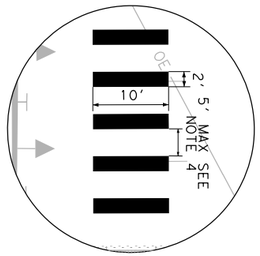
W16-7PL (24"x12")

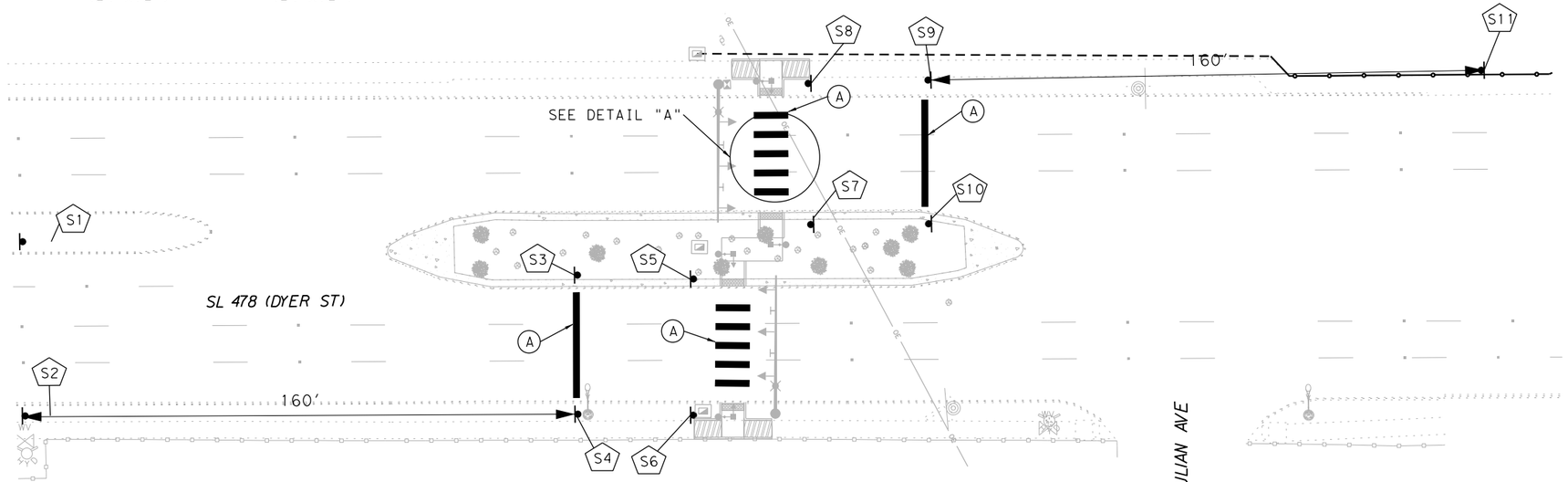
W11-2 (18"x18")

S5 S7

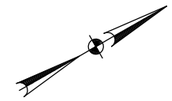
W16-7 (24"x12")

DETAIL "A"
1"=20'





0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'



LEGEND

PAVEMENT MARKING

(A) REFL PAV MRK TY II (W)24"(SLD)(90MIL)

EXISTING SIGN

PROPOSED SIGN

S1 SIGN LABEL

NOTES:

1. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE.
2. ALL EXISTING SIGNS AND PAVEMENT MARKING TO REMAIN UNLESS OTHERWISE NOTED.
3. ELIMINATE EXISTING PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
4. LONGITUDINAL CROSSWALK LINES SHOULD NOT BE PLACED IN THE WHEEL PATH OF VEHICLES. CENTER THE CROSSWALK LINES ON TRAVEL LANES AND LANE LINES.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	11
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	165
666	6230	PAVEMENT SEALER 24"	LF	165
678	6008	PAV SURF PREP FOR MRK (24")	LF	165

3/29/2024

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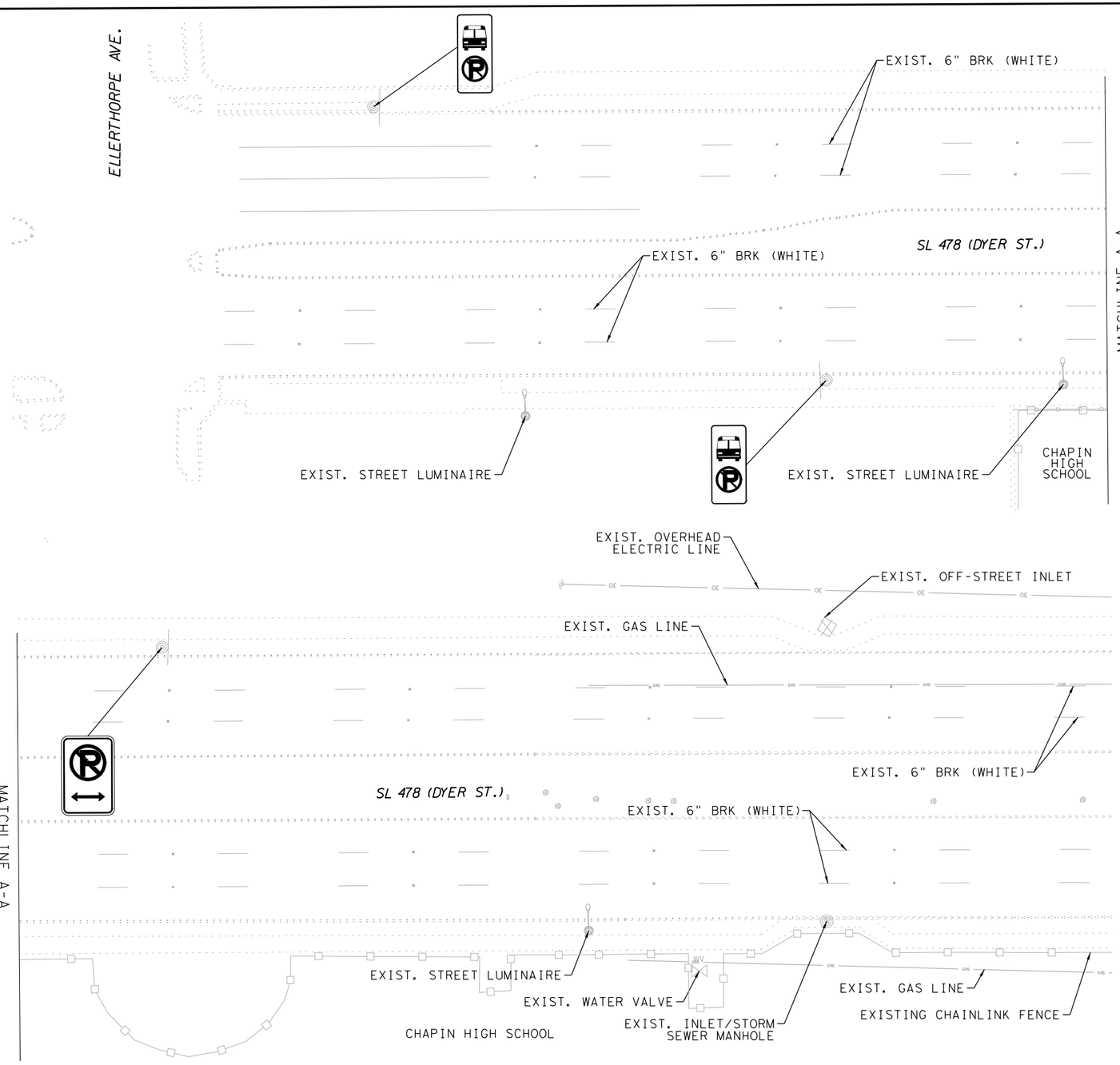
TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SIGNING AND PAVEMENT MARKING LAYOUT

SL 478 AT
JULIAN AVENUE

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	88
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				



EXIST. CONDITIONS SL 478 (EB SCHOOL FLASHER)
680' EAST OF ELLERTHORPE AVE.

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET SIGN
- EXISTING WATER METER
- EXISTING STORM SEWER MANHOLE
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING STREET LUMINAIRE
- EXISTING VEGETATION
- EXISTING CHAINLINK FENCE

STATE OF TEXAS
MANUEL A. PALMA
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3/29/2024

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www.ceagroup.net
TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS

SL 478
SCHOOL FLASHERS

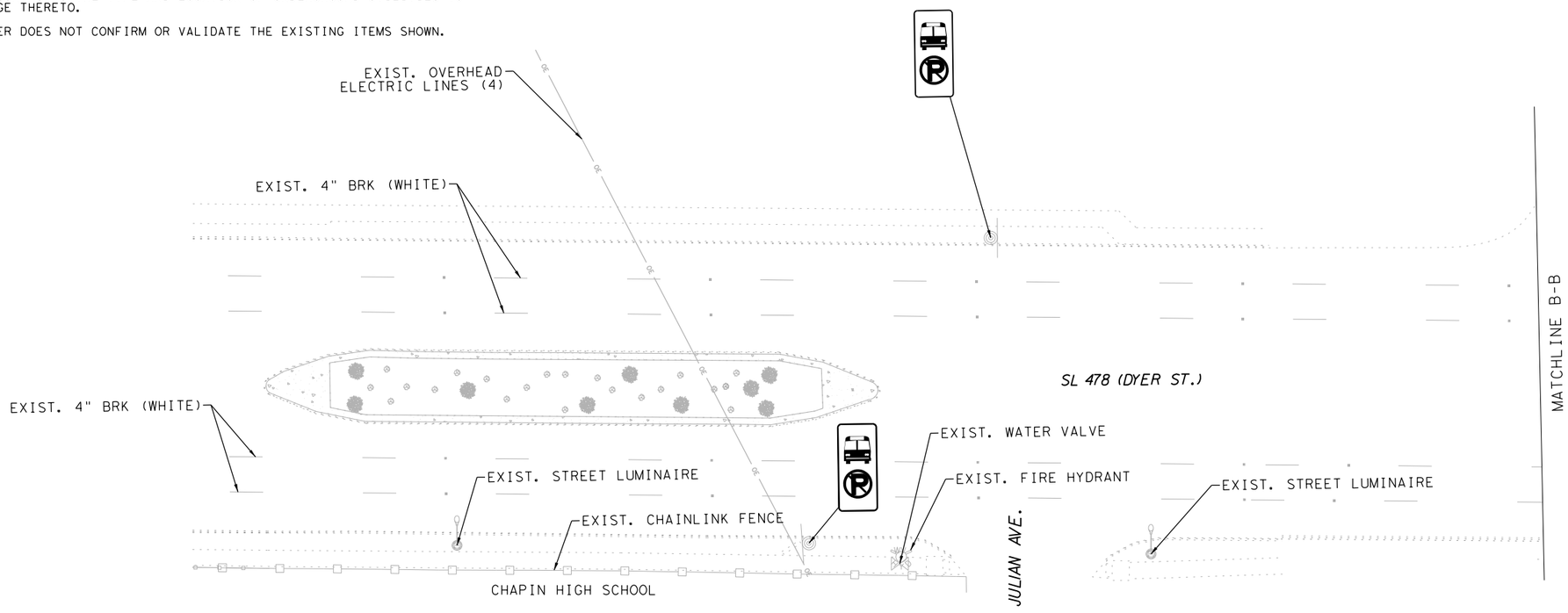
SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	ELP	ELP,ETC.	
CHECK MP	CONTROL	SECTION	JOB	89
CHECK FC	0001	04	102,ETC.	

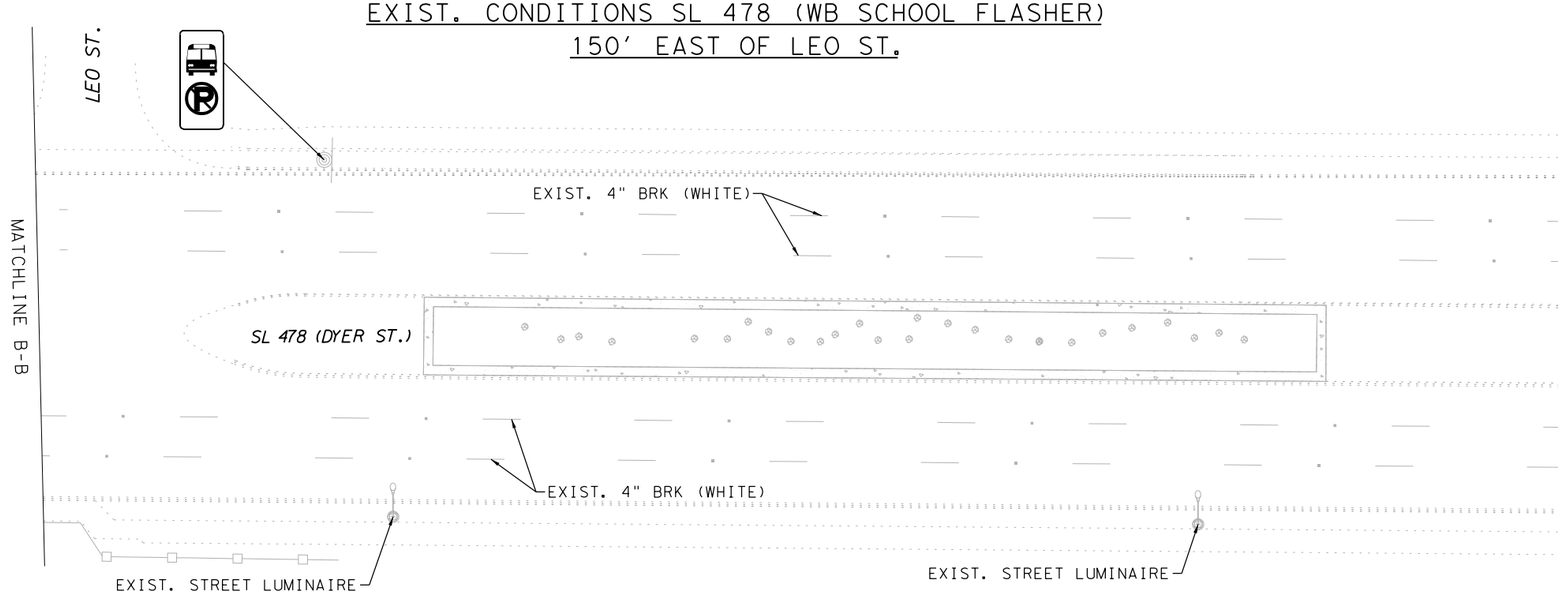
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RGH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.7_CHAPIN_FLASHERS_EXISTI
$$$SCALE$$$
BY: $USER$

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.



EXIST. CONDITIONS SL 478 (WB SCHOOL FLASHER) 150' EAST OF LEO ST.



0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- EXISTING STREET SIGN
- EXISTING WATER METER
- EXISTING STORM SEWER MANHOLE
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING STREET LUMINAIRE
- EXISTING VEGETATION
- EXISTING STAMPED CONCRETE
- EXISTING CHAINLINK FENCE

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TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS
EXISTING CONDITIONS

SL 478
SCHOOL FLASHERS

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AR	TEXAS	ELP	ELP, ETC.	90
CHECK	CONTROL	SECTION	JOB	
MP	0001	04	102, ETC.	
CHECK				
FC				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.7A_CHAPIN_FLASHERS_EXIST
$$$SCALE$$$
BY: $USER$

PROPOSED SIGNAL

H1

SH
1, 2, 3, 4, 5, 6,

PROPOSED SIGNS

S5-1

(24"x 48")

S1

S7-1T

(36"x 18")

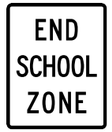
S2

S6-1T

(84"x 36")

S3

S5-2



(24"x 30")

S4

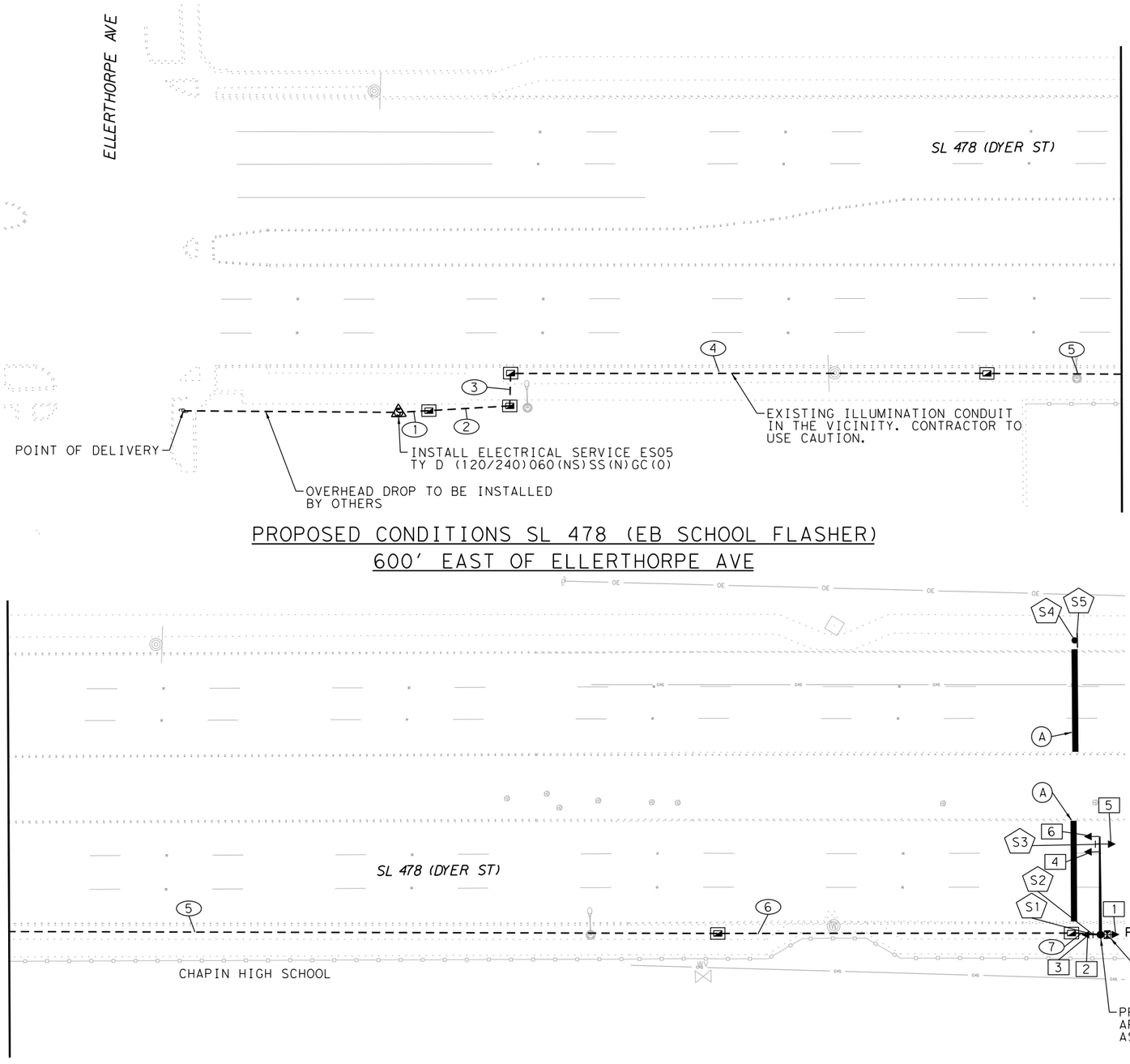
R2-1

(24"x 30")

S5

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS A DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC (IVAN AVILA 915-543-5816) CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. SEE SCHOOL FLASHER DETAIL FOR MORE INFORMATION.



PROPOSED CONDITIONS SL 478 (EB SCHOOL FLASHER)
600' EAST OF ELLERTHORPE AVE

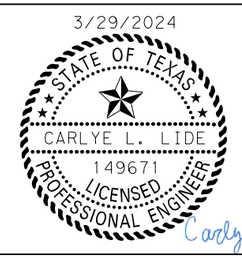
SIGNING & PAVEMENT MARKING SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	1
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	70
666	6230	PAVEMENT SEALER 24"	LF	70
678	6008	PAV SURF PREP FOR MRK (24")	LF	70

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH SCHOOL ZONE FLASHER AND SIGNAGE
- PROPOSED TYPE B GROUND BOX
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED POLE MOUNTED CABINET
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- (S) PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)

3/29/2024



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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SCHOOL FLASHERS LAYOUT

SL 478
SCHOOL FLASHERS

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	91
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.8A_CHAPIN_SCHOOL_FLASHER

PROPOSED SIGNAL

H1

SH
7, 8, 9, 10, 11, 12

PROPOSED SIGNS

S5-1

(24"x 48")
S5

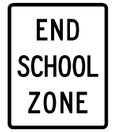
S7-1T

(36"x 18")
S6

S6-1T

(84"x 36")
S7

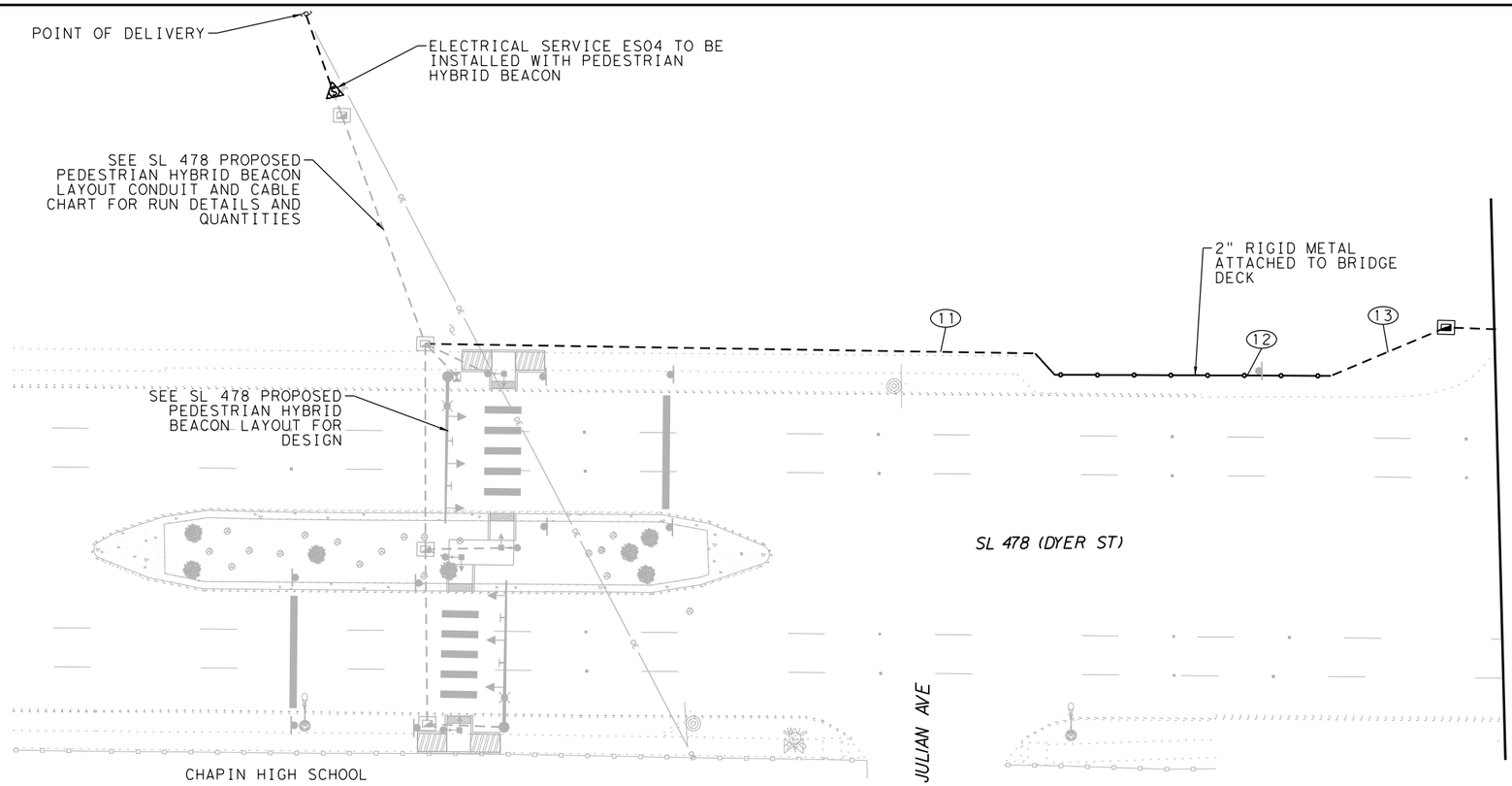
S5-2



(24"x 30")
S8

R2-1

(24"x 30")
S9

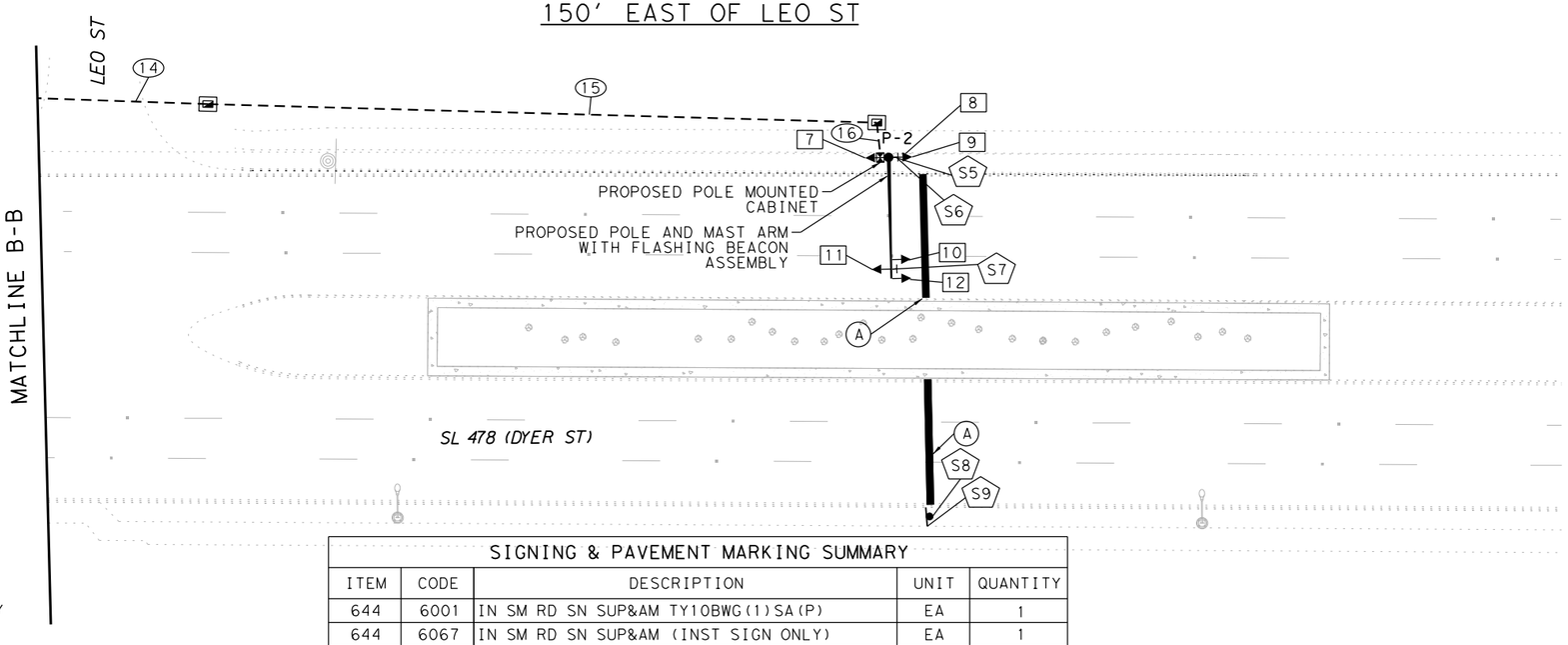


0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL WITH SCHOOL ZONE FLASHER AND SIGNAGE
- PROPOSED TYPE B GROUND BOX W/ APRON
- PROPOSED POLE MOUNTED CABINET
- PROPOSED CONDUIT
- PROPOSED RIGID METAL CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- S1 SIGN LABEL
- PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)

PROPOSED CONDITIONS SL 478 (WB SCHOOL FLASHERS)
150' EAST OF LEO ST



NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, CONDUIT, GROUND BOXES, AND CONDUCTORS A DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE WITH EL PASO ELECTRIC (IVAN AVILA 915-543-5816) CONCERNING TRAFFIC SIGNAL ELECTRICAL SERVICE. CONTACT EL PASO ELECTRIC REGARDING POINT OF DELIVERY AND DISTRIBUTION TO ELECTRICAL SERVICE. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
4. SEE SCHOOL FLASHER DETAIL FOR MORE INFORMATION.

SIGNING & PAVEMENT MARKING SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6067	IN SM RD SN SUP&AM (INST SIGN ONLY)	EA	1
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	70
666	6230	PAVEMENT SEALER 24"	LF	70
678	6008	PAV SURF PREP FOR MRK (24")	LF	70

3/29/2024

STATE OF TEXAS
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149671
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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SCHOOL FLASHERS LAYOUT

SL 478
SCHOOL FLASHERS

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	92
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

SIGNAL LAYOUT SUMMARY

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
110	6003	EXCAVATION (SPECIAL)	CY	0.4
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	22
618	6023	CONDT (PVC) (SCH 40) (2")	LF	875
618	6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	190
618	6070	CONDT (RM) (2")	LF	85
620	6010	ELEC CONDR (NO.6) INSULATED	LF	3,450
624	6004	GROUND BOX TY B (122322)W/APRON	EA	9
628	6149	ELC SRV TY D 120/240 060(NS)SS(N)GC(O)	EA	1
680	6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	2
	*	POLE MOUNTED CONTROL CABINET	EA	2
	*	SIGN, SCHOOL SPEED LIMIT 25 WHEN FLASHING (24"x48") (S5-1)	EA	2
	*	SIGN, CELL PHONE USE PROHIBITED (36"x18") (S7-1T)	EA	2
	*	SIGN, SCHOOL SPEED LIMIT 25 WHEN FLASHING (84"x36") (S6-1T)	EA	2
	*	SCHOOL FLASHER CONTROLLER	EA	2
	*	GPS CLOCK	EA	2
	*	CELLULAR MODEM	EA	2
682	6003	VEH SIG SEC (12")LED(YEL)	EA	12
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	330
686	6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	2

* SUBSIDIARY TO ITEM 680 6001 "INSTALL HWY TRF SIG (FLASH BEACON)".

EB SCHOOL FLASHER CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT				CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				TOTAL LENGTH OF RUN	RUN NO
		2" PVC (TRENCHED)		2" PVC (BORED)			NO. 6 XHHW INSULATED (POWER)		NO. 6 XHHW INSULATED (GROUND)			
		Qty	Len	Qty	Len		Qty	Len	Qty	Len		
1	I	1	10			I	2	20	1	10	10	1
2	I	1	30			I	2	60	1	30	30	2
3	I			1	15	I	2	30	1	15	15	3
4	I	1	155			I	2	310	1	155	155	4
5	I	1	275			I	2	550	1	275	275	5
6	I			1	115	I	2	230	1	115	115	6
7	I	1	10			I	2	20	1	10	10	7
TOTAL			480		130			1220		610		

CONDUIT STATUS: I=INSTALL

CONDUCTOR FROM CABINET TO SIGNAL HEAD

POLE NO.	SIGNAL HEAD NO.	TY A 5 CNDR NO. 14
P-1	1	5
P-1	2	5
P-1	3	15
P-1	4	45
P-1	5	45
P-1	6	50
P-2	7	5
P-2	8	5
P-2	9	15
P-2	10	45
P-2	11	45
P-2	12	50
TOTAL (FT)		330

WB SCHOOL FLASHER CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT						CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				TOTAL LENGTH OF RUN	RUN NO
		2" (METAL RIGID)		2" PVC (TRENCHED)		2" PVC (BORED)			NO. 6 XHHW INSULATED (POWER)		NO. 6 XHHW INSULATED (GROUND)			
		Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len		
11	I			1	170			I	2	340	1	170	170	11
12	I	1	85					I	2	170	1	85	85	12
13	I			1	35			I	2	70	1	35	35	13
14	I					1	60	I	2	120	1	60	60	14
15	I			1	180			I	2	360	1	180	180	15
16	I			1	10			I	2	20	1	10	10	16
TOTAL			85		395		60			1080		540		

CONDUIT STATUS: I=INSTALL

* SEE SL 478 AT JULIAN AVE PEDESTRIAN HYBRID BEACON LAYOUT FOR CONDUIT AND CABLE CONNECTION TO ELECTRICAL SERVICE ES04. SEE ES04 ELECTRICAL SERVICE DATA TABLE FOR CIRCUIT INFORMATION.

SIGNS SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	S5-1	SCHOOL SPEED LIMIT 25 WHEN FLASHING	I	*	P-1	24"x48"
S2	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-1	36"x18"
S3	S6-1T	SCHOOL SPEED LIMIT 25 WHEN FLASHING	I	*	P-1	84"x36"
S4	S5-1	SCHOOL SPEED LIMIT 25 WHEN FLASHING	I	*	P-2	24"x48"
S5	S7-1T	CELL PHONE USE PROHIBITED	I	*	P-2	36"x18"
S6	S6-1T	SCHOOL SPEED LIMIT 25 WHEN FLASHING	I	*	P-2	84"x36"

STATUS: I=INSTALL

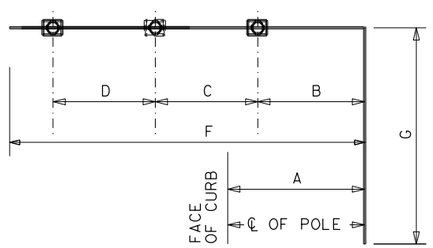
* SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (SUB TO ITEM 680)

SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	F (FT)	G (FT)	NO. OF HEADS (EA)*	LUM	DRILLED SHAFT 30" DIA TYPE A ITEM 416	DRILLED SHAFT FDN TYPE WIND ZONE (80 MPH)
P-1	I	6.0	27	2.5	2.5	32	19	3	NO	11	30-A
P-2	I	6.0	27	2.5	2.5	32	19	3	NO	11	30-A
								TOTAL:		22	

SIGNAL POLE STATUS: I=INSTALL

*- DOES NOT INCLUDE SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS



SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION		
	SIGNAL HEAD TYPE	STATUS	VEHICLE SIGNAL Y (EA)
1, 2, 3, 4, 5, 6	H1	I	6
7, 8, 9, 10, 11, 12	H1	I	6
		TOTAL (NEW)	12

STATUS: I=INSTALL

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	LATITUDE	LONGITUDE	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES05 SL 478 AT ELLERTHORPE AVE	TY D (120/240) 060 (NS) SS (N) GC (O) (52' EAST OF SL 478 ON ELLERTHORPE AVE)	31.841489°	-106.444998°	2"	3 / #4	N/A	2P / 60	N/A	100	EB FLASHER	1P / 20	10	1.2

** VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

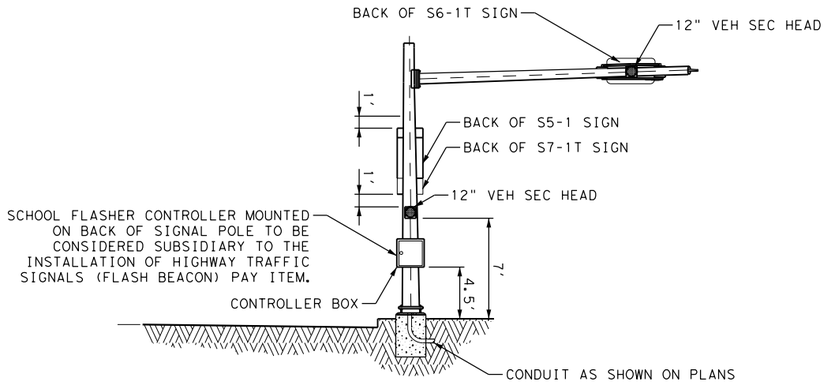
PROPOSED SCHOOL FLASHERS LAYOUT

SL 478 SCHOOL FLASHERS

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS CL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MK	TEXAS	ELP	ELP,ETC.	93
CHECK DL	CONTROL	SECTION	JOB	
	0001	04	102,ETC.	

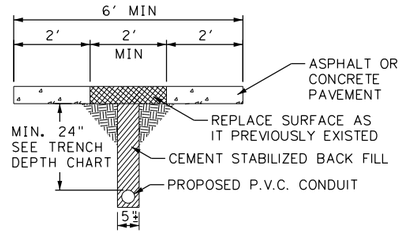
PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.9_CHAPIN_FLASHERS_TABLES



BACKSIDE OF SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

TRENCH DEPTH CHART	
SYSTEM	DEPTH (MIN)
SAFETY FLASHERS	24 INCHES

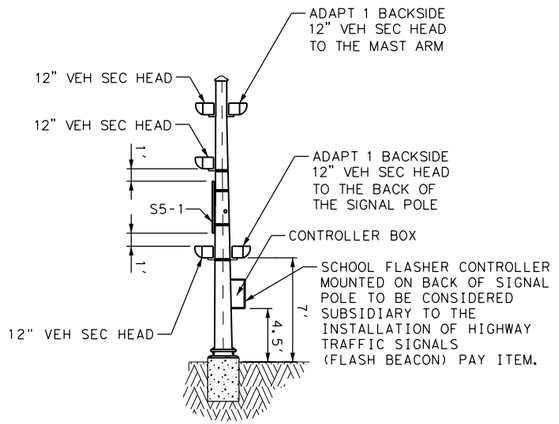


PAVEMENT

SCALE: NTS

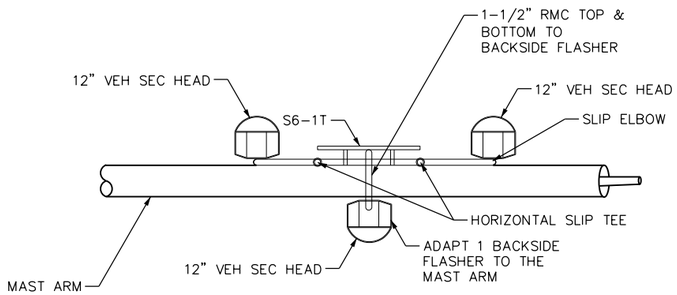
NOTES:

1. SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAILS AND DIMENSIONS ARE SHOWN AS EXAMPLES ONLY. OPTIONAL DESIGNS SHALL MEET ALL OTHER REQUIREMENTS FOR TRAFFIC SIGNAL POLE ASSEMBLIES AND SHALL BE APPROVED IN WRITING BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE.
2. SCHOOL SAFETY FLASHER BRACKET ASSEMBLIES AND ALL NECESSARY BOLTS, CLAMPS, NUTS, WASHERS, TEMPLATES, MATERIALS, LABOR, TOOLS AND EQUIPMENT NECESSARY TO COMPLETE THE INSTALLATION SHALL BE CONSIDERED SUBSIDIARY TO "TRAFFIC SIGNAL POLE ASSEMBLIES".
3. THE LOCATION OF THE SIGNAL POLE, AND FIXTURES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE TO ACCOMMODATE LOCAL CONDITIONS. EXACT LOCATION OF SIGNAL POLE, CONTROLLER, ETC. TO BE APPROVED BY THE OWNER OR ITS DESIGNATED REPRESENTATIVE IN THE FIELD.
4. PROPOSED SIGNS AND BRACKET ASSEMBLY MOUNTED ON SIGNAL MAST ARM/POLE SHALL BE BANDED. DRILLING THROUGH MAST ARM OR POLE WILL NOT BE ACCEPTED.
5. THE OUTSIDE EDGE OF THE DRILLED SHAFT SHALL BE A MINIMUM OF 3' FROM THE FACE OF CURB.
6. CONTRACTOR SHALL PROVIDE ONE CONTROLLER BOX OF SUFFICIENT DIMENSION TO HOUSE ONE CONTROLLER UNITS.
7. CONTRACTOR SHALL PROVIDE ALL FLASHER ASSEMBLIES AND CONTROLLERS FROM MANUFACTURERS PREQUALIFIED BY TXDOT.
8. CONTROLLER UNITS (TIME CLOCKS) SHALL BE PROGRAMMABLE, A MINIMUM OF TWO RELAY OUTPUTS, AND ALLOW FOR MULTIPLE PROGRAMS, ALTERNATE PROGRAM SCHEDULES, AND EXEMPTION PERIODS.



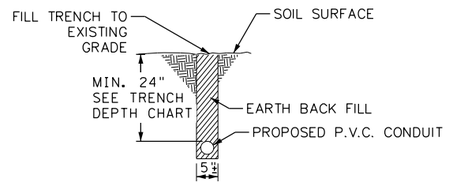
SIDE VIEW

SCALE: NTS



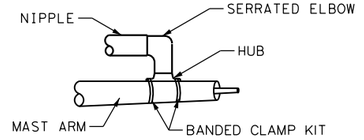
TOP VIEW

SCALE: NTS



OPEN SOIL TRENCH

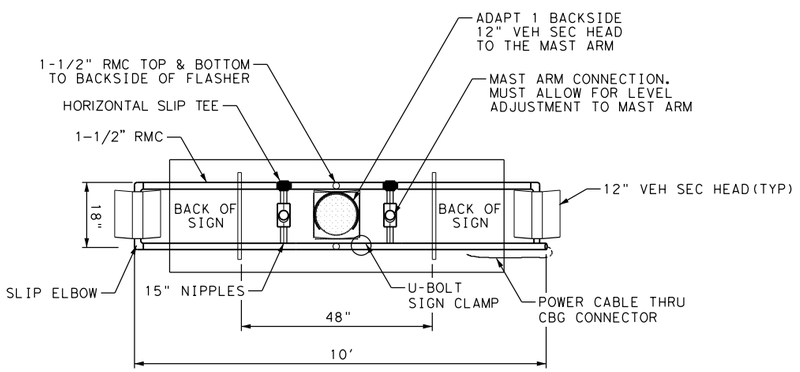
SCALE: NTS



MAST ARM CONNECTION DETAIL

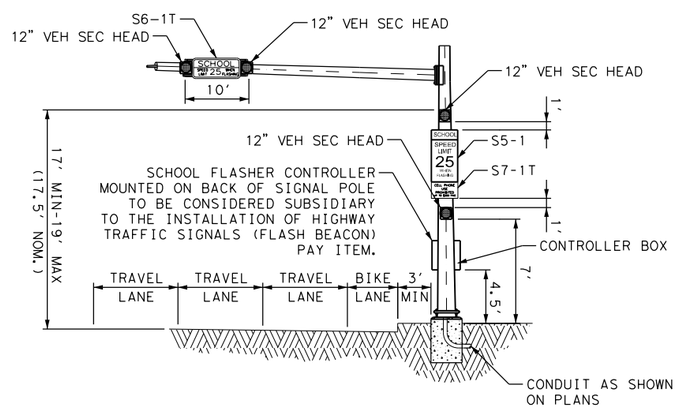
SCALE: NTS

TRENCH DETAILS



SCHOOL SAFETY FLASHER BRACKET ASSEMBLY DETAIL - BACK VIEW

SCALE: NTS



SCHOOL SAFETY FLASHER MAST ARM DETAIL

SCALE: NTS

3/29/2024

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Texas Department of Transportation
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TRAFFIC SAFETY IMPROVEMENTS

SCHOOL FLASHER DETAIL

SL 478
SCHOOL FLASHERS

SHEET 1 OF 1

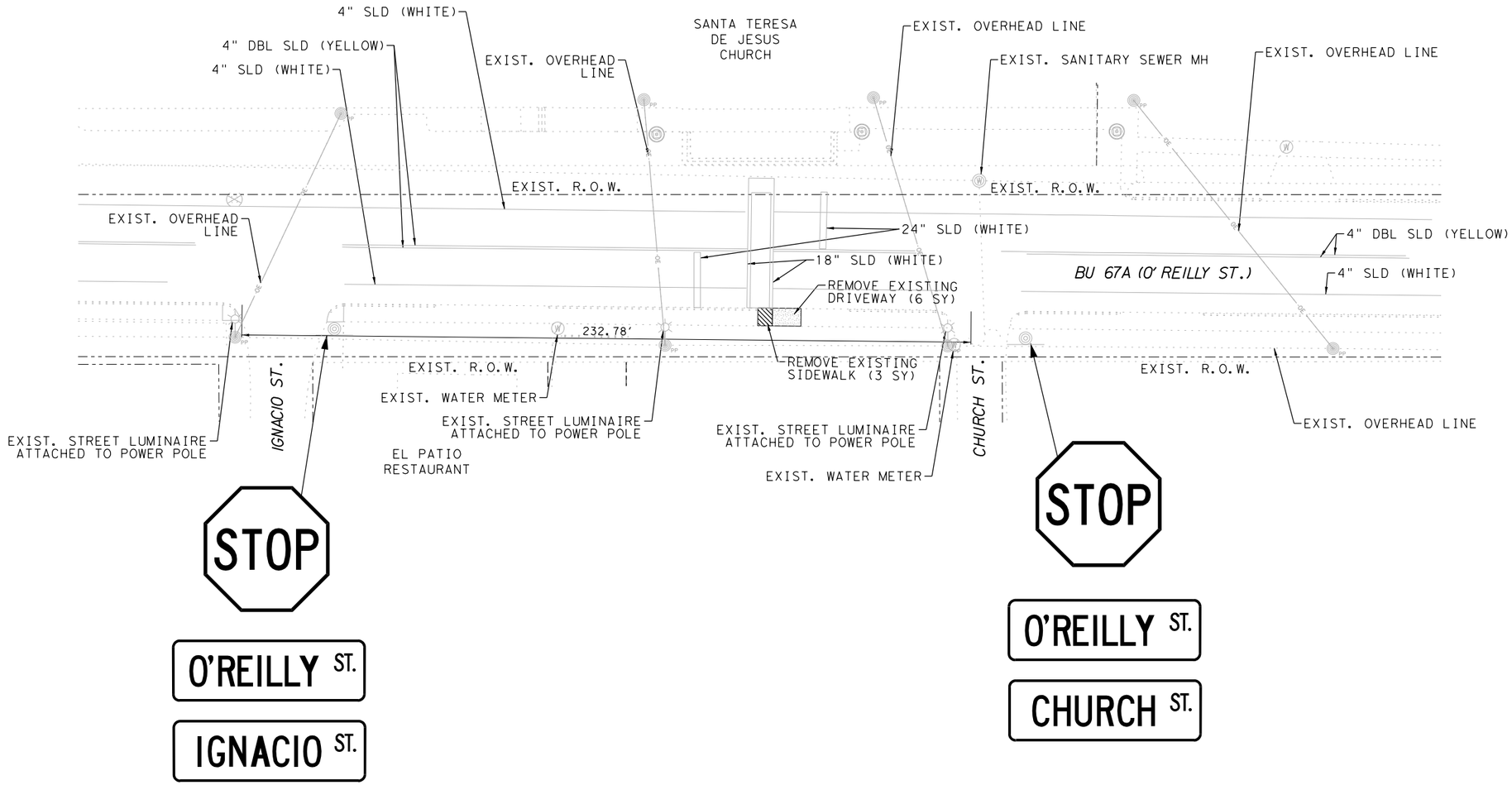
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	
CHECK	CONTROL	SECTION	JOB	94
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_105.10_CHAPIN_FLASHERS_DETAILS.dgn

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.

REMOVAL SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
104	6015	REMOVING CONC (SIDEWALKS)	SY	3
104	6017	REMOVING CONC (DRIVEWAYS)	SY	6
110	6003	EXCAVATION (SPECIAL)	CY	0.4



0 10 20 40
ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

LEGEND

- EXISTING STREET SIGN
- EXISTING WATER METER
- EXISTING SEWER MH
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING STREET LUMINAIRE
- EXISTING SMALL LUMINAIRE
- REMOVE EXISTING CONCRETE SIDEWALK
- REMOVE EXISTING DRIVEWAY

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TEXAS REGISTERED ENGINEERING FIRM F-4564

TRAFFIC SAFETY IMPROVEMENTS

EXISTING CONDITIONS AND REMOVALS

BU 67A AT CHURCH STREET

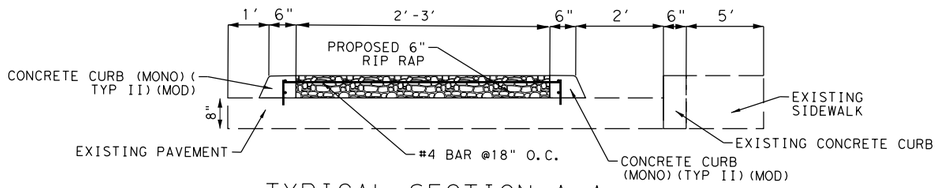
SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
N/A	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MP	TEXAS	ELP	ELP, ETC.	95
CHECK FC	CONTROL	SECTION	JOB	
	0001	04	102, ETC.	

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_104.1_PRESIDIO_EXISTING.dgn
$$$SCALE$$$
BY: $USER$

MEDIAN / ROADWAY SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
432	6003	RIPRAP (CONC)(6 IN)	CY	3.1
529	6034	CONC CURB (MONO) (TY II) (MOD)	LF	152
530	6004	DRIVEWAYS (CONC)	SY	6

PEDESTRIAN RAMP / SIDEWALK SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
531	6010	CURB RAMPS (TY 7)	EA	1
531	6040	CURB RAMPS (TY3)(MOD)	EA	1



TYPICAL SECTION A-A

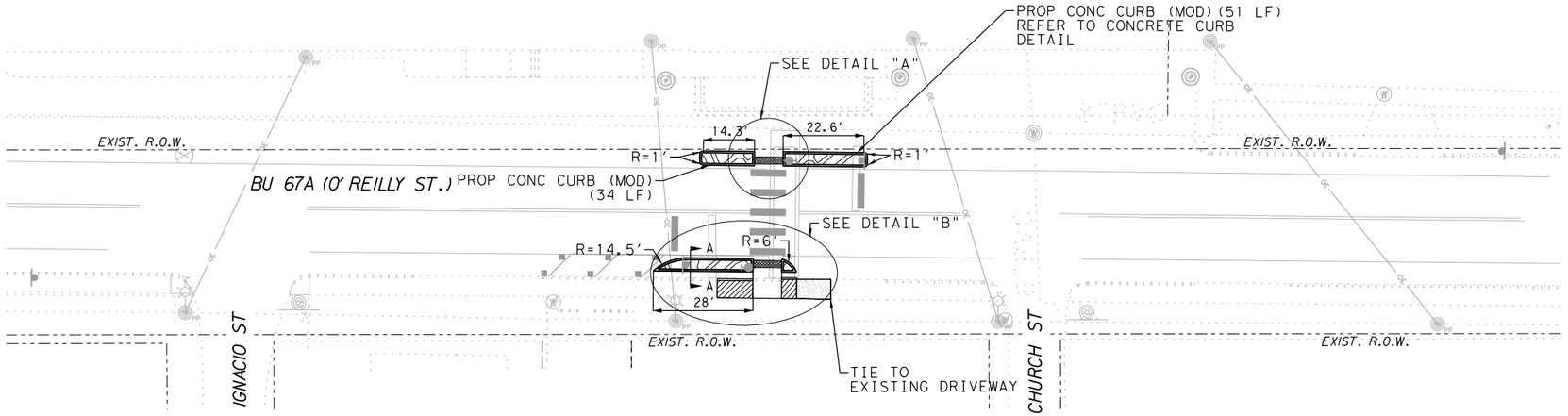
NTS

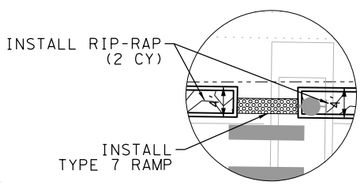
0 10 20 40

ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

LEGEND

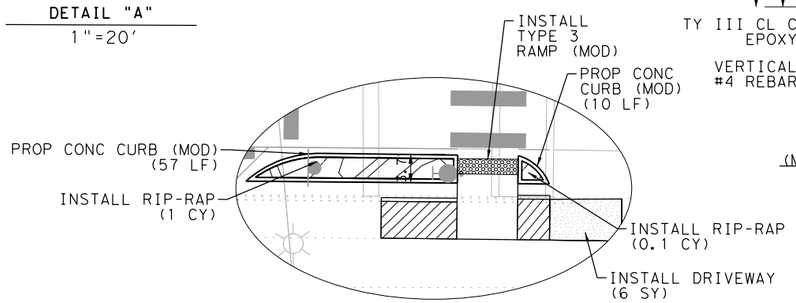
- 8.3% MAX RUNNING SLOPE, 2% MAX CROSS SLOPE
- INSTALL CONCRETE CURB
- INSTALL CONCRETE DRIVEWAY
- INSTALL RIP-RAP





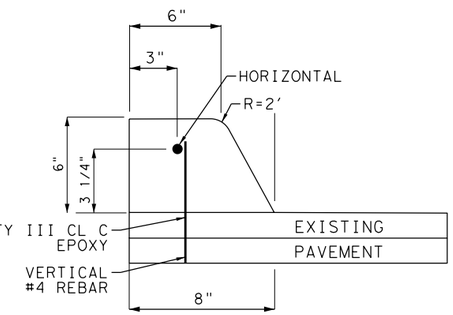
DETAIL "A"

1"=20'



DETAIL "B"

1"=20'



CONCRETE CURB (MONO) (TY II) (MOD)

MEDIAN CURB

NOTES:

1. INSTALLATION AND PAVEMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL, AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS.
2. EXISTING STRIPING AND RPMS UNDER PROPOSED MEDIAN SHALL BE REMOVED PRIOR TO MEDIAN INSTALLATION. STRIPING AND RPMS REMOVAL WILL BE PAID FOR UNDER ITEM 677 "ELIMINATE EXISTING PAVEMENT MARKINGS AND MARKERS".
3. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
4. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE.
5. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND SUBSTITUTIION OF ANY DAMAGED IRRIGATION EQUIPMENT.
6. MEDIAN WIDTH IS MEASURED FROM FACE OF CURB.
7. REFER TO CCCG-22(MOD) FOR GENERAL NOTES ON MEDIAN CURB INSTALLATION.

4/2/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RAMP LAYOUT

BU 67A AT CHURCH STREET

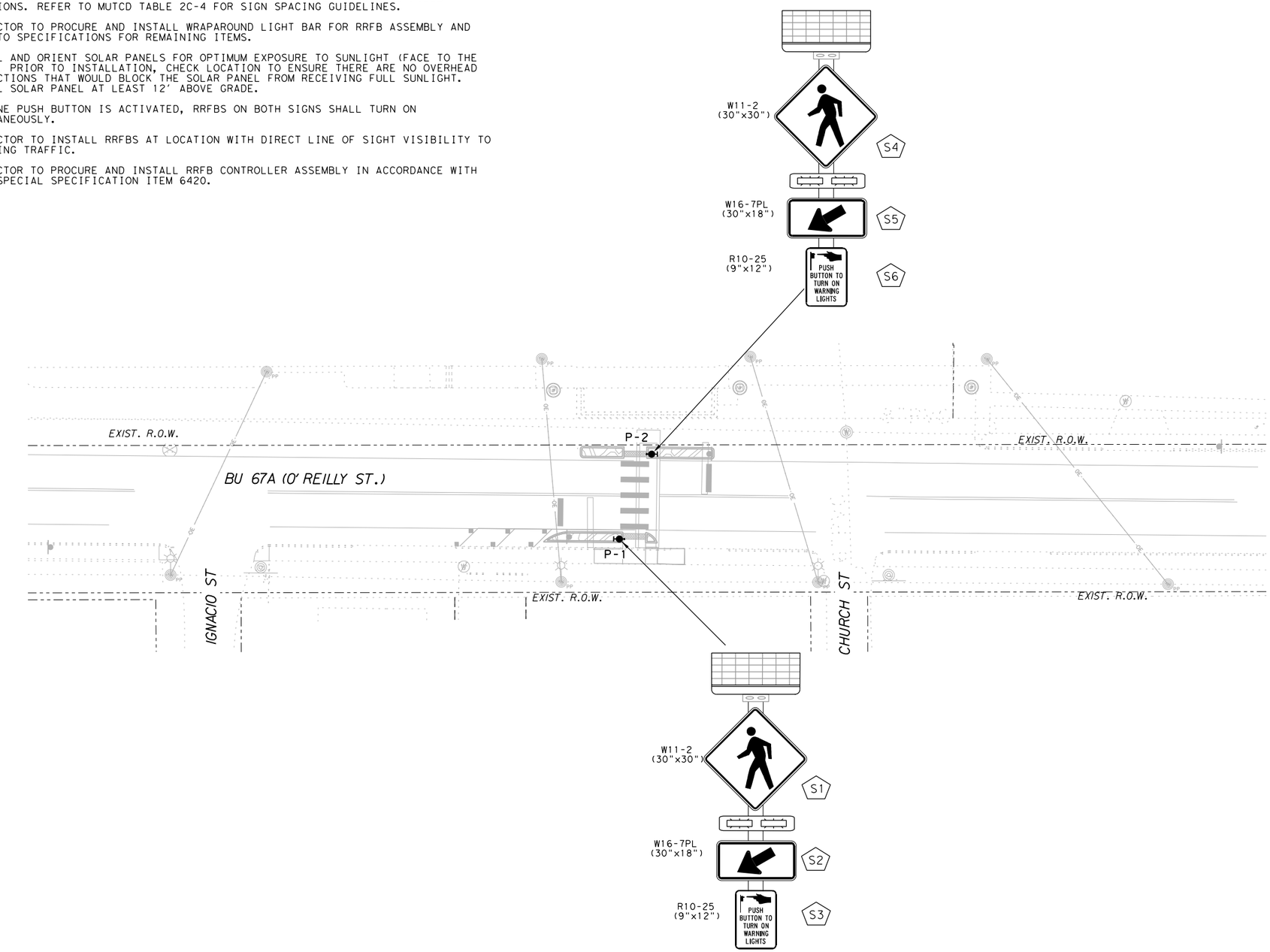
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	96
CHECK MK	CONTROL	SECTION	JOB	
CHECK DL	0001	04	102, ETC.	

PLOTTED: 4/2/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8, Traffic/102_TRF_SGNL_104.2_PRESIDIO_RAMP.dgn

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. EXISTING AND PROPOSED LOCATIONS SHOWN ON PLANS ARE DIAGRAMMATIC ONLY. EXACT LOCATIONS TO BE DETERMINED IN THE FIELD AND CAN BE ADJUSTED DUE TO FIELD CONDITIONS. REFER TO MUTCD TABLE 2C-4 FOR SIGN SPACING GUIDELINES.
3. CONTRACTOR TO PROCURE AND INSTALL WRAPAROUND LIGHT BAR FOR RRFB ASSEMBLY AND REFER TO SPECIFICATIONS FOR REMAINING ITEMS.
4. INSTALL AND ORIENT SOLAR PANELS FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO THE SOUTH). PRIOR TO INSTALLATION, CHECK LOCATION TO ENSURE THERE ARE NO OVERHEAD OBSTRUCTIONS THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. INSTALL SOLAR PANEL AT LEAST 12' ABOVE GRADE.
5. WHEN ONE PUSH BUTTON IS ACTIVATED, RRFBS ON BOTH SIGNS SHALL TURN ON SIMULTANEOUSLY.
6. CONTRACTOR TO INSTALL RRFBS AT LOCATION WITH DIRECT LINE OF SIGHT VISIBILITY TO ON-COMING TRAFFIC.
7. CONTRACTOR TO PROCURE AND INSTALL RRFB CONTROLLER ASSEMBLY IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION ITEM 6420.



0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED RECTANGULAR RAPID FLASHING BEACON
- S1 — SIGN LABEL
- P-# — PROPOSED TRAFFIC SIGNAL POLE NUMBER

3/29/2024

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TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RECTANGULAR RAPID FLASHING BEACON LAYOUT

BU 67A AT
CHURCH STREET

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	97
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_104.3_PRESIDIO_LAYOUT.dgn

SIGNAL LAYOUT SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
6420	6001	SOLAR POWERS REC RAPID FLASH BEACON ASSEMBLIES	EA	2
	*	DRILL SHAFT (24 IN)	LF	12
	*	SIGN, PEDESTRIAN CROSSING (30"x30") (W11-2)	EA	2
	*	SIGN, ARROW LEFT (30"18") (W16-7PL)	EA	2
	*	SIGN, PUSH BUTTON (9"X12") (R10-25)	EA	2

* SUBSIDIARY TO ITEM 6372-6001 "REC RAPID FLASH BEACON(RRFB) SOLAR PWR".

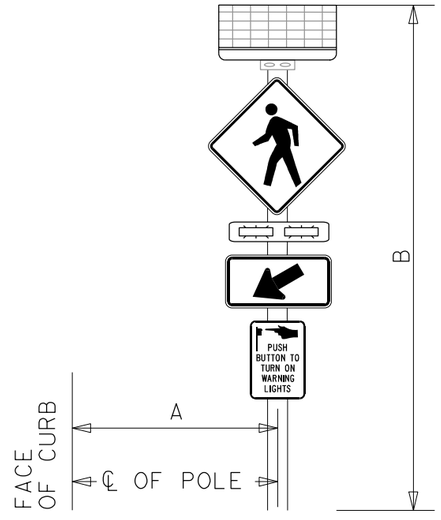
SIGNS SUMMARY						
SIGN	SIGN TYPE	SIGN LEGEND	STATUS	ITEM	SUPPORT	SIGN DIMENSION (in x in)
S1	W11-2	PEDESTRIAN CROSSING	I	*	P-1	30"x30"
S2	W16-7PL	ARROW LEFT	I	*	P-1	30"18"
S3	R10-25	PUSH BUTTON	I	*	P-1	9"X12"
S4	W11-2	PEDESTRIAN CROSSING	I	*	P-2	30"x30"
S5	W16-7PL	ARROW LEFT	I	*	P-2	30"18"
S6	R10-25	PUSH BUTTON	I	*	P-2	9"X12"

STATUS: I=INSTALL

* SUBSIDIARY TO ITEM 6372

SIGNAL HEAD AND POLE PLACEMENT (FT)				
POLE NUMBER	STATUS	A (FT)	B (FT)	FDN. TYPE WIND ZONE (80 MPH)
P-1	I	2.2	15	24-A
P-2	I	1.3	15	24-A
			TOTAL:	

SIGNAL POLE STATUS: I=INSTALL



3/29/2024

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Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

PROPOSED RECTANGULAR RAPID FLASHING BEACON LAYOUT

BU 67A AT
CHURCH STREET

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62, ETC
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP, ETC.	98
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102, ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/102_TRF_SGNL_104.4_PRESIDIO_TABLES.dgn

SIGNING & PAVEMENT MARKING SUMMARY				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4
666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	70
666	6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	85
666	6225	PAVEMENT SEALER 6"	LF	85
666	6230	PAVEMENT SEALER 24"	LF	70
672	6007	REFL PAV MRKR TY I-C	EA	6
677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	85
677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	40
678	6002	PAV SURF PREP FOR MRK (6")	LF	85
678	6008	PAV SURF PREP FOR MRK (24")	LF	70

PROPOSED SIGNS

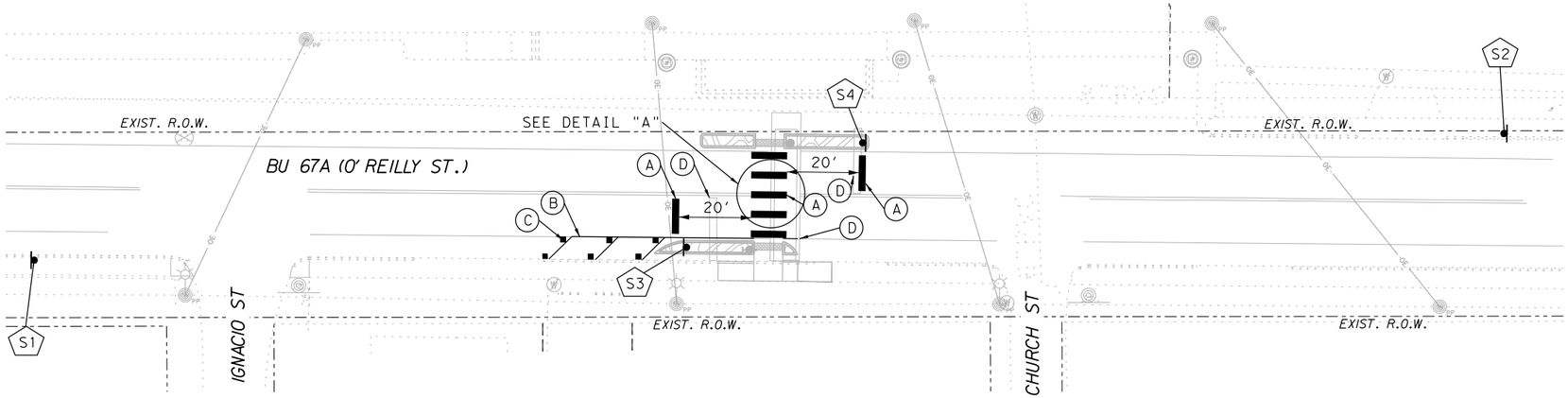
W11-2
(18"x18")

W16-9P
(24"x12")

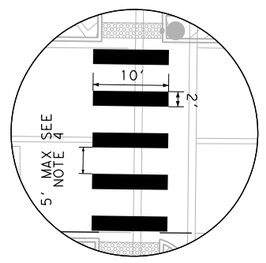
S1 S2

R1-5BL
(36"x36")

S3 S4



DETAIL "A"
1"=20'



NOTES:

1. LANE WIDTHS SHALL MATCH EXISTING LANES. ALL PROPOSED PAVEMENT MARKINGS SHALL BE TIED TO EXISTING MARKINGS WHERE APPLICABLE.
2. ALL EXISTING SIGNS AND PAVEMENT MARKING TO REMAIN UNLESS OTHERWISE NOTED.
3. ELIMINATE EXISTING PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
4. LONGITUDINAL CROSSWALK LINES SHOULD NOT BE PLACED IN THE WHEEL PATH OF VEHICLES. CENTER THE CROSSWALK LINES ON TRAVEL LANES AND LANE LINES.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

PAVEMENT MARKING

- (A) REFL PAV MRK TY I (W)24"(SLD)(90MIL)
- (B) REFL PAV MRK TY II (W)6"(SLD)(90MIL)
- (C) REFL PAV MRKR TY I CREFL PAV MRKR TY I-C
- (D) ELIM EXT PAV MRK & MRKS
- (S1) SIGN LABEL
- PROPOSED SIGN
- EXISTING SIGN

3/29/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

Carlye Lide

Kimley»Horn
F-928
2600 N Central Expy
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Tel. No. (214) 617-0535

TRAFFIC SAFETY IMPROVEMENTS

PROPOSED SIGNING AND PAVEMENT MARKING LAYOUT

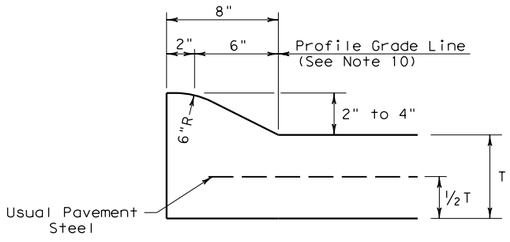
BU 67A AT CHURCH STREET

SHEET 1 OF 1

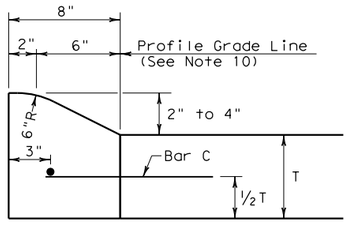
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DL	6	F 2B24(190)		US62,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CL	TEXAS	ELP	ELP,ETC.	99
CHECK	CONTROL	SECTION	JOB	
MK	0001	04	102,ETC.	
CHECK				
DL				

PLOTTED: 3/29/2024
FILENAME: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8, Traffic/102_TRF_SGNL_104.5_PRESIDIO_MARKINGS.dgn

DATE:
FILE:



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



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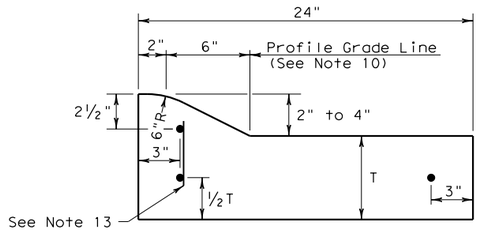
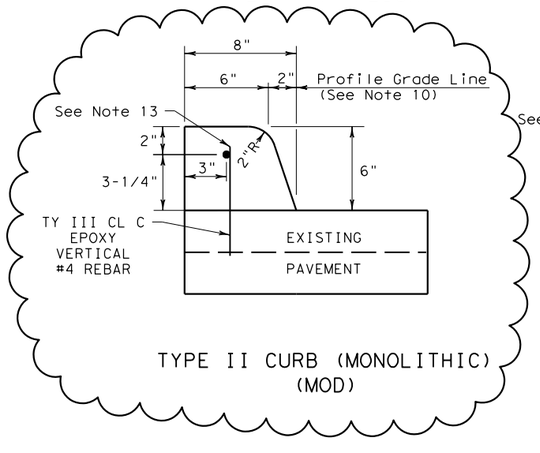
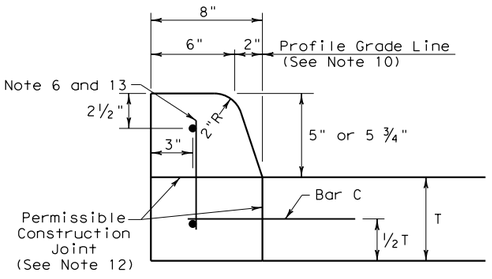
2" - 4" HEIGHT



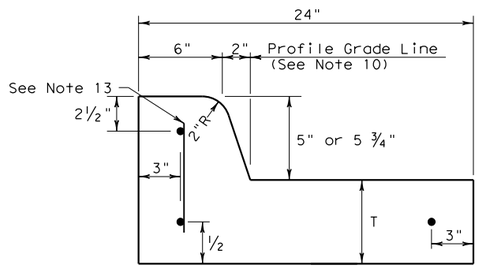
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



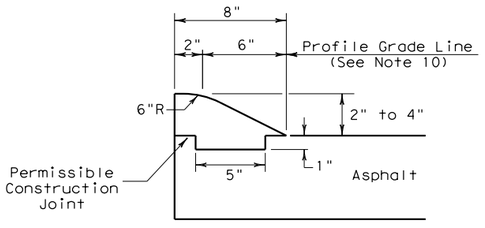
TYPE II CURB (MONOLITHIC)
(MOD)



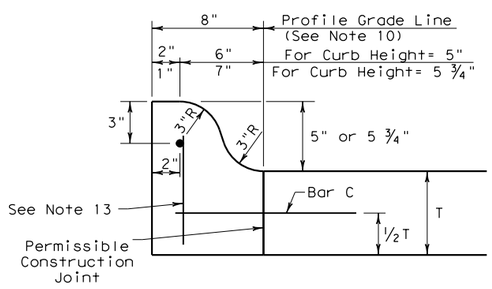
TYPE II CURB
5" - 5 ¾" HEIGHT



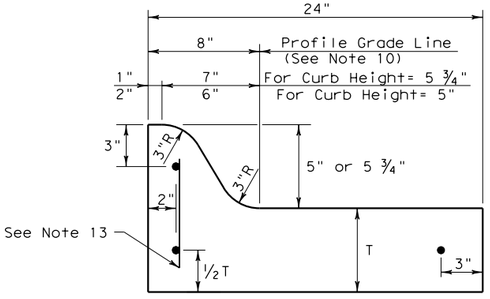
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



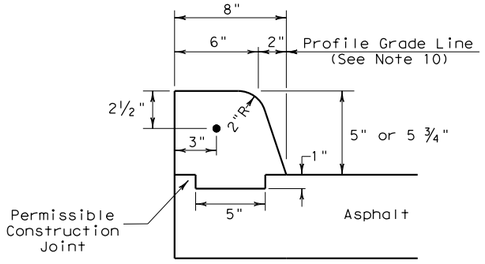
TYPE III CURB (KEYED)
2" - 4" HEIGHT



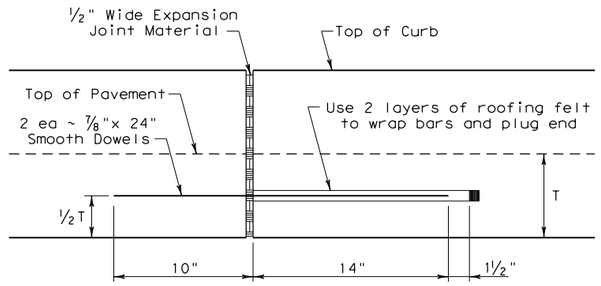
TYPE IIa CURB
5" - 5 ¾" HEIGHT



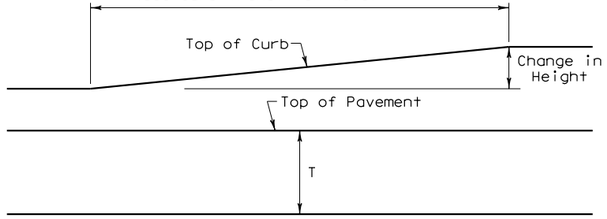
TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

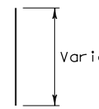


CURB TRANSITION
Note: To be paid for as Highest Curb

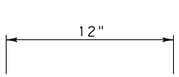
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.

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

4/8/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

Texas Department of Transportation

Design Division Standard

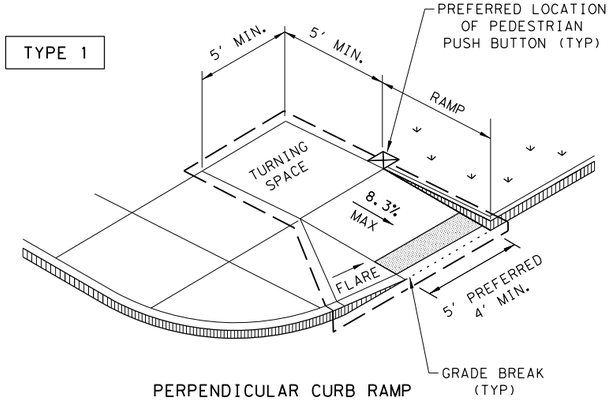
CONCRETE CURB AND CURB AND GUTTER

CCCG-22 (MOD)

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		100

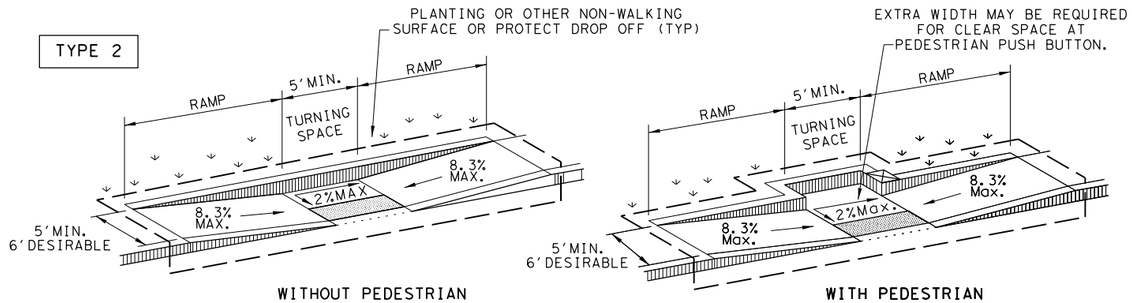
DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/ped18.dgn

TYPE 1



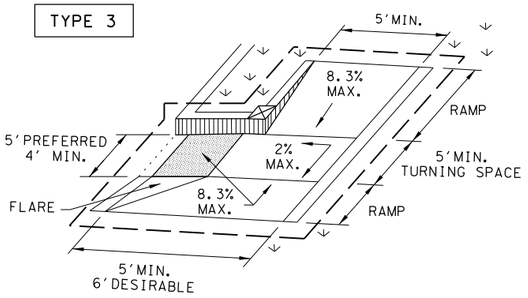
PERPENDICULAR CURB RAMP

TYPE 2

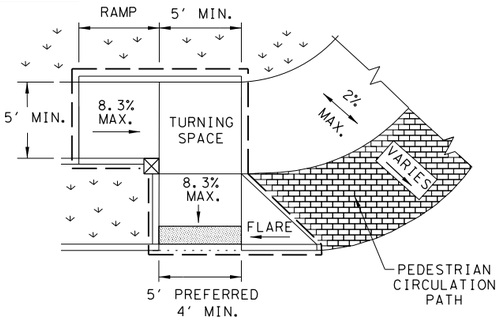


PARALLEL CURB RAMP

TYPE 3

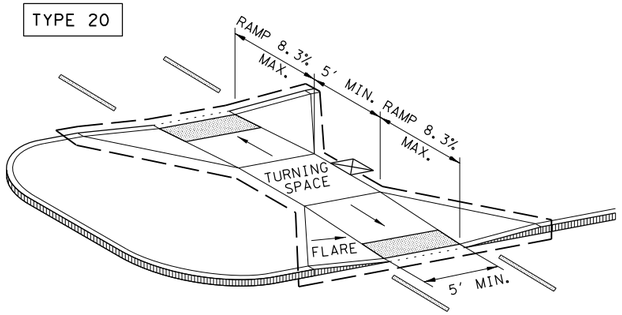


TYPE 6



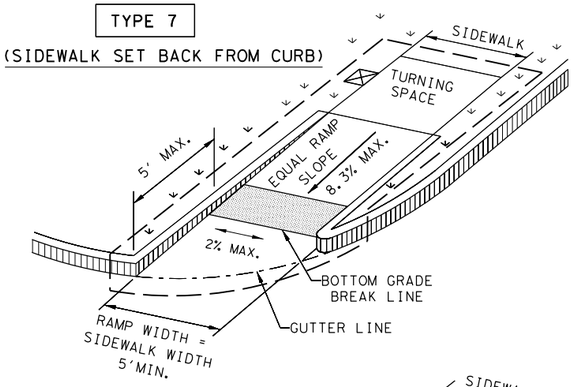
COMBINATION CURB RAMPS

TYPE 20

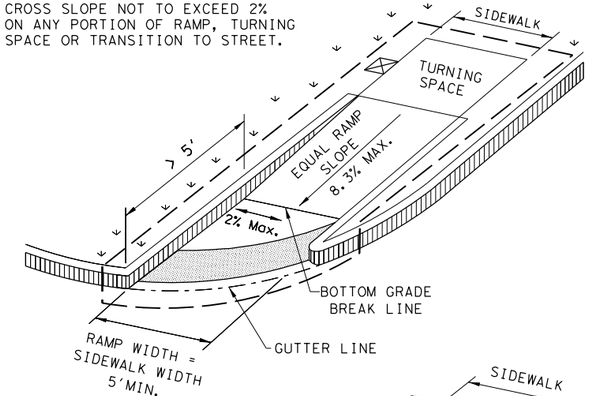


CURB RAMPS AT MEDIAN ISLANDS

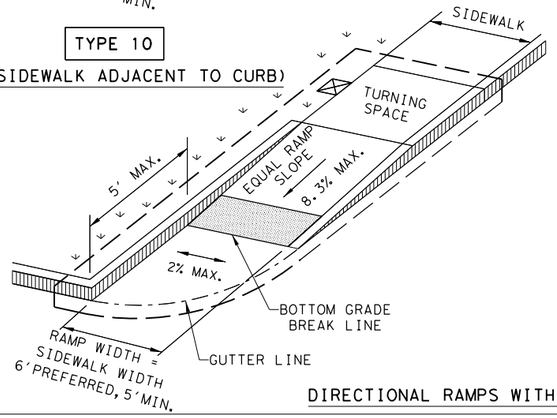
TYPE 7
(SIDEWALK SET BACK FROM CURB)



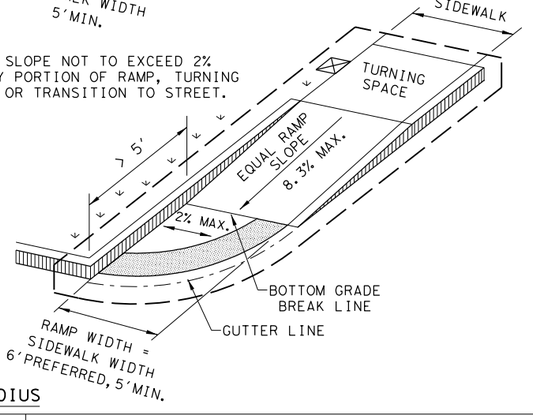
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

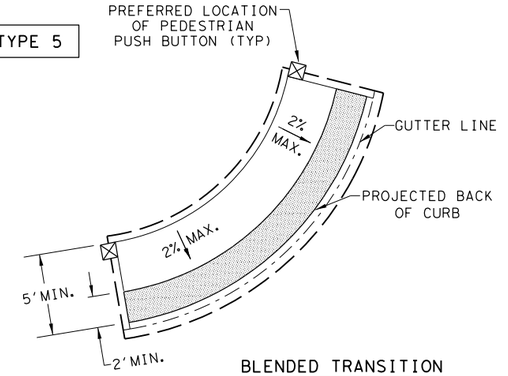


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

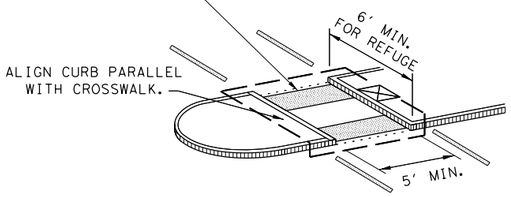
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

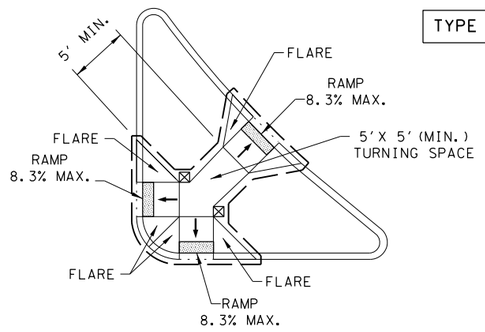
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21



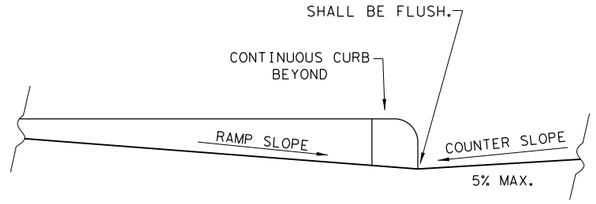
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

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

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

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	0001	04	102, ETC.	US62, ETC.
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		101

DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/

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 applicable 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.

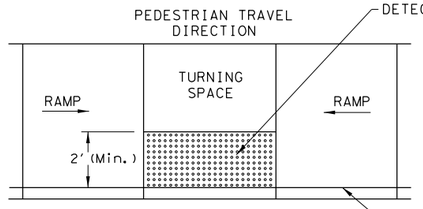
DETECTABLE WARNING PAVERS (IF USED)

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

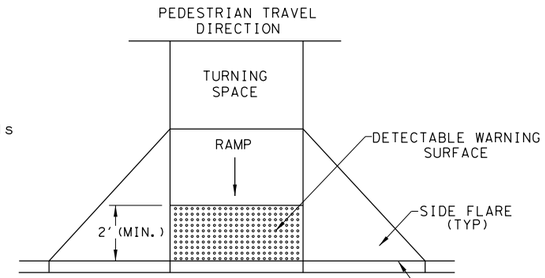
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items 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.

DETECTABLE WARNING SURFACE DETAILS



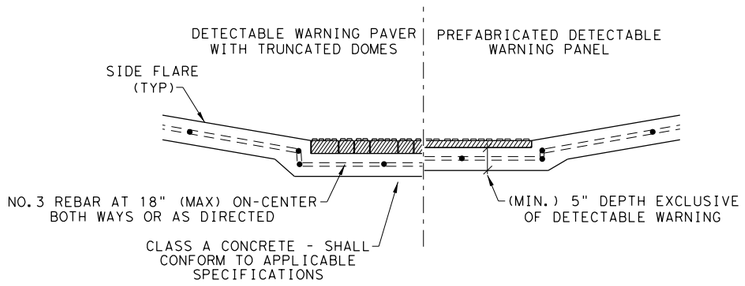
PARALLEL CURB RAMP

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

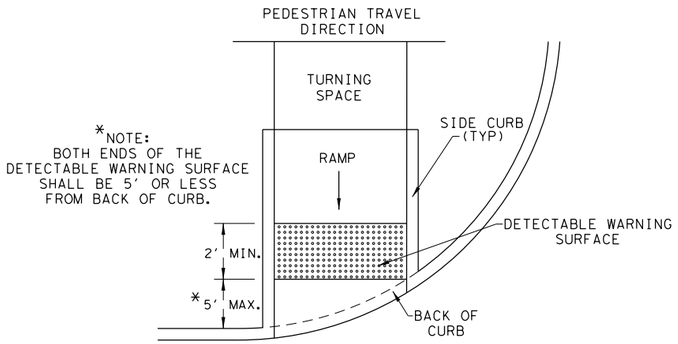


PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation — Design Division Standard

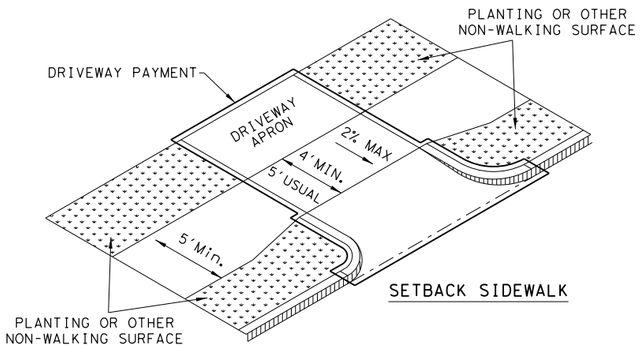
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

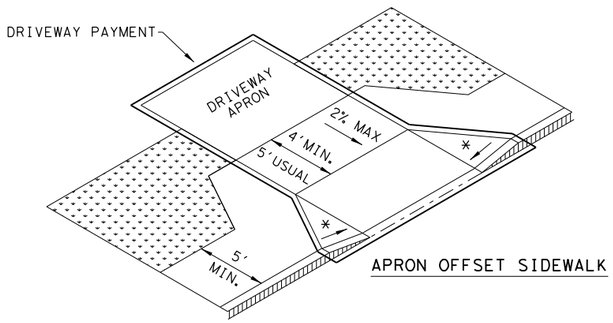
FILE: ped18	DN: TxDOT		DW: VP		CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0001	04	102, ETC.		US62, ETC.	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.	
	ELP	ELP, ETC.			102	

DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/

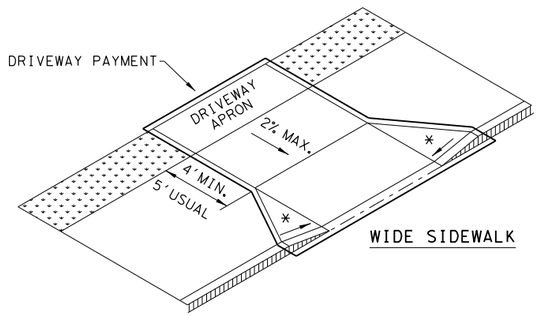
SIDEWALK TREATMENT AT DRIVEWAYS



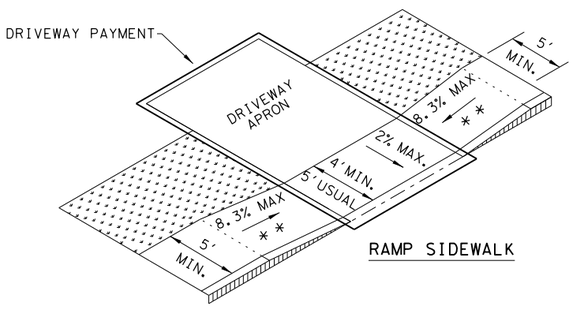
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

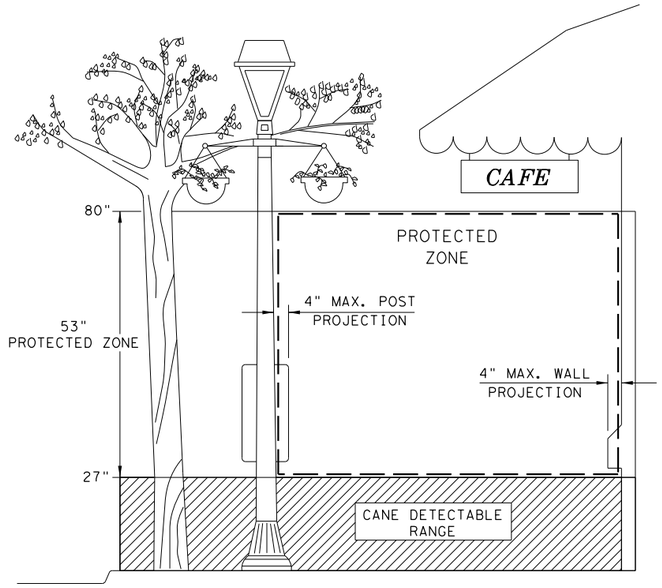


RAMP SIDEWALK

NOTES:

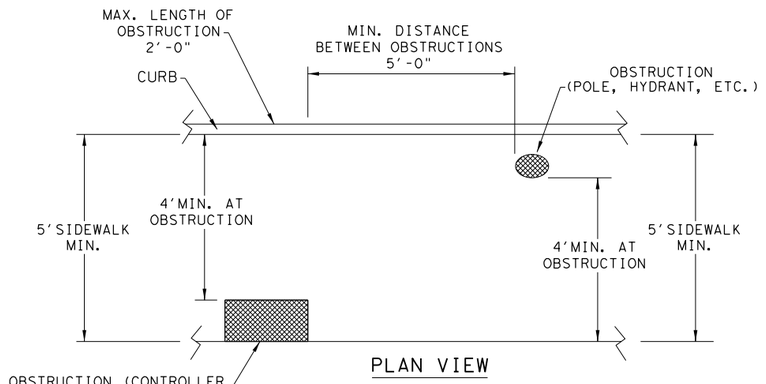
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * 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

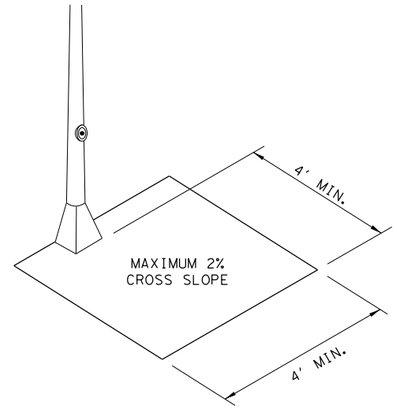
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



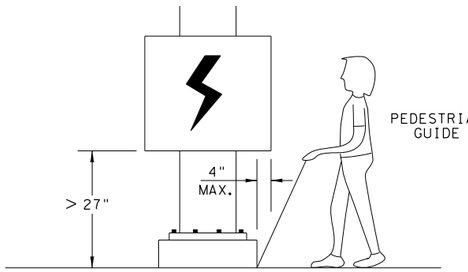
PLAN VIEW

PLACEMENT OF STREET FIXTURES

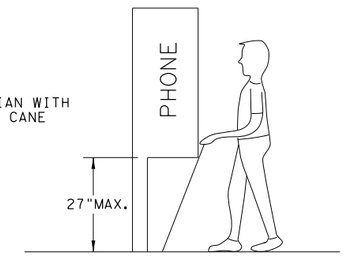
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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

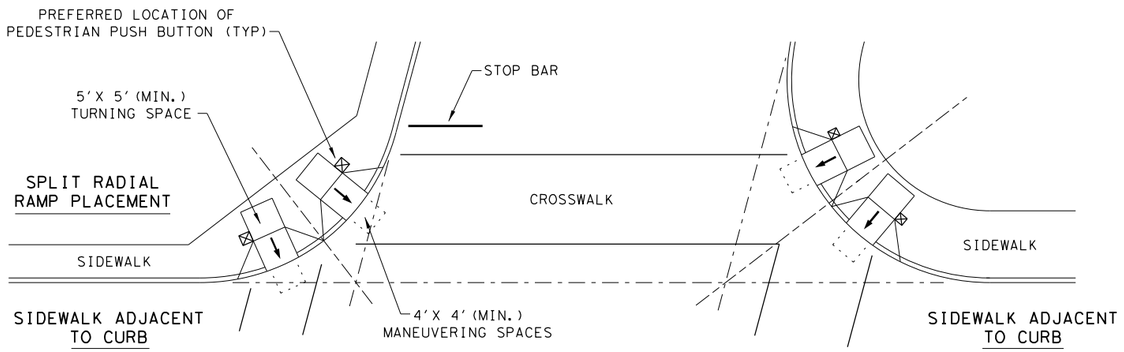
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0001	04	102, ETC.		US62, ETC.	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.	
	ELP	ELP, ETC.			103	

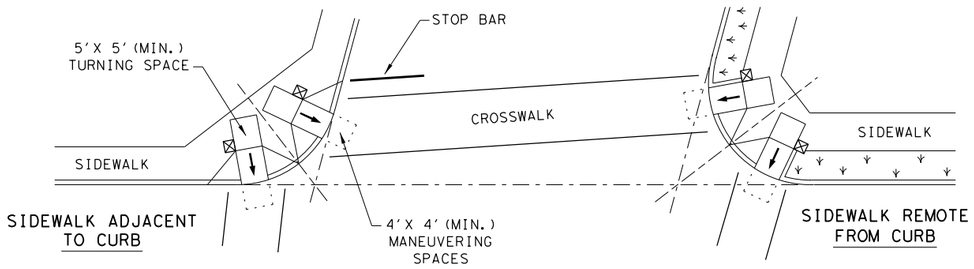
DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/

TYPICAL CROSSING LAYOUTS

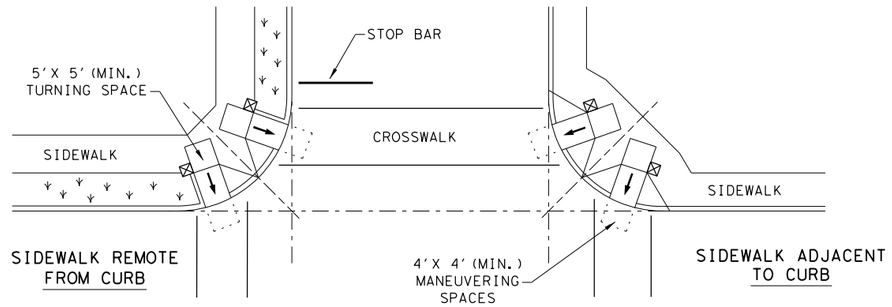
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



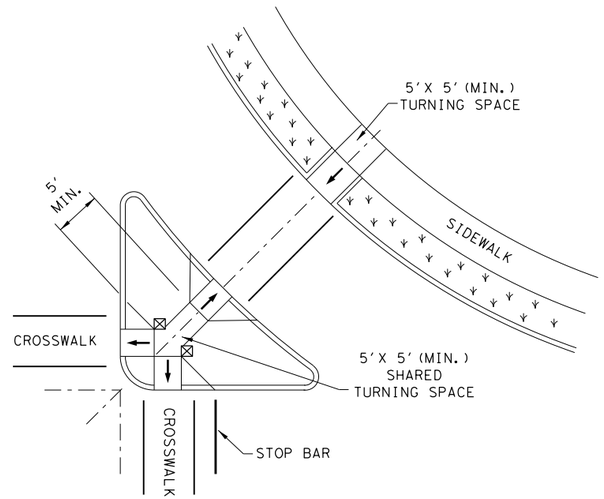
SKEWED INTERSECTION WITH "LARGE" RADIUS



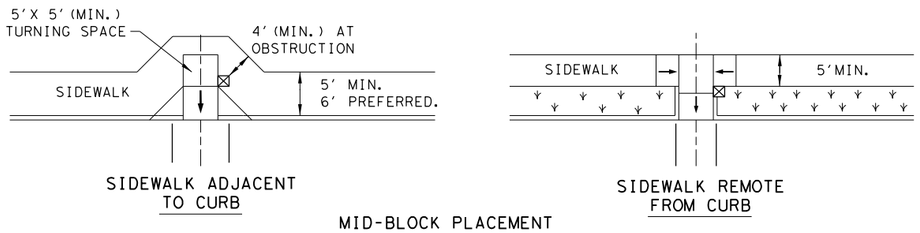
SKEWED INTERSECTION WITH "SMALL" RADIUS



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.

SHEET 4 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	0001	04	102, ETC.	US62, ETC.	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	ELP	ELP, ETC.		104	

DATE: 3/26/2024 1:21:57 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standard

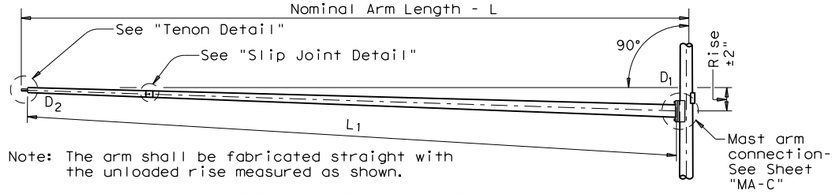
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

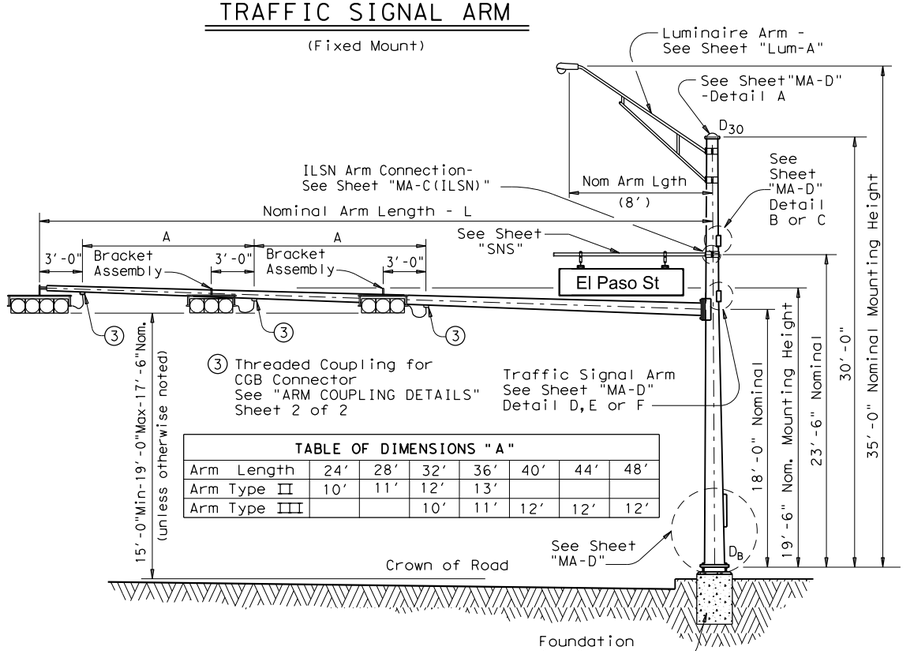


TABLE OF DIMENSIONS "A"

Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	6
36	36L-80		36S-80		36-80	
40	40L-80	4	40S-80		40-80	
44	44L-80	2	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	6
36			36II-80		36III-80	
40					40III-80	4
44					44III-80	2
48					48III-80	

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	6

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3′-4"	6
1 ¾"	3′-10"	6

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

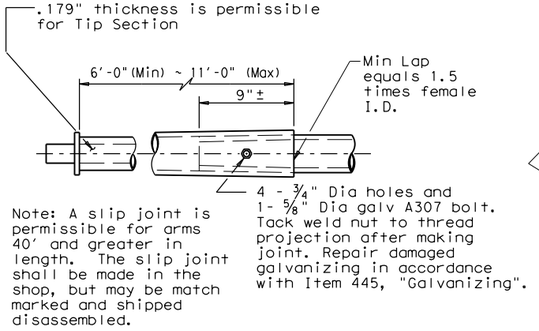
SMA-80(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

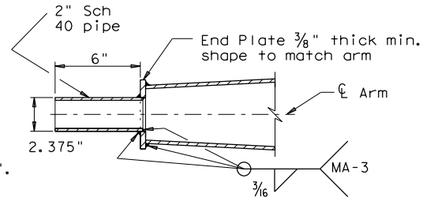
REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP,ETC.		105

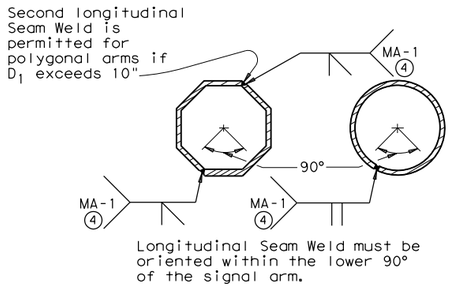
122A



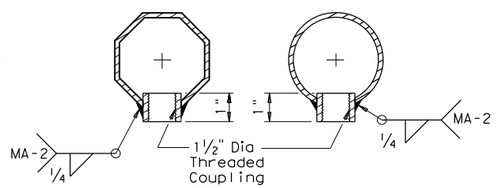
SLIP JOINT DETAIL



TENON DETAIL



ARM WELD DETAIL



ARM COUPLING DETAILS

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

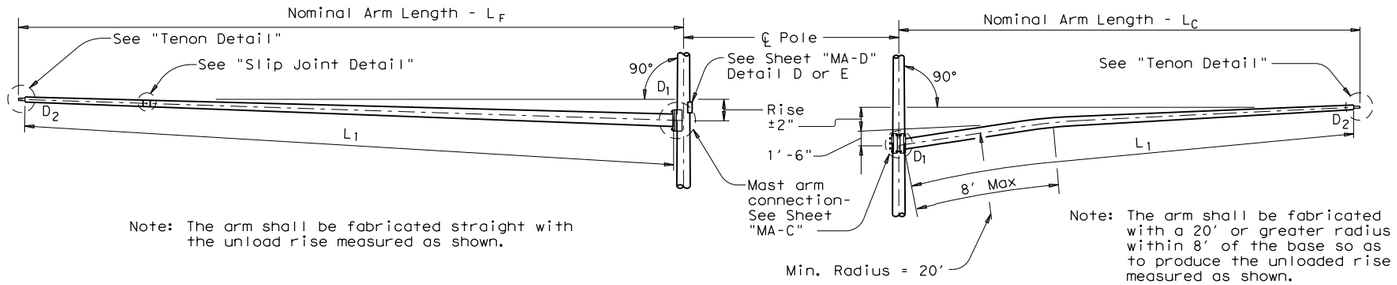
DN: MS	CK: JSY	DW: MWF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP,ETC.		106

122B

DATE:
FILE:

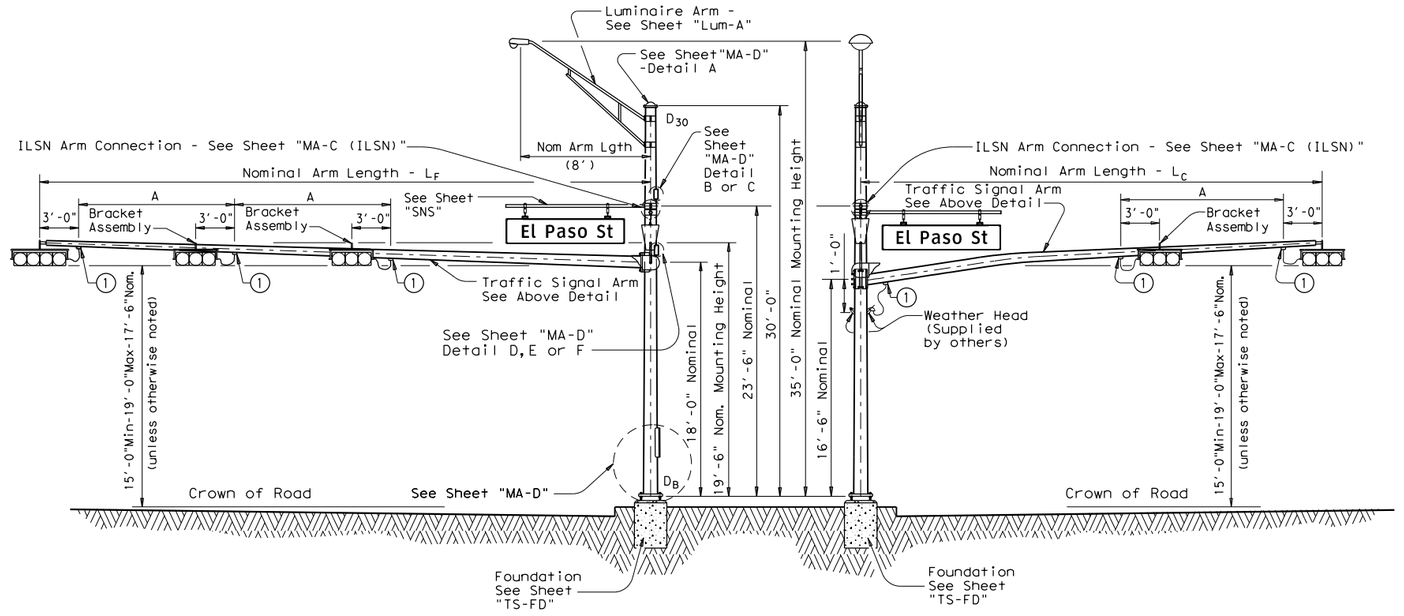


Note: The arm shall be fabricated straight with the unload rise measured as shown.

Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

CLAMP-ON TRAFFIC SIGNAL ARM



ELEVATION

(Showing fixed mount arm)

STRUCTURE ASSEMBLY

(1) Threaded Coupling for CGB Connector See "ARM COUPLING DETAILS" Sheet 2 of 3

ELEVATION

(Showing clamp mount arm)

TABLE OF DIMENSIONS "A"						
Arm Length	24'	28'	32'	36'	40'	44'
Arm Type II	10'	11'	12'	13'		
Arm Type III			10'	11'	12'	12'

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name signs and two traffic signal arms with length combinations as tabulated. The specified luminaire load applied at the end of luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign applied 4'-6" from the centerline of the pole equals 85 lbs vertical dead load plus the horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

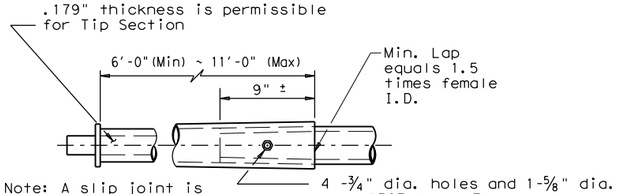
DMA-80 (1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

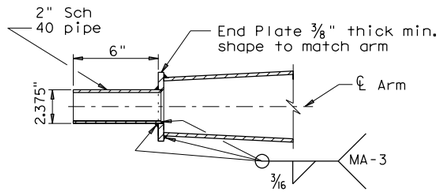
REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102, ETC.	US62, ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP, ETC.		107

124A



SLIP JOINT DETAIL



TENON DETAIL

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY

VIBRATION WARNING

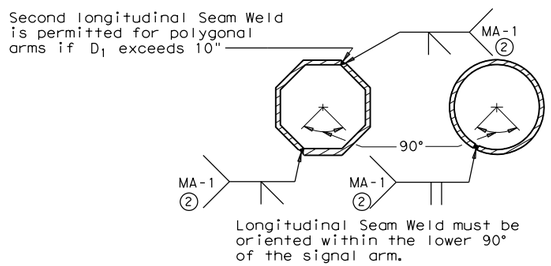
Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

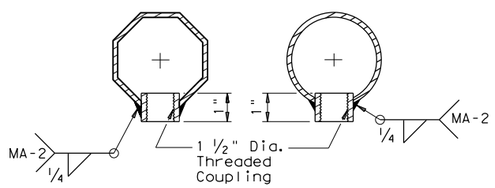
The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.



ARM WELD DETAIL

②60% Min. penetration
100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

SHEET 2 OF 3

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

DMA-80 (2)-12

©TxDOT August 1995	DN: MS		CK: JSY	DW: MMF	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY	
5-96 1-12	0001	04	102, ETC.	US62, ETC.	
	DIST	COUNTY		SHEET NO.	
	ELP	ELP, ETC.		108	

DATE:
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124B

DATE:
FILE:

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length		30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With no Luminaire and no ILSN	
		See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		See note above plus one small hand hole		See note above	
LF	Lc						
ft.	ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20	2020L-80		2020S-80		2020-80	
24	20	2420L-80		2420S-80		2420-80	
	24	2424L-80		2424S-80		2424-80	
28	20	2820L-80		2820S-80		2820-80	
	24	2824L-80		2824S-80		2824-80	
	28	2828L-80		2828S-80		2828-80	
32	20	3220L-80		3220S-80		3220-80	
	24	3224L-80		3224S-80		3224-80	
	28	3228L-80		3228S-80		3228-80	
	32	3232L-80		3232S-80		3232-80	
36	20	3620L-80		3620S-80		3620-80	
	24	3624L-80		3624S-80		3624-80	
	28	3628L-80		3628S-80		3628-80	
	32	3632L-80		3632S-80		3632-80	
	36	3636L-80		3636S-80		3636-80	
40	20	4020L-80		4020S-80		4020-80	
	24	4024L-80		4024S-80		4024-80	
	28	4028L-80		4028S-80		4028-80	
	32	4032L-80		4032S-80		4032-80	
	36	4036L-80		4036S-80		4036-80	1
44	20	4420L-80		4420S-80		4420-80	
	24	4424L-80		4424S-80		4424-80	
	28	4428L-80		4428S-80		4428-80	
	32	4432L-80		4432S-80		4432-80	
	36	4436L-80		4436S-80		4436-80	

Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	1
44					44III-80	

Traffic Signal Arms (Clamp-On Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	2 CGB connector and 1 clamp w/bolts and washers		1 Bracket Assembly, 3 CGB Connectors, and 1 clamp w/bolts and washers		2 Bracket Assemblies, 4 CGB Connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	1

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	

ILSN Arm (1 or 2 per pole) ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3′-4"	
1 3/4"	3′-10"	2
2"	4′-3"	

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

ARMS		ROUND POLES					POLYGONAL POLES					Foundation Type
LF	Lc	D_B	D_{19}	D_{24}	D_{30}	③ thk	D_B	D_{19}	D_{24}	D_{30}	③ thk	
ft.	ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	20	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
24	20	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.179	30-A
	24	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.239	30-A
28	20	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
	24	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
	28	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
32	20	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	24	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	28	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	30-A
	32	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
36	20	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	24	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	28	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	32	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	36	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
40	20	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	24	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	28	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
	32	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A
	36	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
44	20	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	24	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	28	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	32	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
	36	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B

Arm L_F or L_C	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	③ thk	Rise	L_1	D_1	④ D_2	③ thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire

D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length
L_C = Clamp-on Arm Length (36′ Max)

③ Thickness shown are minimums, thicker materials may be used.

④ D_2 may be increased by up to 1.0" for polygonal arms.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

DMA-80 (3)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102, ETC.	US62, ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP, ETC.		109

124C

DATE: 3/26/2024 1:22:38 PM
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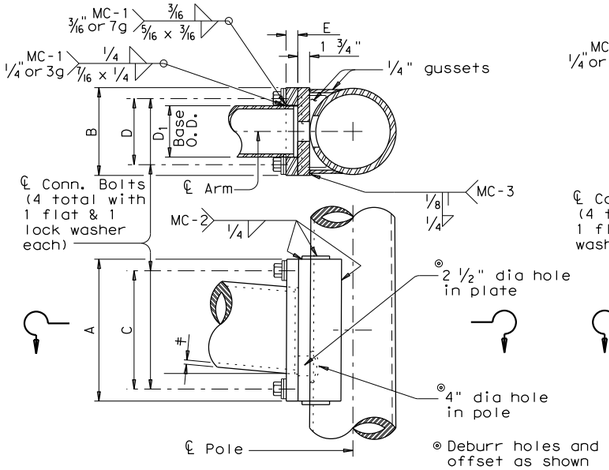
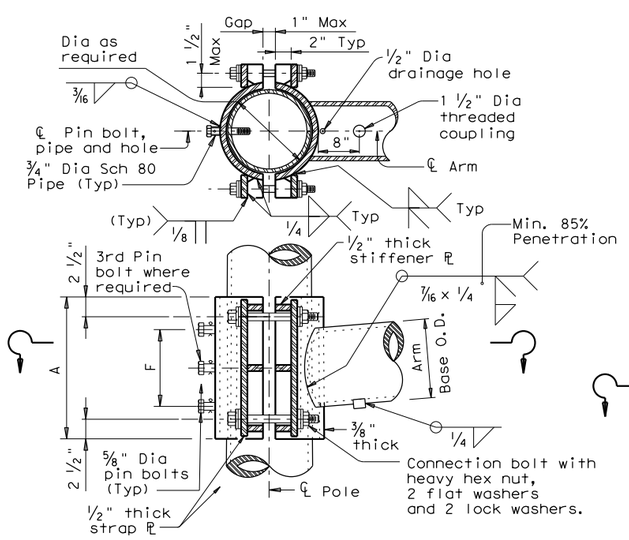
ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2



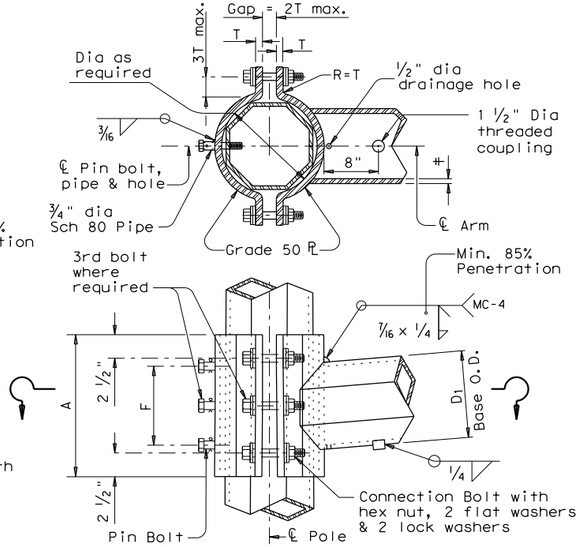
FIXED MOUNT DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



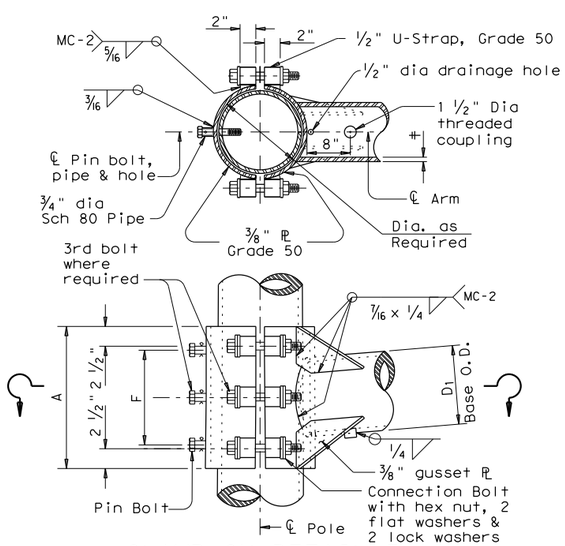
CLAMP-ON DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

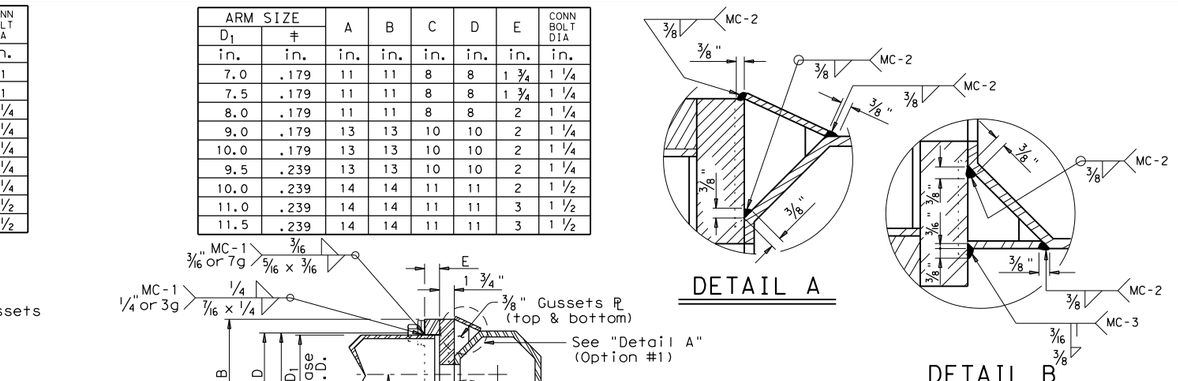


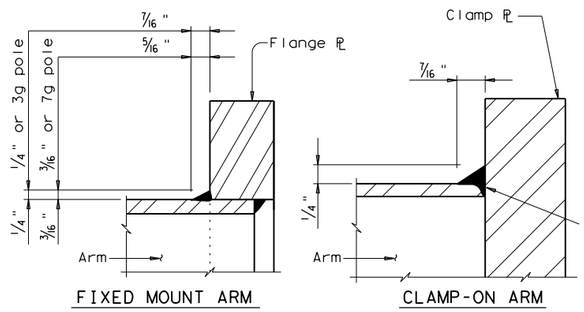
CLAMP-ON DETAIL 2

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8



CLAMP-ON DETAIL 3





ARM BASE WELD DETAILS

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 9/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

REVISIONS	DN: MS	CK: JSY	DW: MMF	CK: JSY
5-96	CONT	SECT	JOB	HIGHWAY
5-09	0001	04	102, ETC.	US62, ETC.
1-12	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		110

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DATE: 3/26/2024 1:22:58 PM
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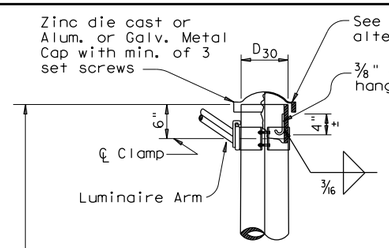
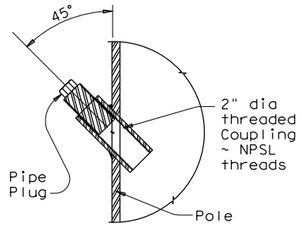
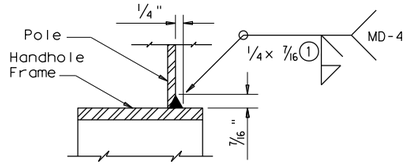


DETAIL A

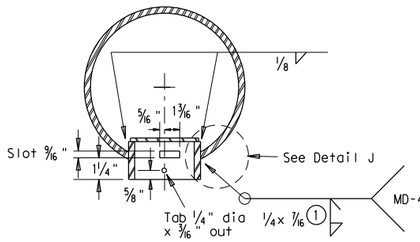
(for pole with luminaire)



POLE COUPLING DETAIL

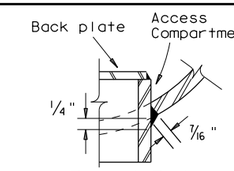


DETAIL G

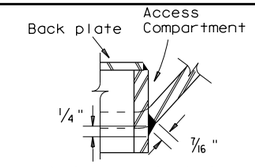


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

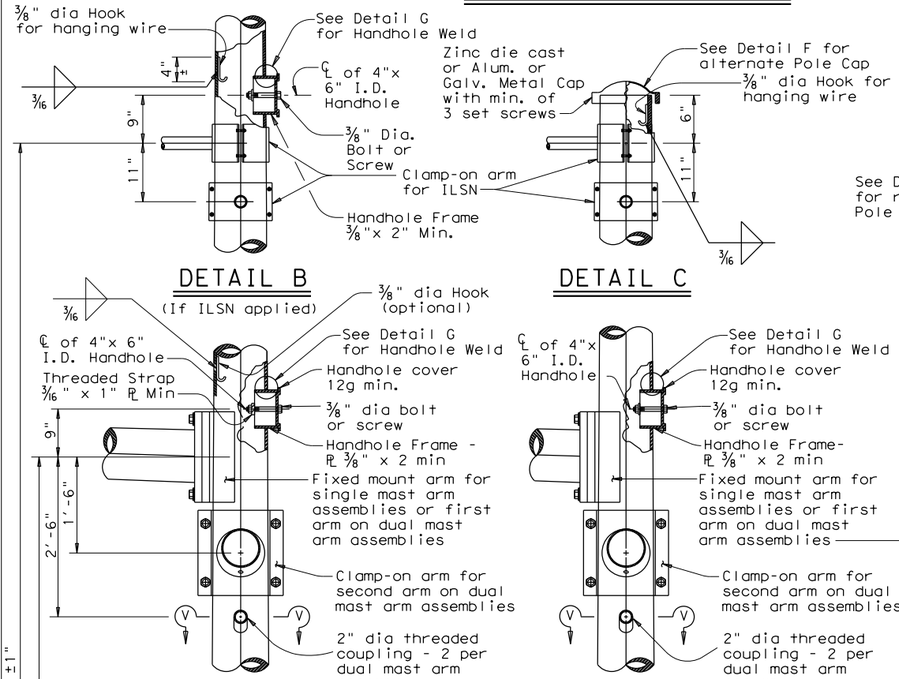


Round Pole



Polygonal Pole

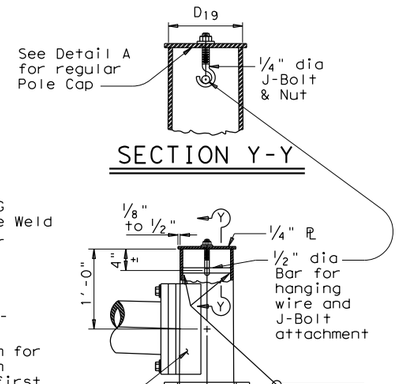
DETAIL J



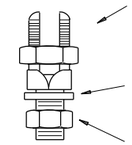
DETAIL B

(If ILSN applied)

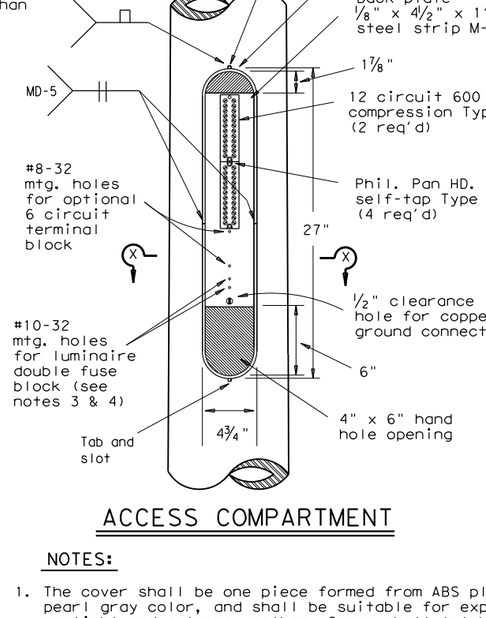
DETAIL C



SECTION Y-Y



COPPER GROUND CONNECTOR



ACCESS COMPARTMENT

DETAIL D

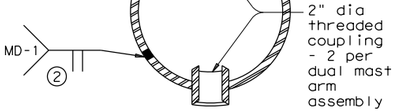
(for 30' pole with luminaire and ILSN sign)

DETAIL E

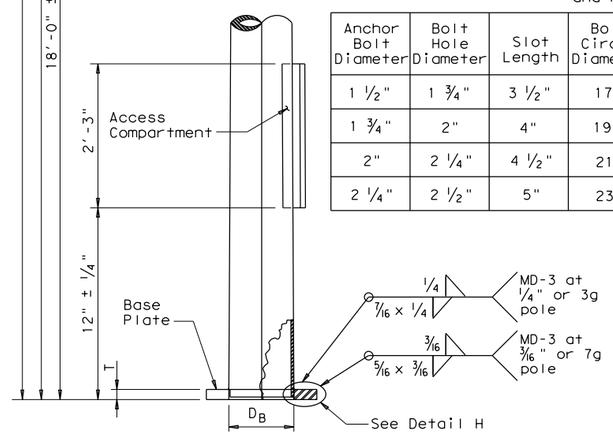
(for 24' pole with ILSN sign and no luminaire)

DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

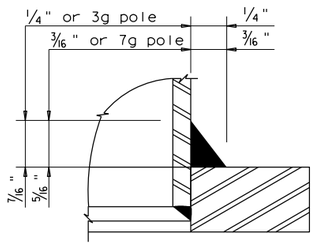


SECTION V-V

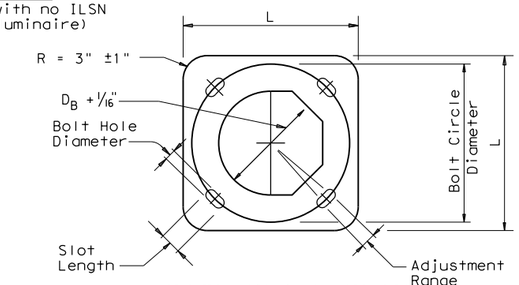


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102, ETC.	US62, ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP, ETC.		111

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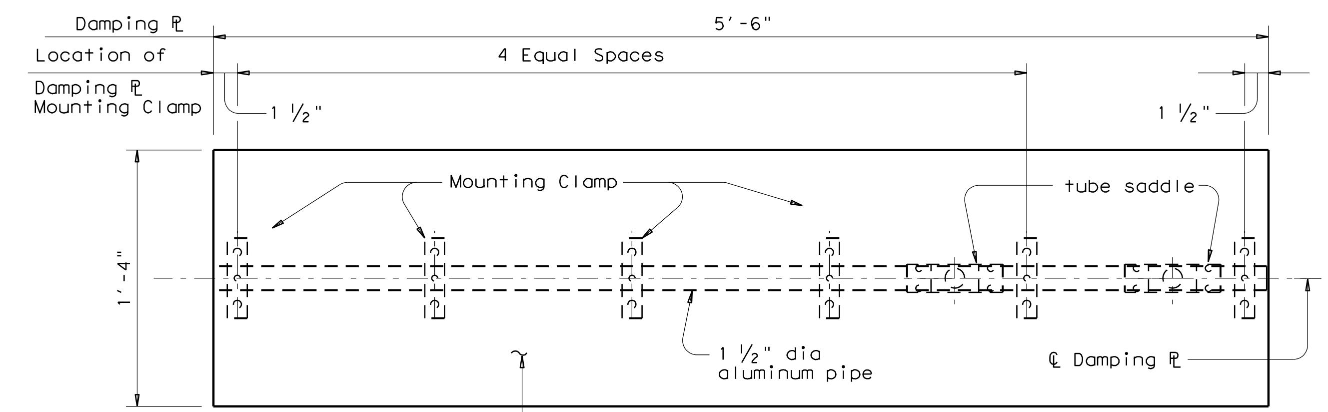
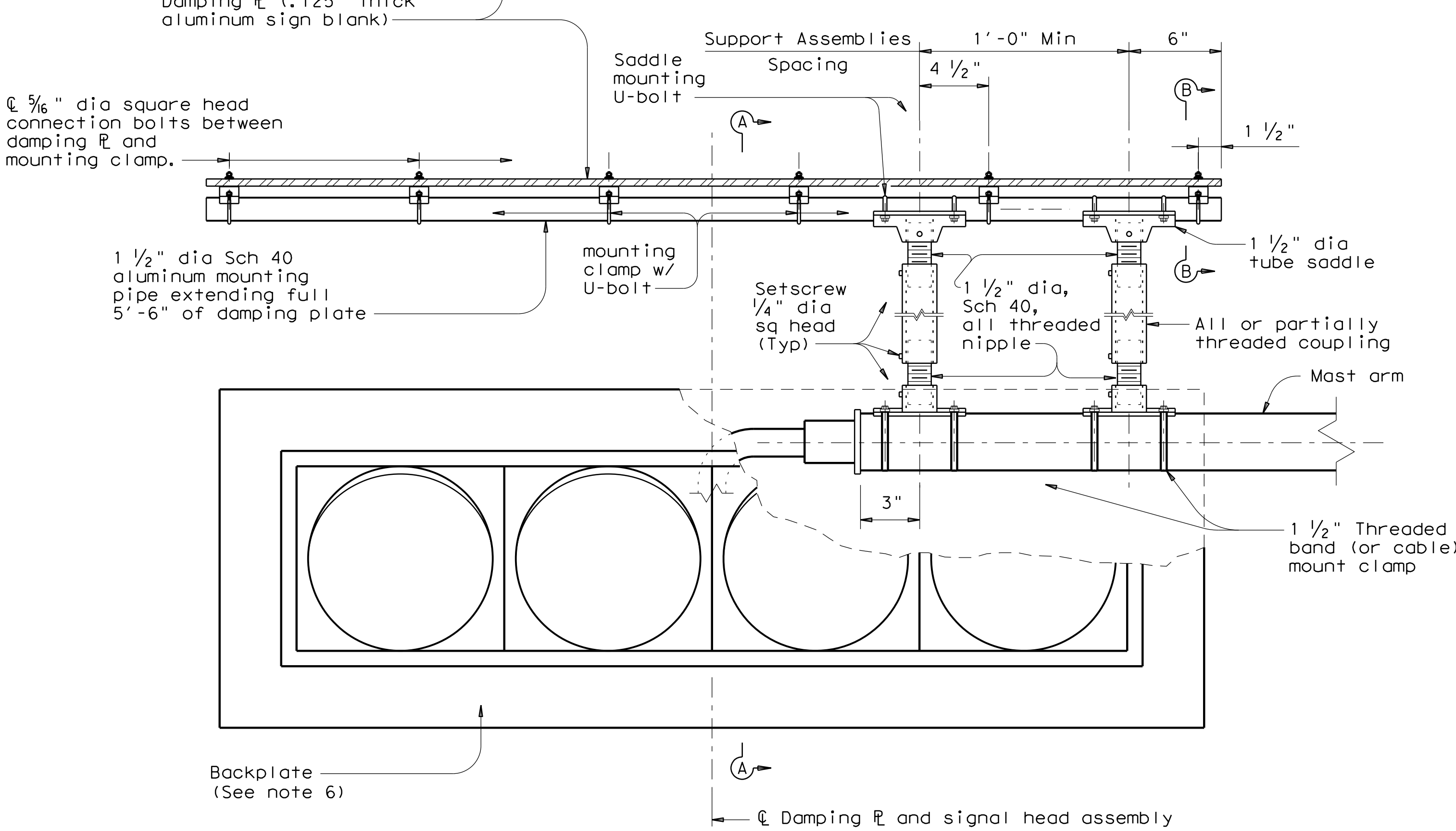


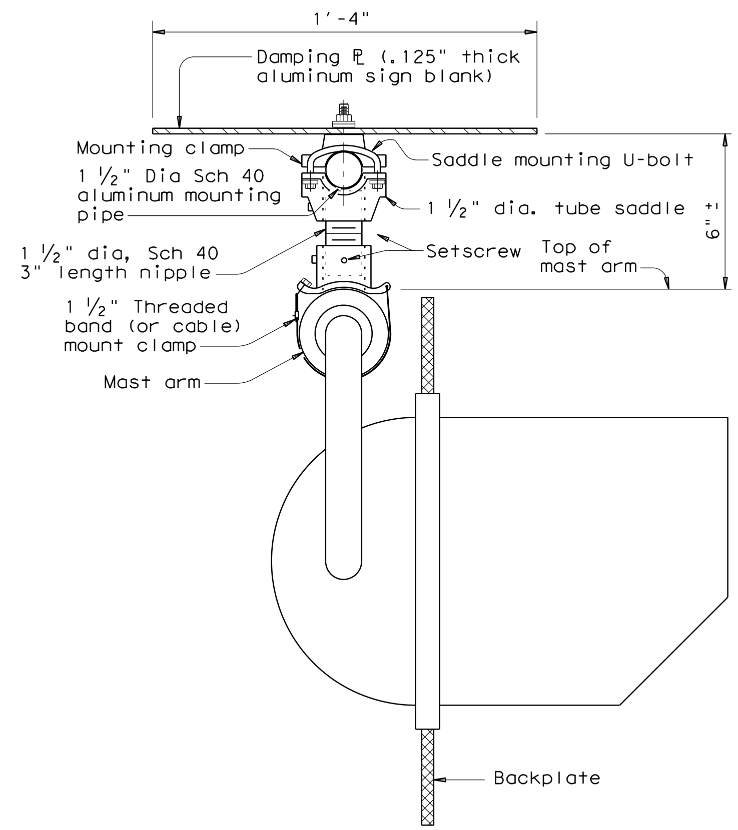
PLAN



ELEVATION

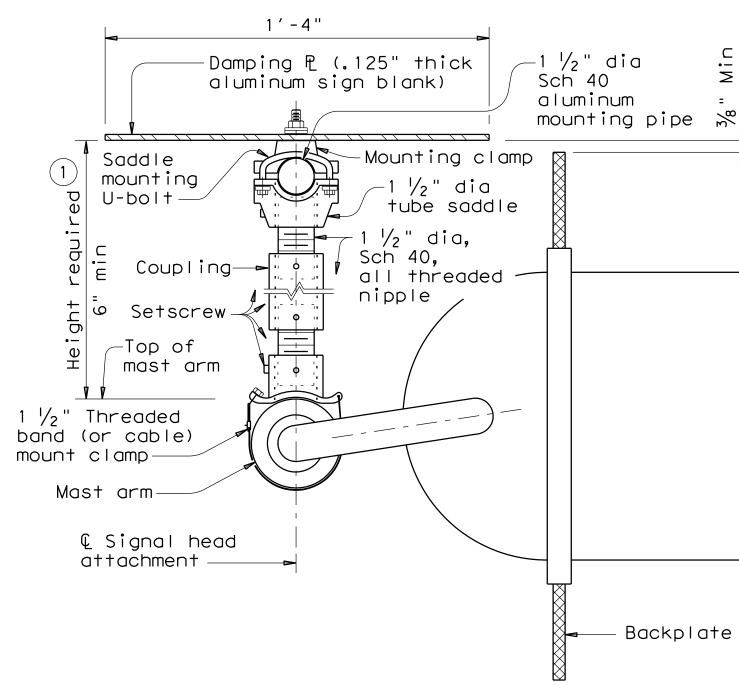
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

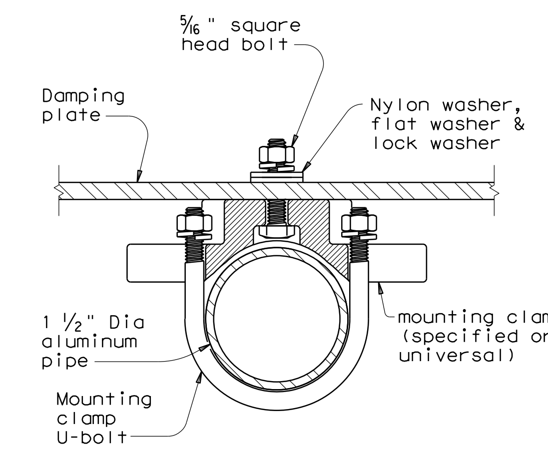


SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate)and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.



SECTION B-B

(Showing damping plate attachment)

(1) Recommended supporting assemblies to achieve required height for horizontal section heads

Height required	One nipple each length	Two nipples each length	plus	One coupling each length
6"-6 3/4"	3"	-		-
7"-8 1/2"	4"	-		-
9"-10 1/2"	6"	-		-
11"-15 1/2"	-	4"		5"
16"-24"	-	6"		10"

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
6-20	DIST		COUNTY	SHEET NO.
	ELP		ELP, ETC.	112

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FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

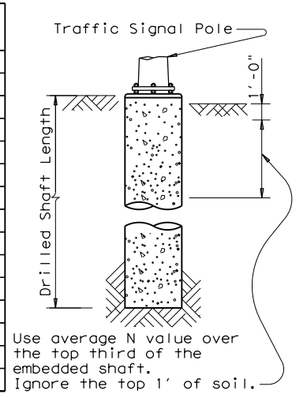
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
CSJ: 0001-04-102								
P-1 (WASHINGTON FLASHER)	10	30-A	1		11			
P-1 (TOBIN PHB)	10	36-A	1			13		
P-5 (TOBIN PHB)	10	36-A	1			13		
P-1 (FRANCIS)	10	30-A	1		11			
P-2 (FRANCIS)	10	30-A	1		11			
P-4 (FRANCIS)	10	36-A	1			13		
P-8 (FRANCIS)	10	36-A	1			13		
P-9 (FRANCIS)	10	30-A	1		11			
CSJ: 0167-02-080								
P-2 (TITANIC)	10	36-A	1			13		
CSJ: 0167-02-095								
P-1 (PHB)	10	36-A	1			13		
P-5 (PHB)	10	36-A	1			13		
P-1 (FLASHER)	10	30-A	1		11			
P-2 (FLASHER)	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS					66	91		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

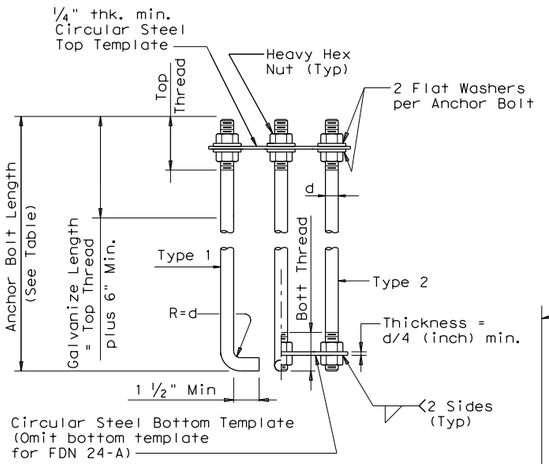


ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

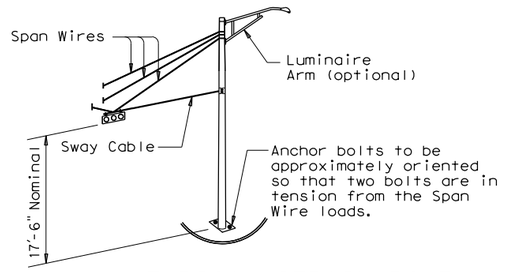
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



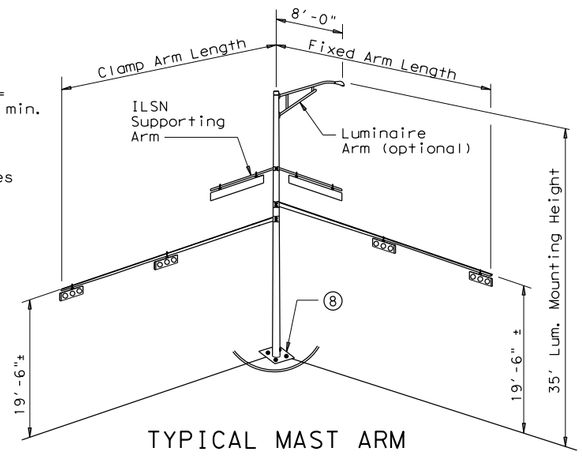
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

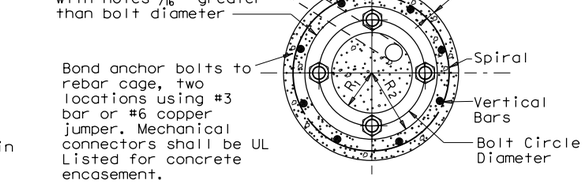
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



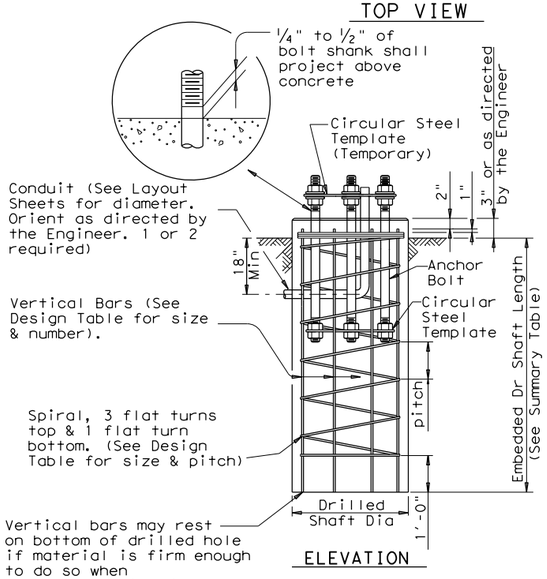
TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102, ETC.	US62, ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP, ETC.		113

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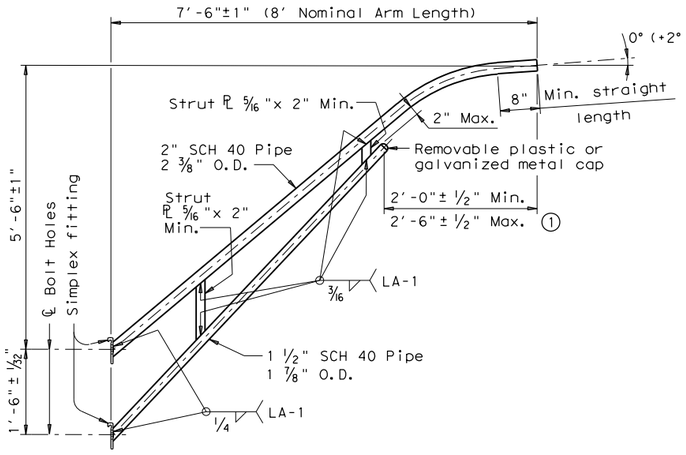
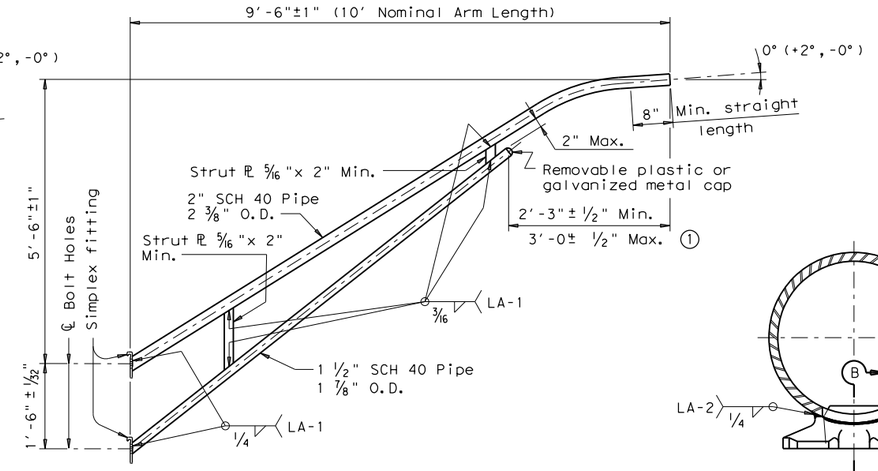


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

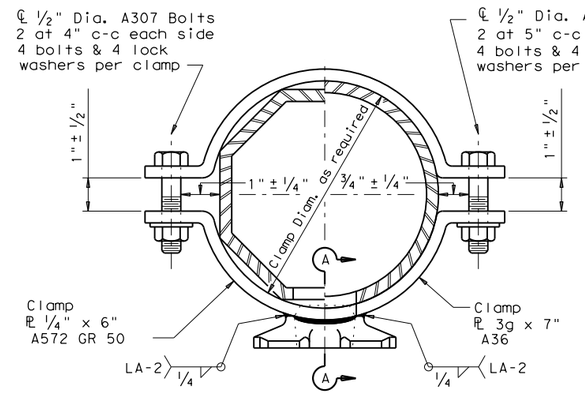
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

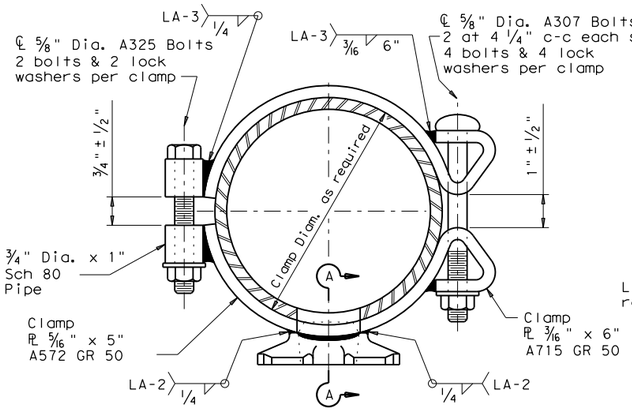
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



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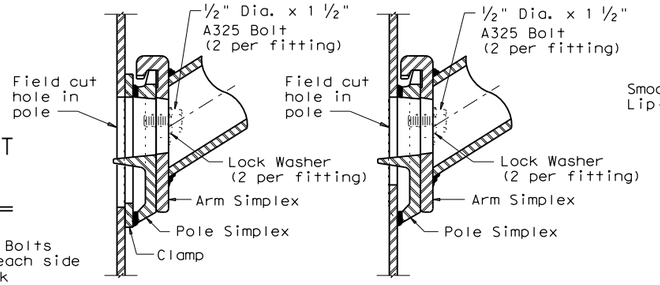
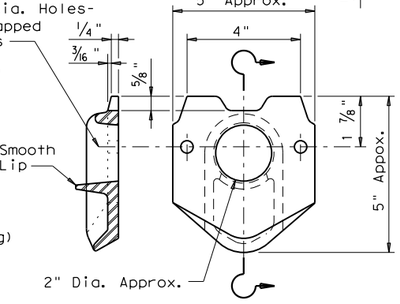
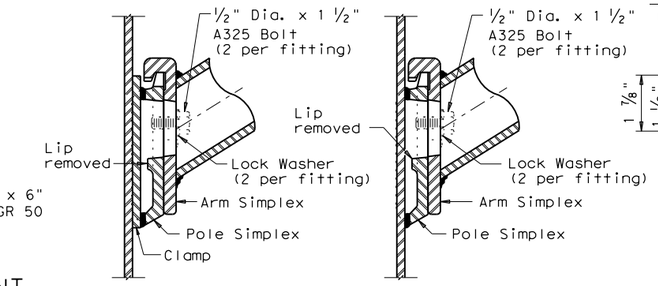


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

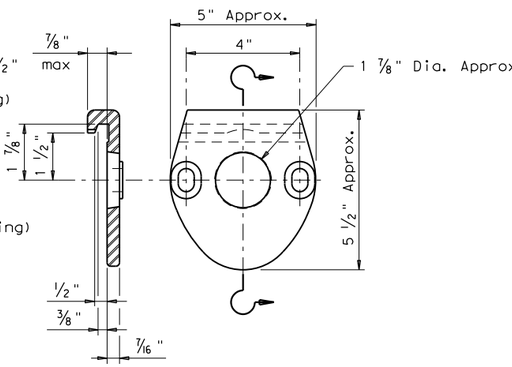


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS
5-96
1-99
1-12

CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP,ETC.		114

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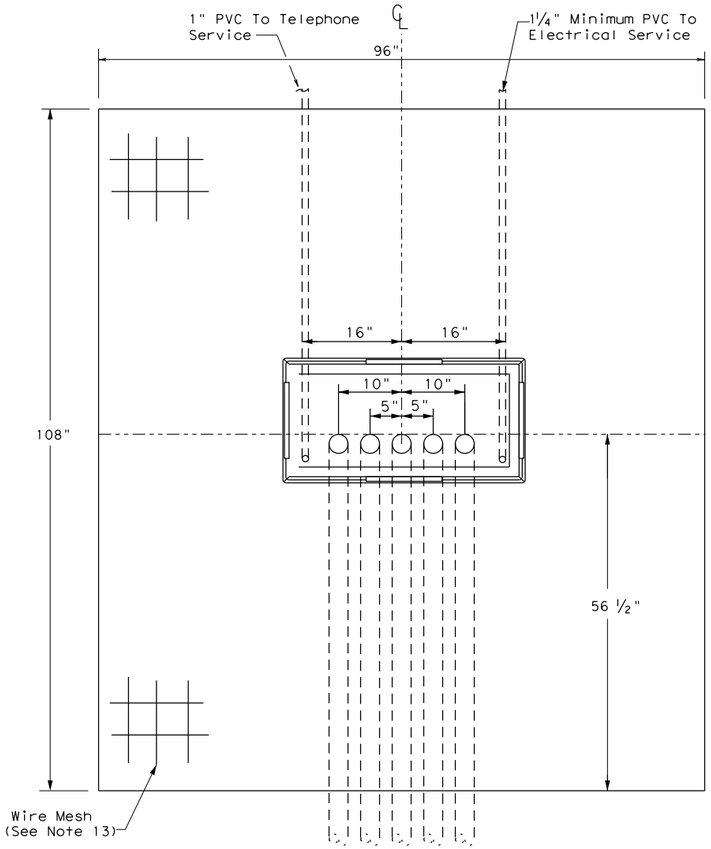
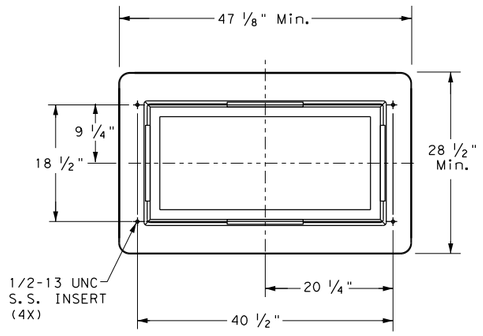
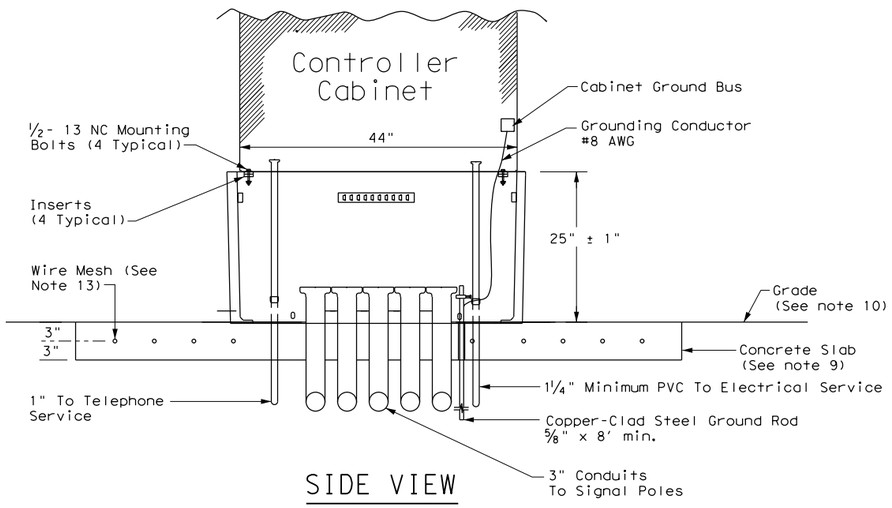


TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
©TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
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12-04	DIST	COUNTY		SHEET NO.
2-21	ELP	ELP,ETC.		115

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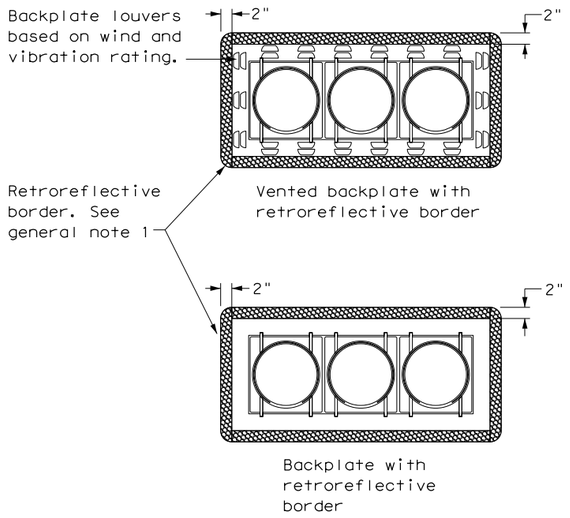

THREE-SECTION HEAD
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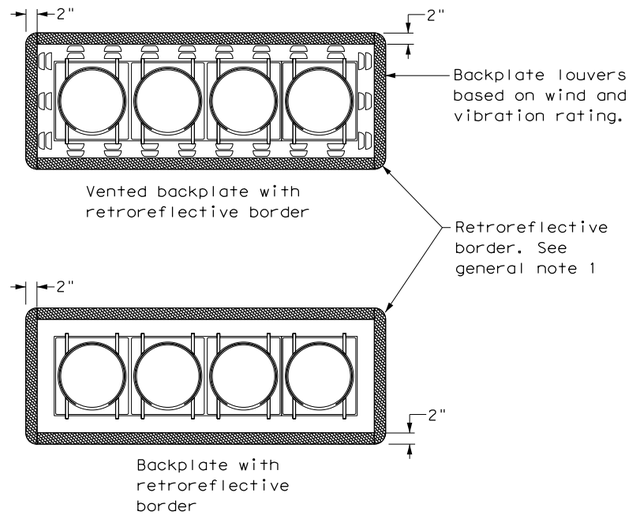

FOUR-SECTION HEAD
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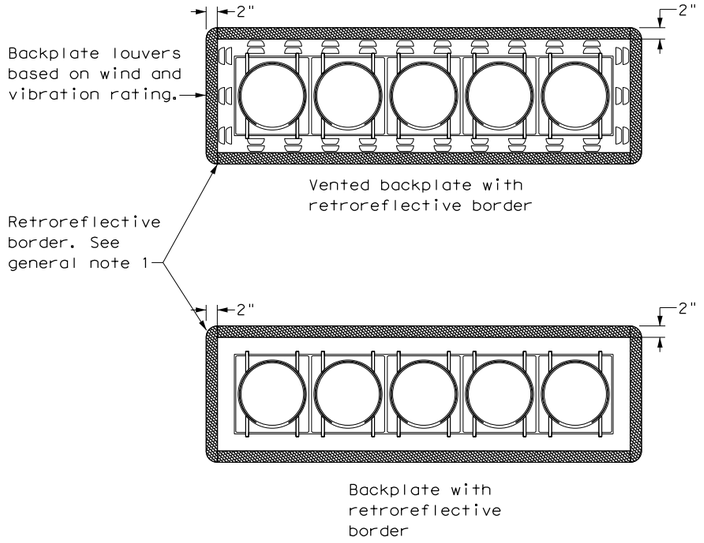
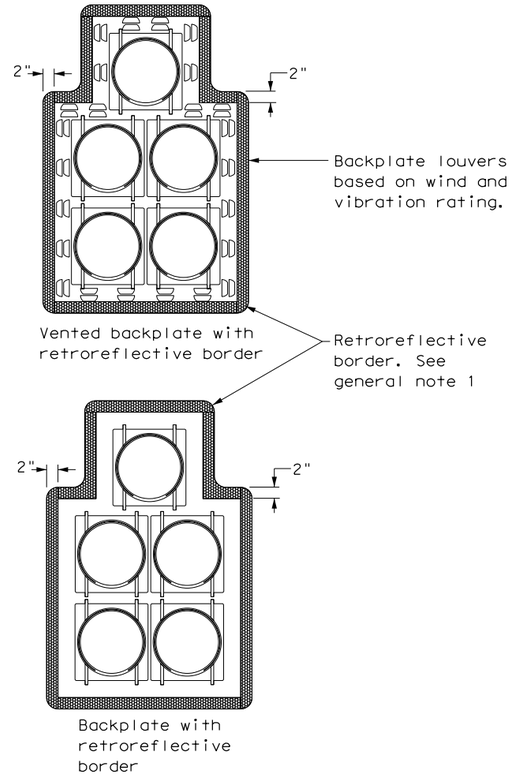
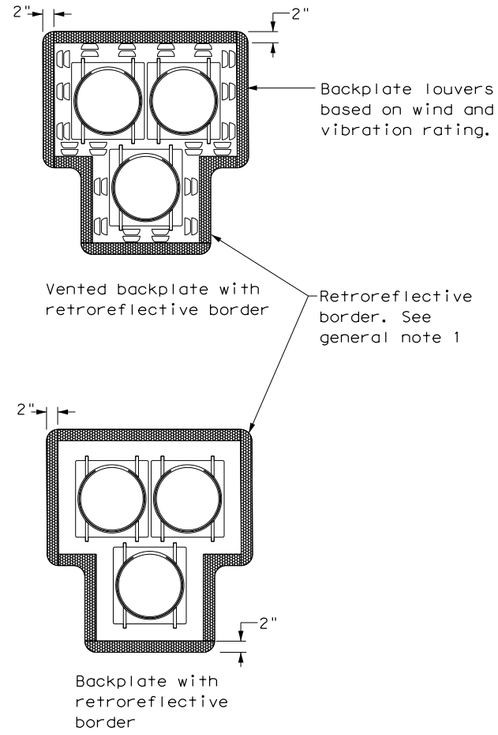


FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		116

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is $\frac{1}{2}$ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

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Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0001	04	102, ETC.	US62, ETC.
		DIST		COUNTY	SHEET NO.
		ELP		ELP, ETC.	117

71A

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

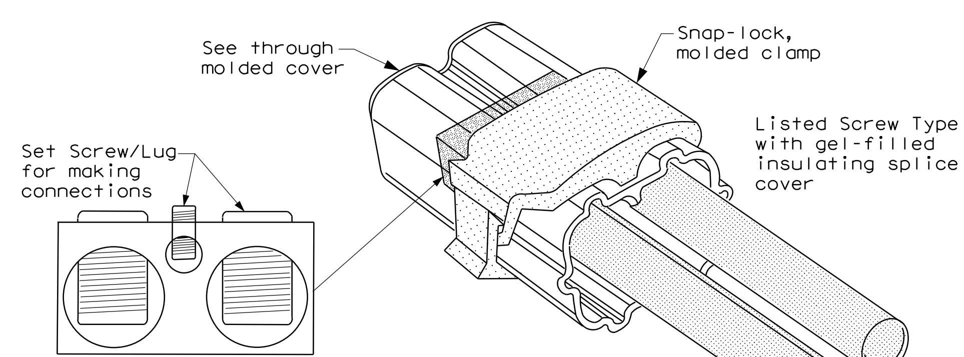
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

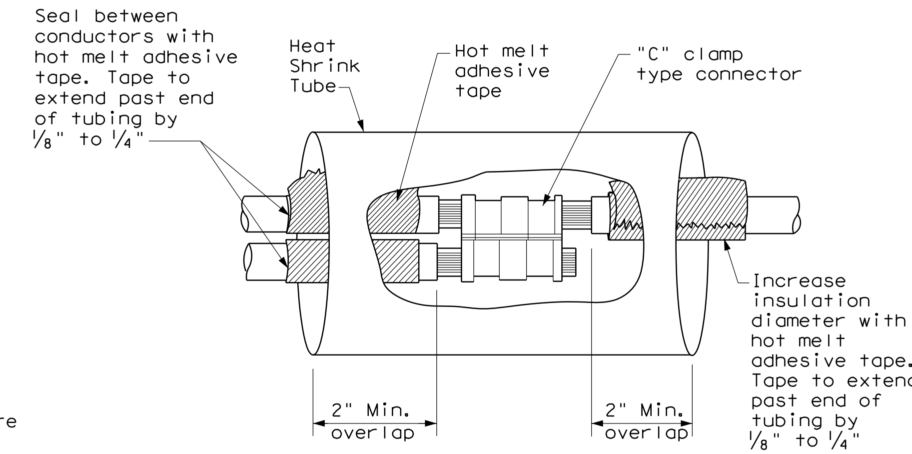
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

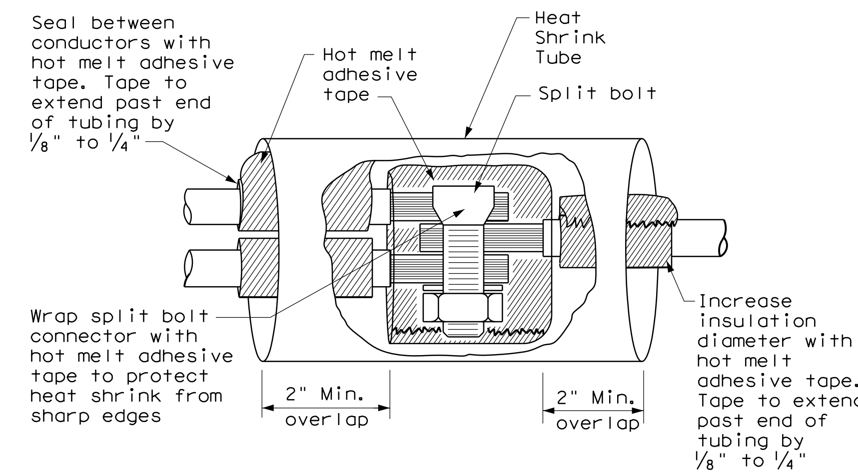
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 3
Listed Screw Type



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUCTORS

ED(3)-14

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		DIST		COUNTY	SHEET NO.
		ELP		ELP,ETC.	118

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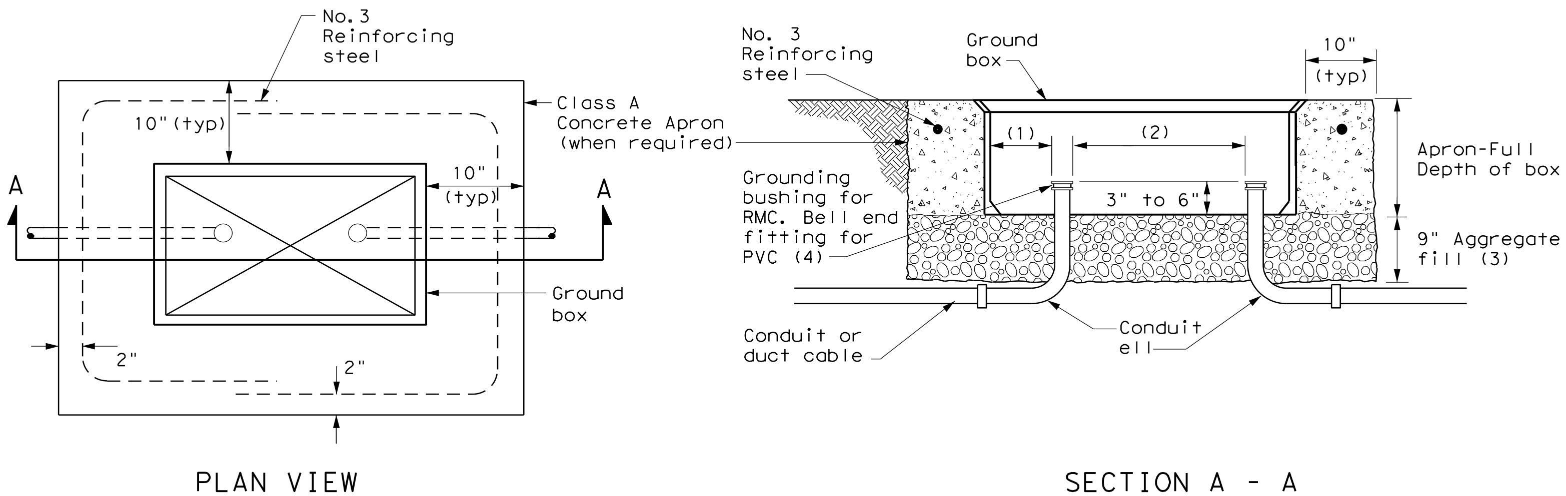


APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

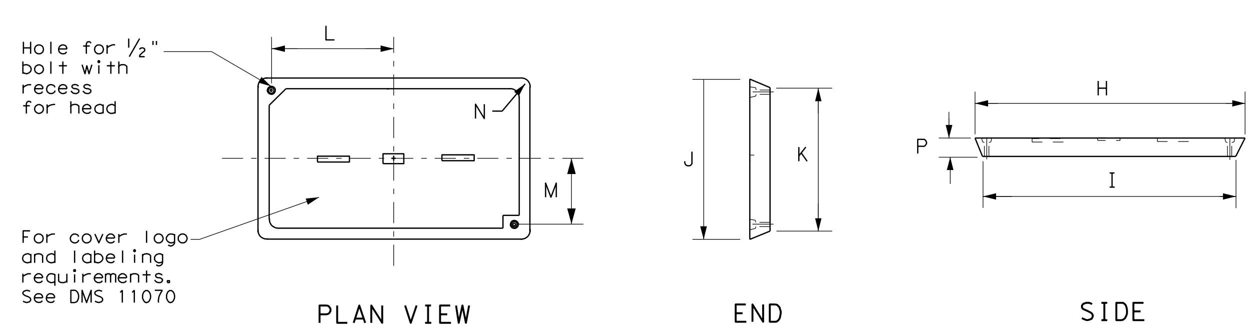
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

GROUND BOX DIMENSIONS

TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS

TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



GROUND BOX COVER

Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT 0001	SECT 04	JOB 102,ETC.	HIGHWAY US62,ETC.
REVISIONS	DIST ELP	COUNTY ELP,ETC.		SHEET NO. 119

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

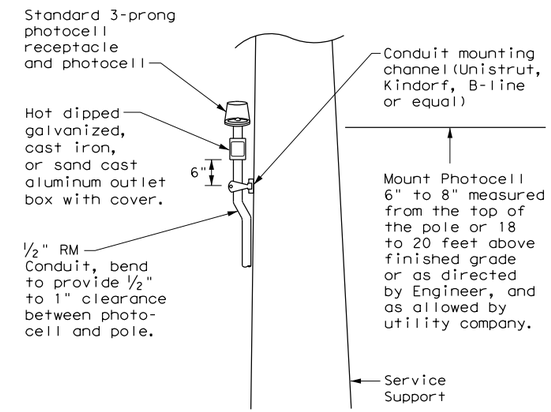
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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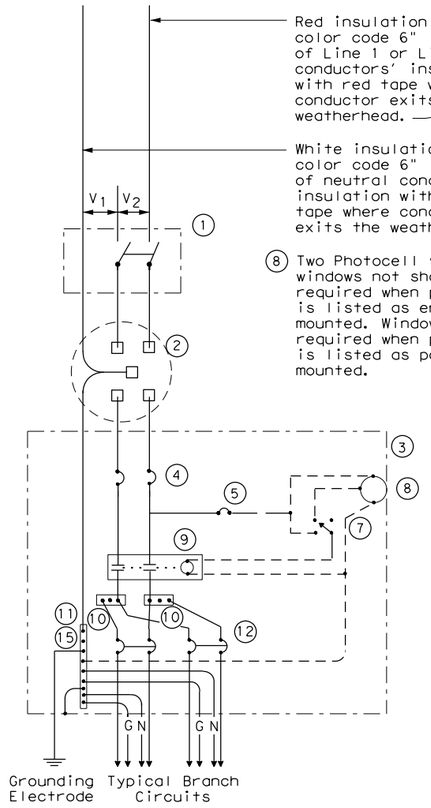
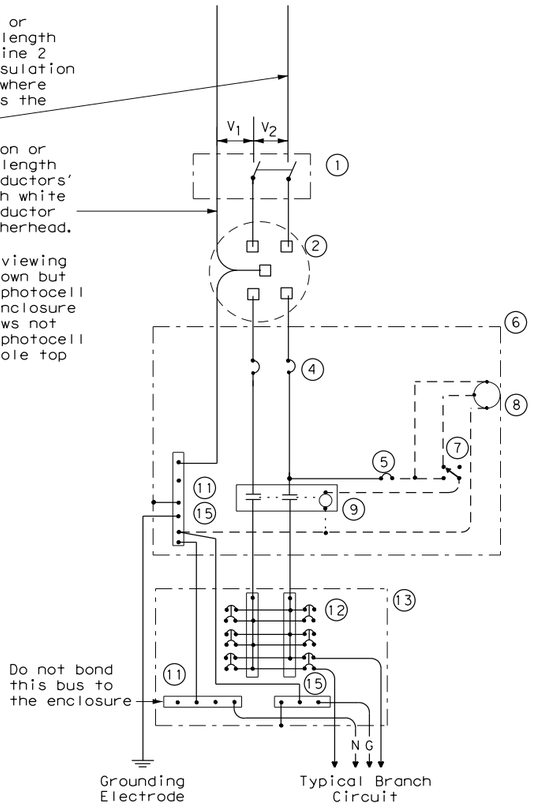
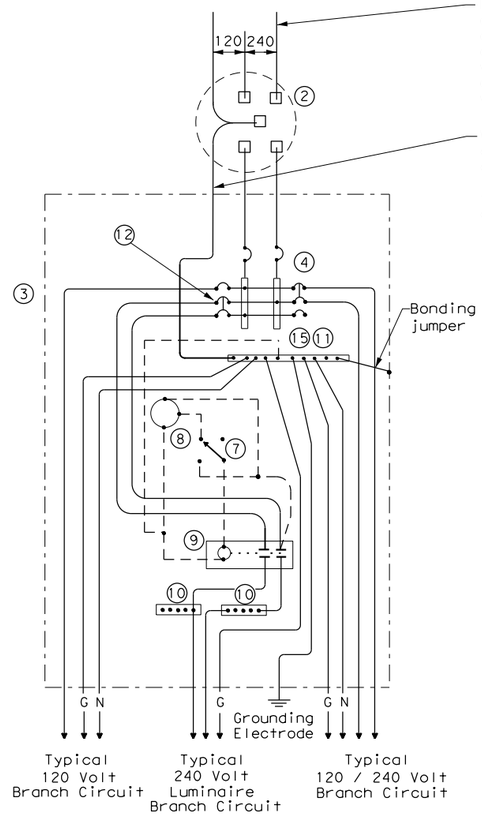


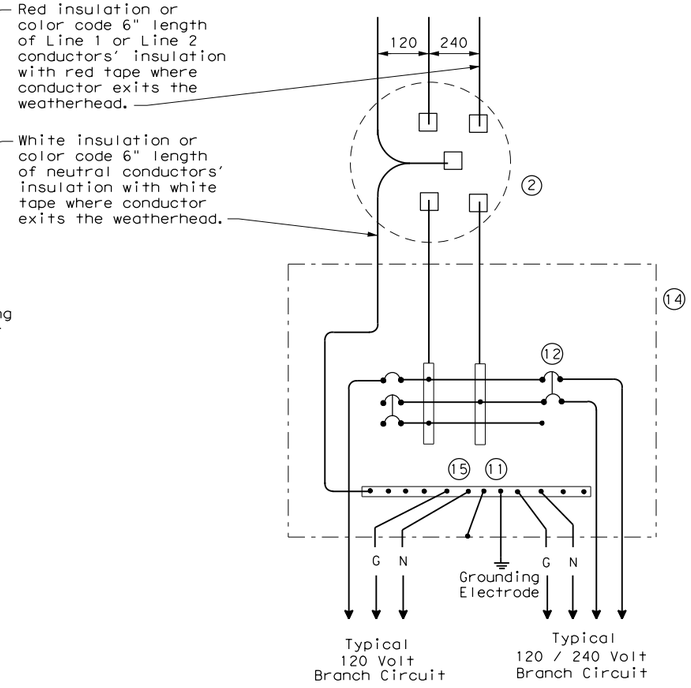
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		121

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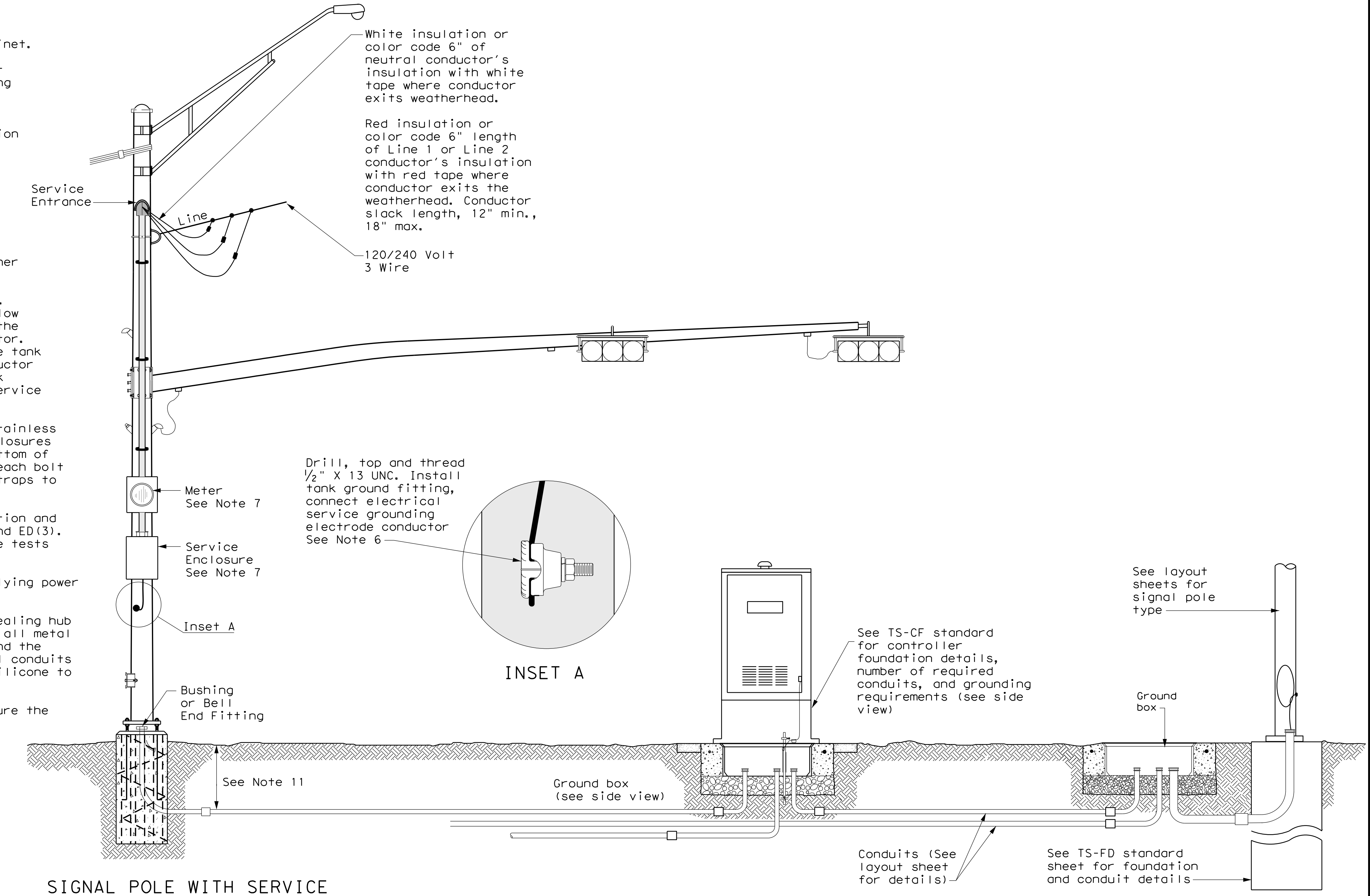
TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".

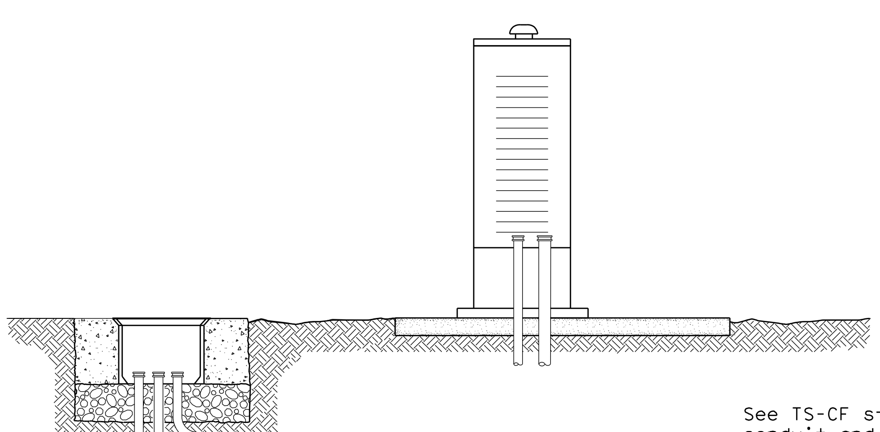


SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

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Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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	ELP		ELP, ETC.	122

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FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-0644029 Traffic/Standards/ED(10)-14 Service Support Types GC, OC, & TP.dgn

TIMBER POLE(TP)SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 5/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 1½ in. to 1⅝ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, ¼ in. minimum diameter by 1½ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC)and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in ½ in. PVC to ground rod - extend ½ in. PVC 6 in. underground.

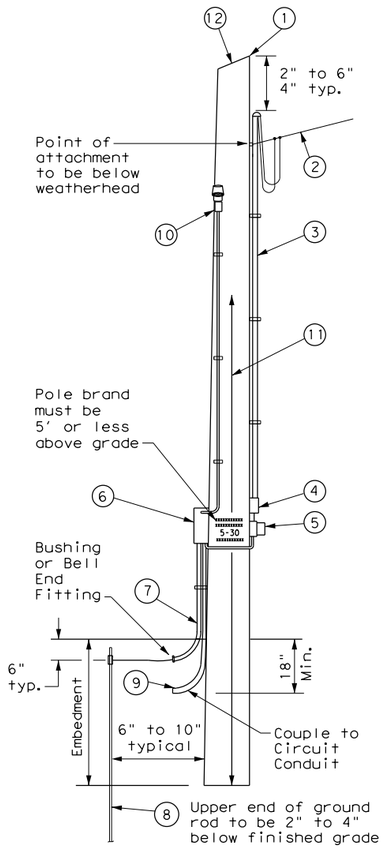
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

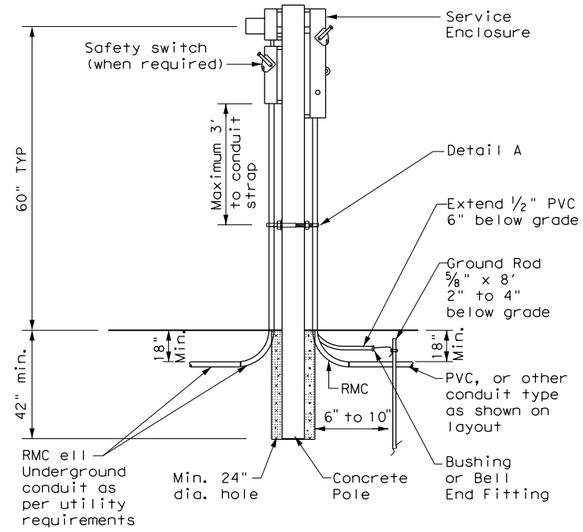


SERVICE SUPPORT TYPE TP (O)

GRANITE CONCRETE(GC)& OTHER CONCRETE(OC)NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

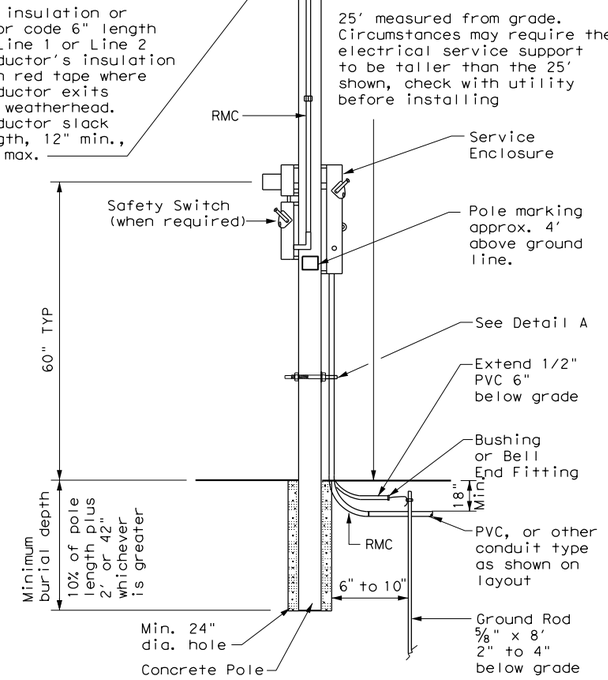
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



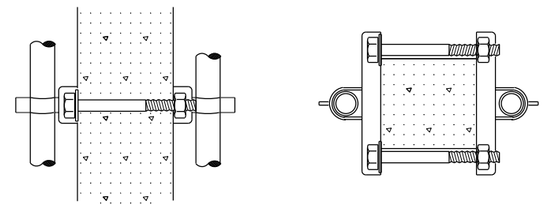
CONCRETE SERVICE SUPPORT
Underground(U)

White Insulation or color code 6" length neutral conductor's insulation with white tape where conductor exits the weatherhead.

Red insulation or color code 6" length of Line 1 or Line 2 conductor's insulation with red tape where conductor exits the weatherhead. Conductor slack length, 12" min., 18" max.



CONCRETE SERVICE SUPPORT
Overhead(O)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

Texas Department of Transportation

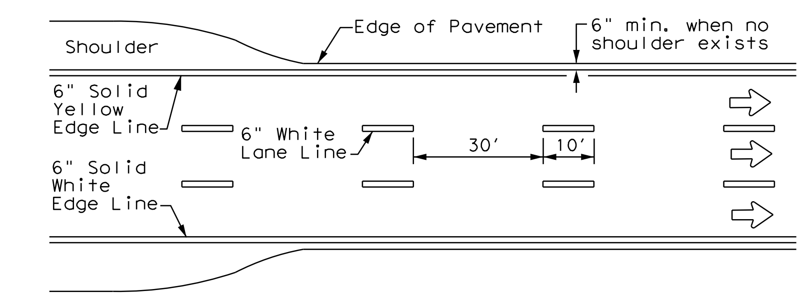
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

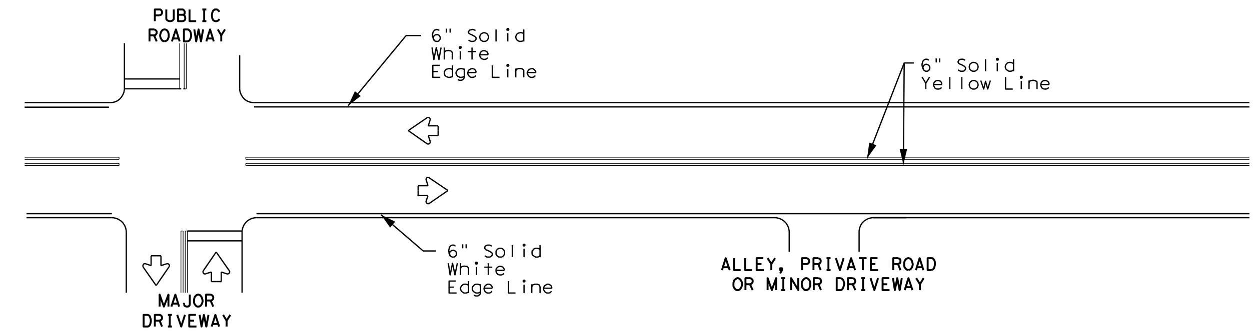
ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		123

71K



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



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

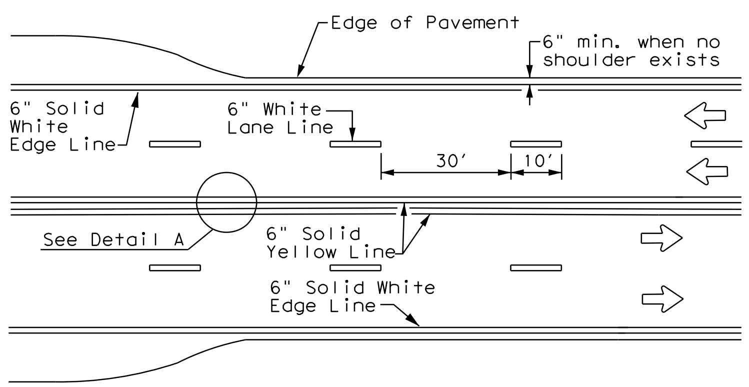
GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.

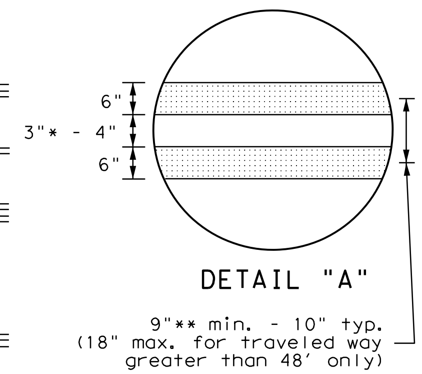
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



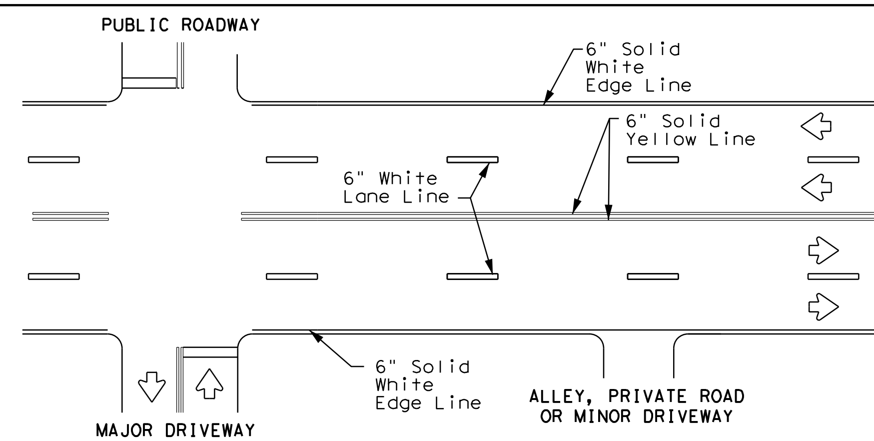
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



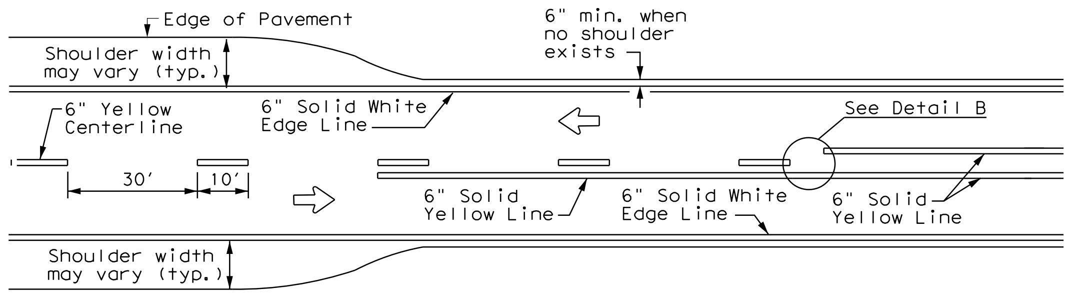
DETAIL "A"

9"** min. - 10" typ. (18" max. for traveled way greater than 48' only)

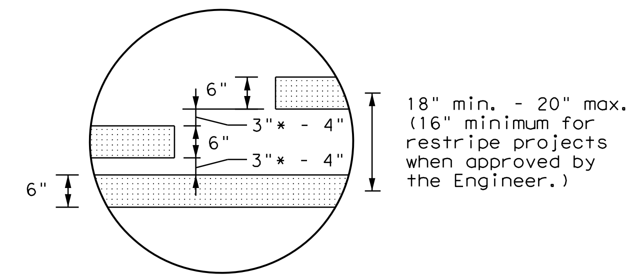
* 2" minimum for restripe projects when approved by the Engineer.
** 8" minimum for restripe projects when approved by the Engineer.



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

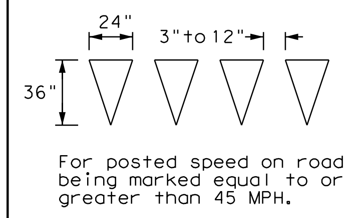


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

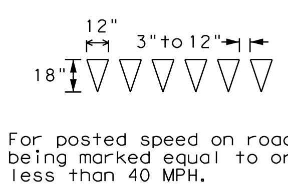


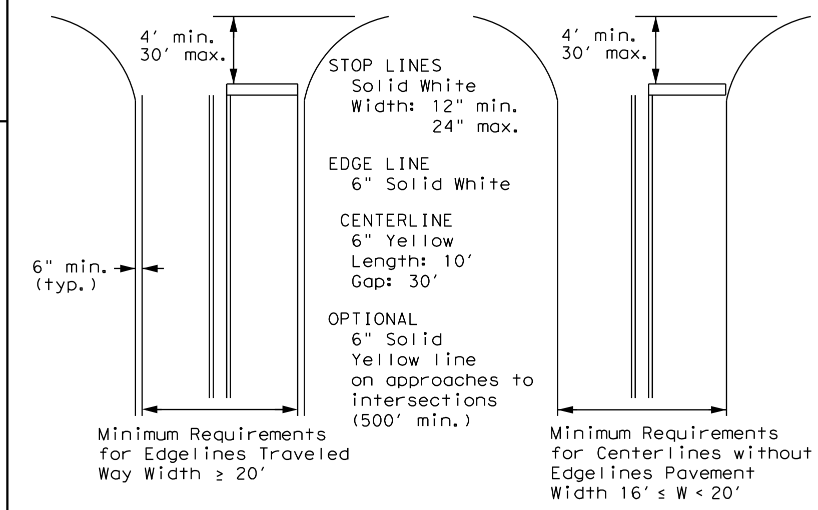
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.



YIELD LINES

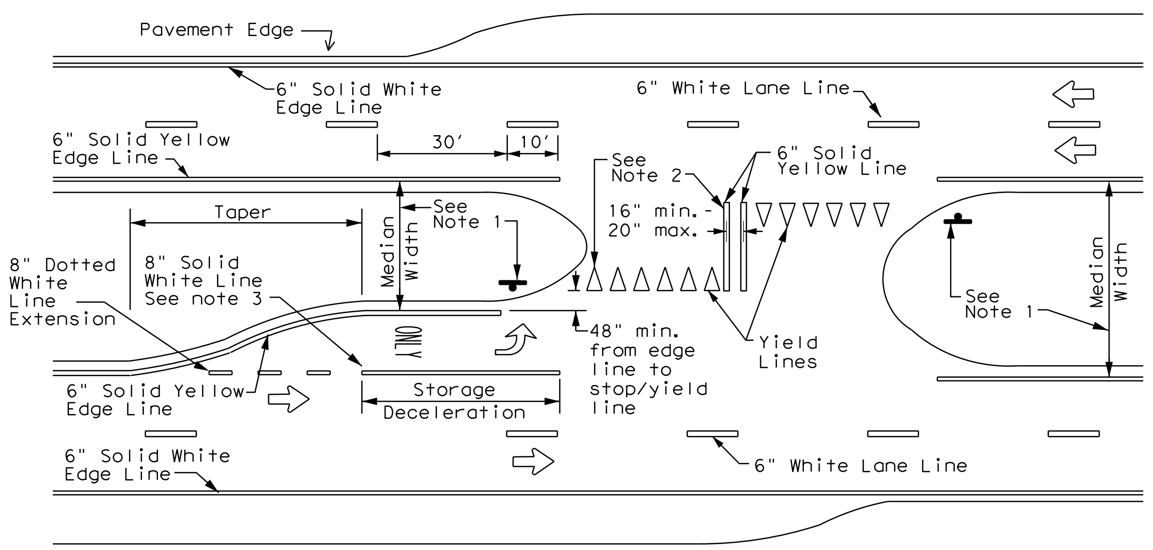




NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

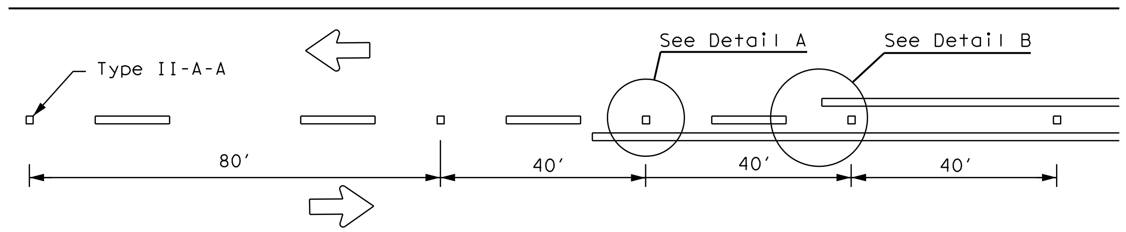
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0001	04	102, ETC.	US62, ETC.
	DIST		COUNTY	SHEET NO.
	ELP		ELP, ETC.	124

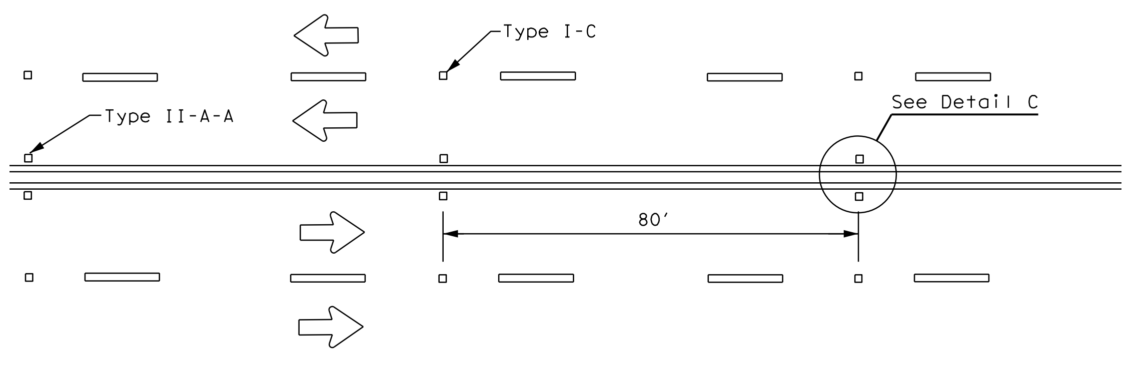
22A

DATE: 3/26/2024 1:27:37 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-...

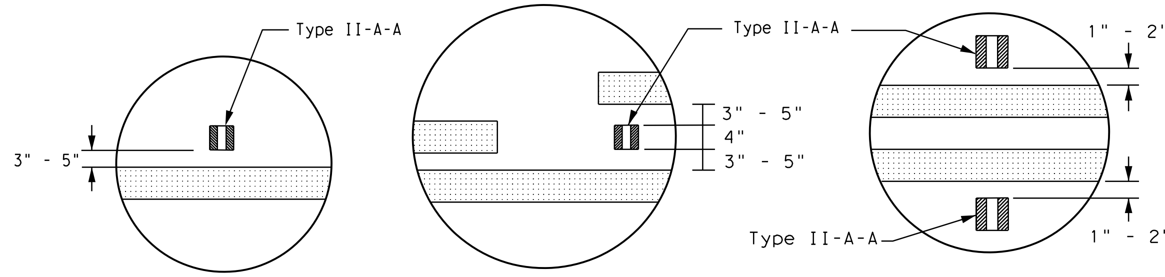
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



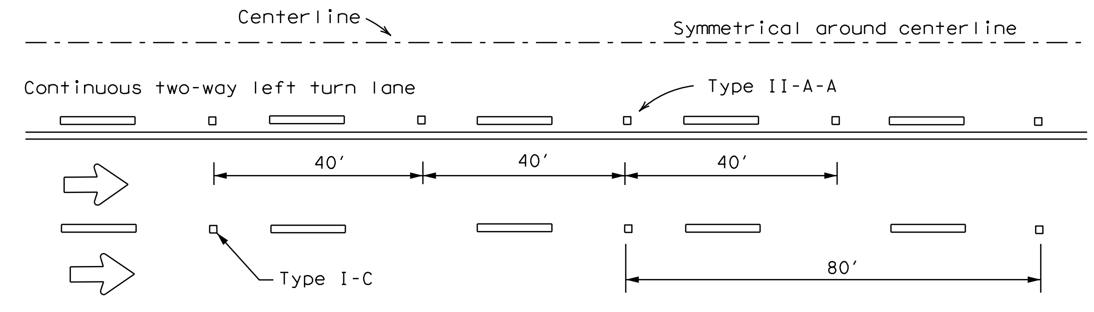
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



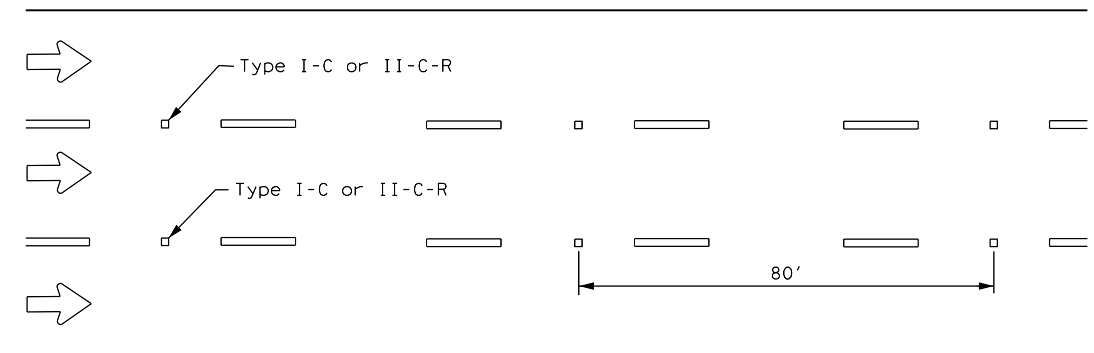
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



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



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



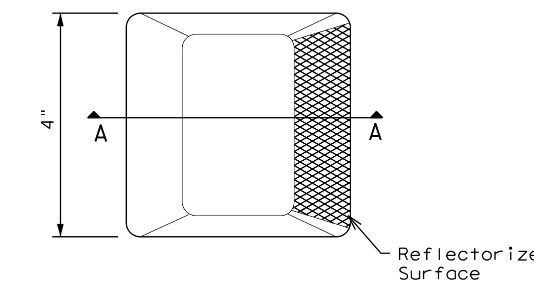
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

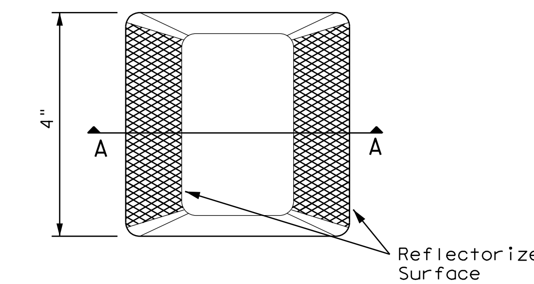
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

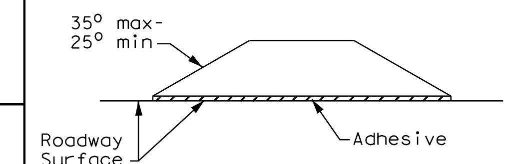
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

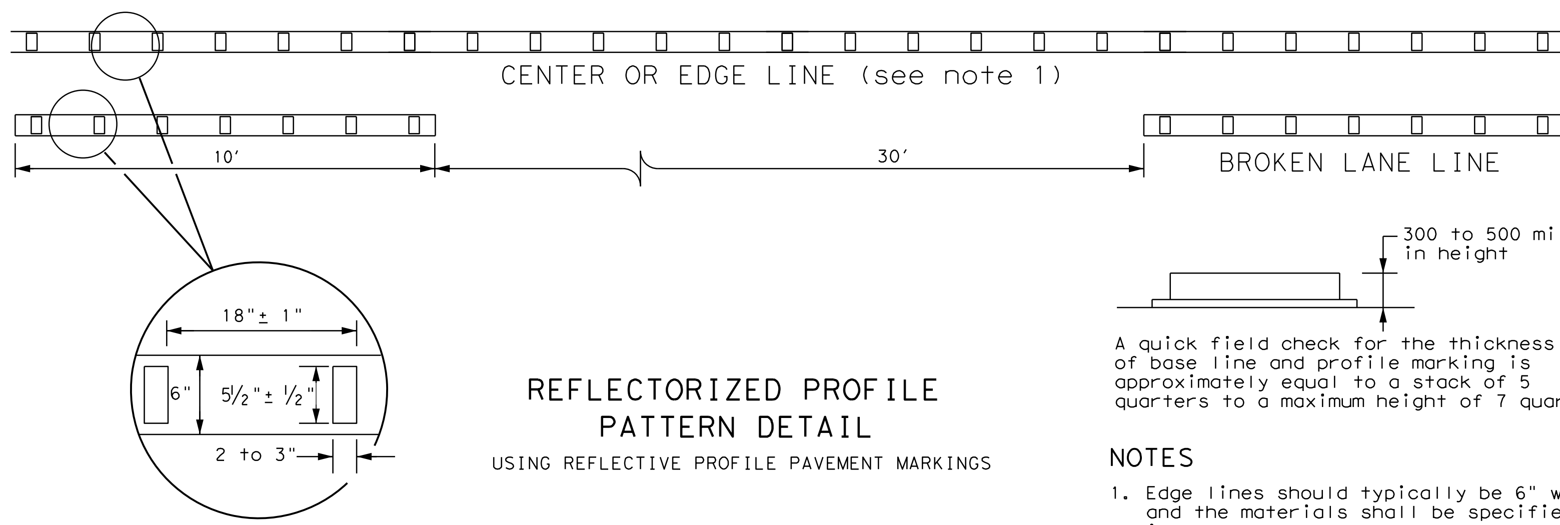


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0001	04	102, ETC.	US62, ETC.
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	ELP		ELP, ETC.	125

22B

DATE: 3/26/2024 1:27:59 PM
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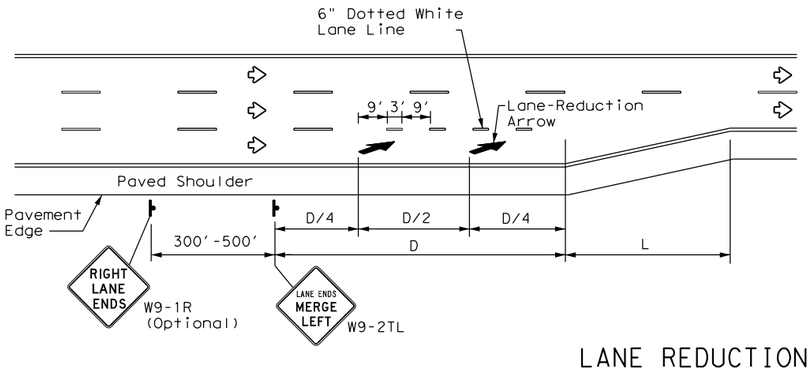


LANE REDUCTION

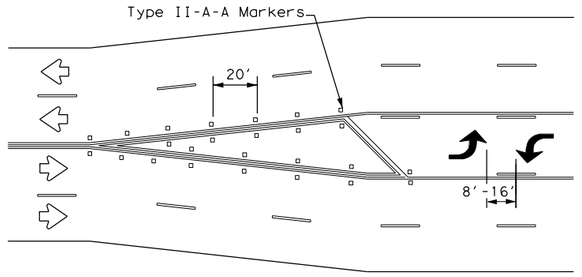
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

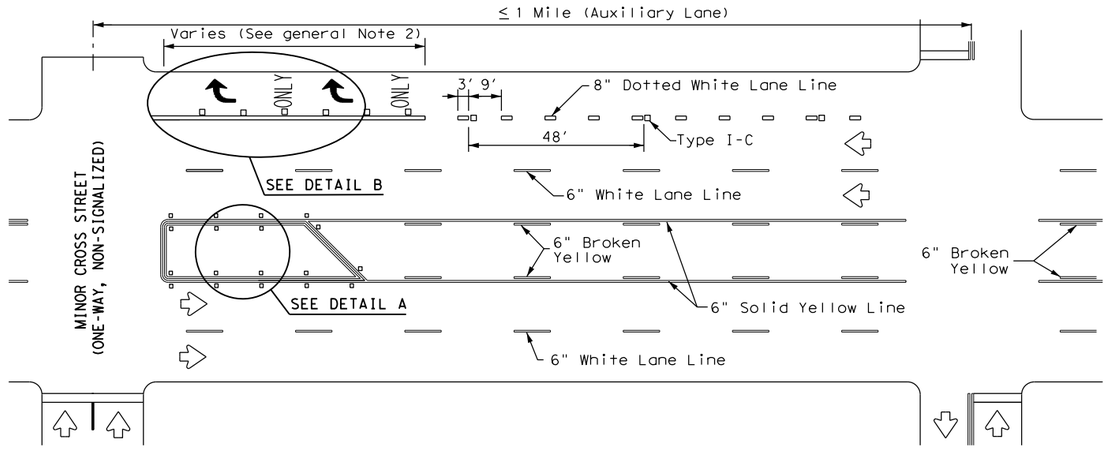


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

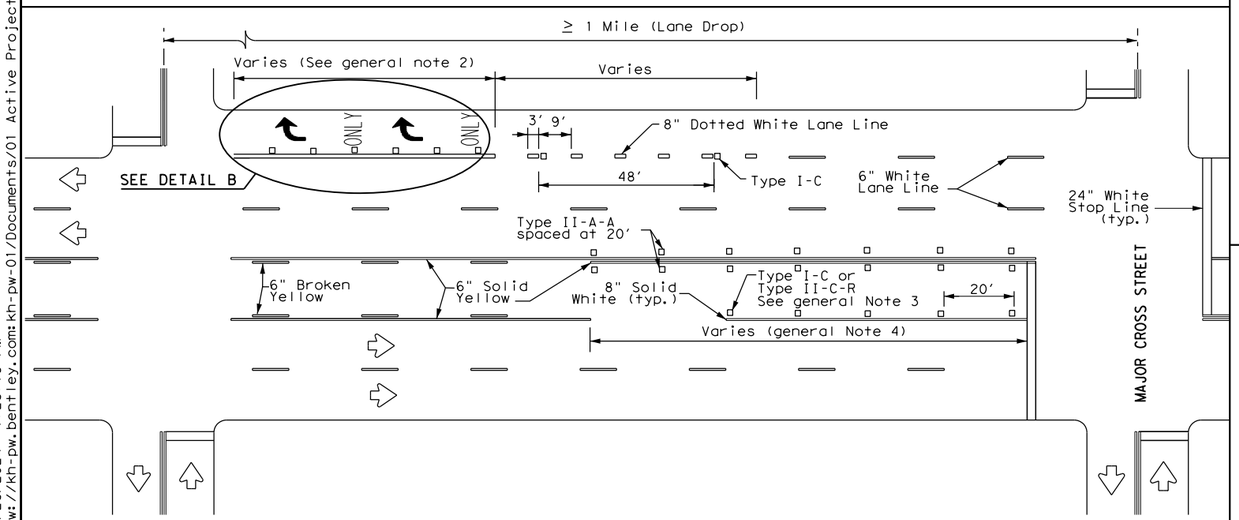
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

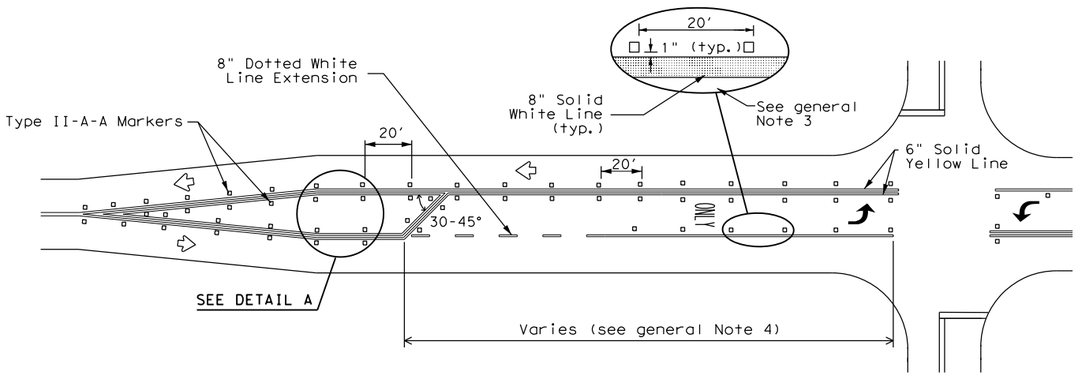
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



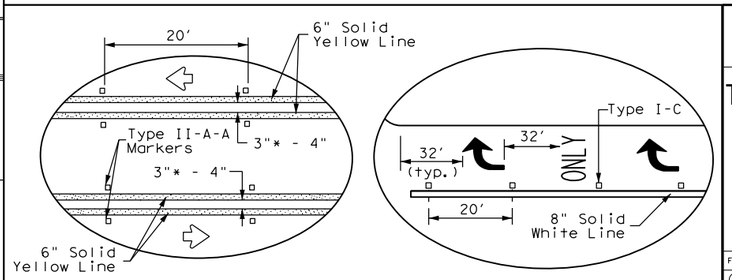
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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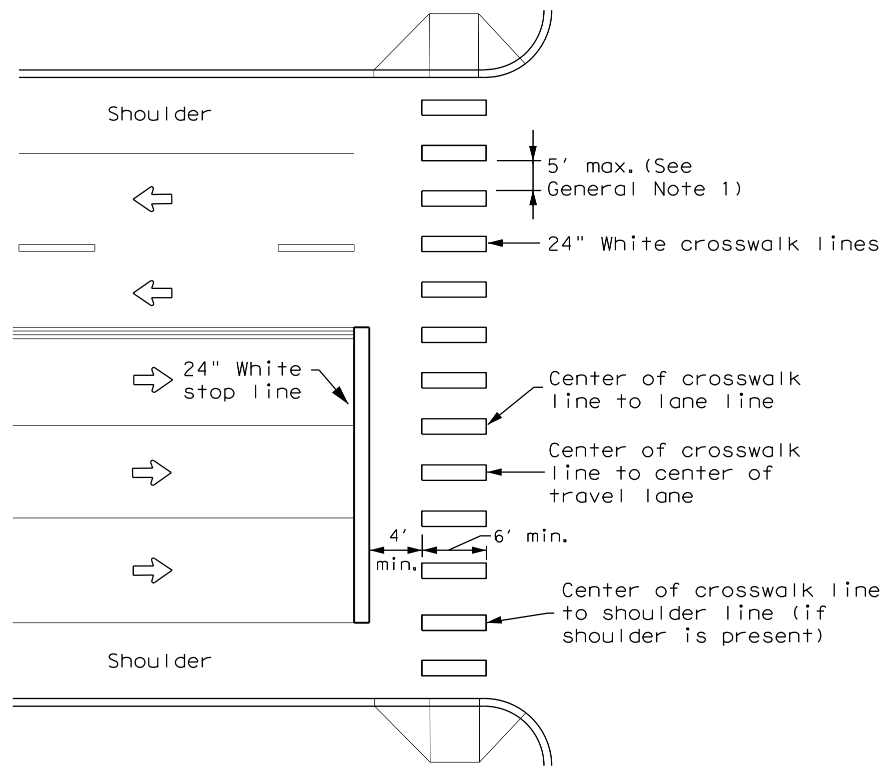
5-00 2-10 12-22	ELP	ELP,ETC.		126
8-00 2-12				

22C



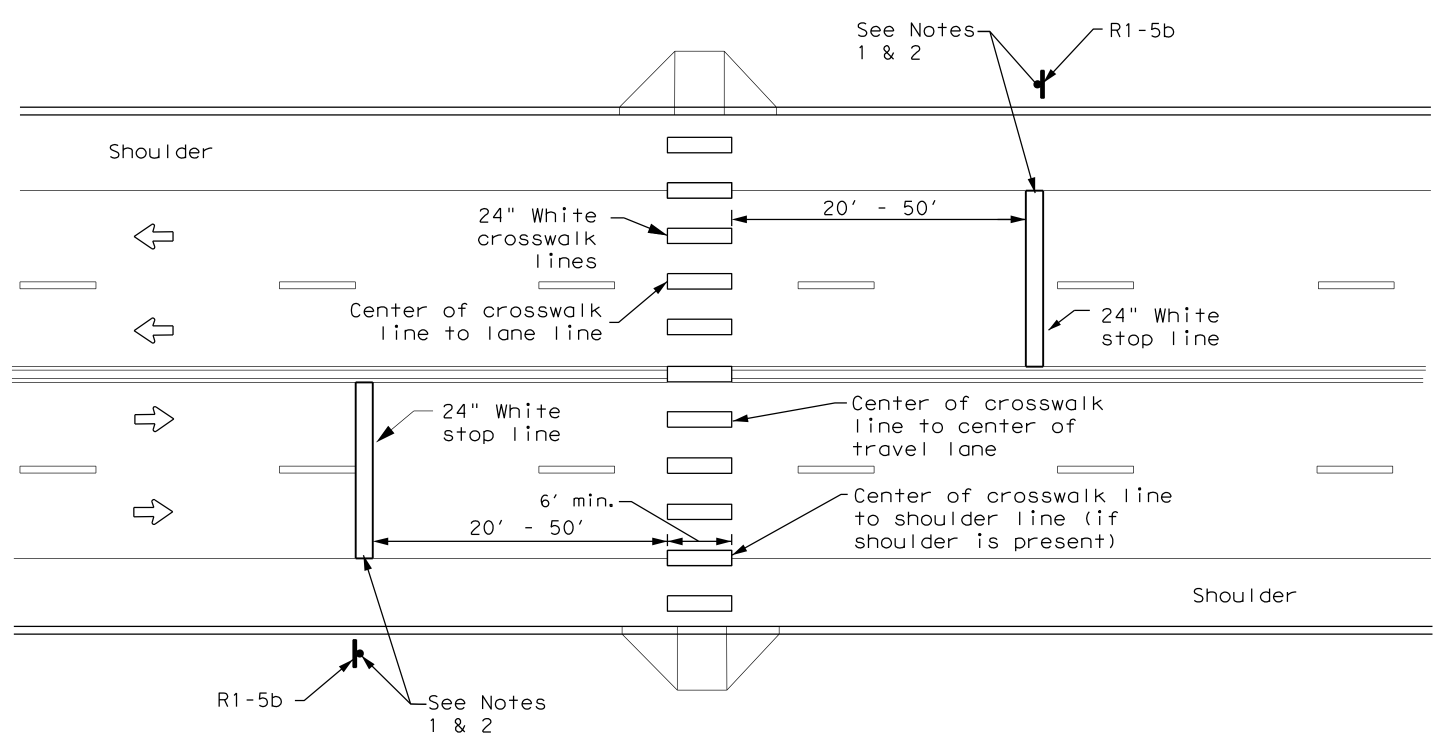
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

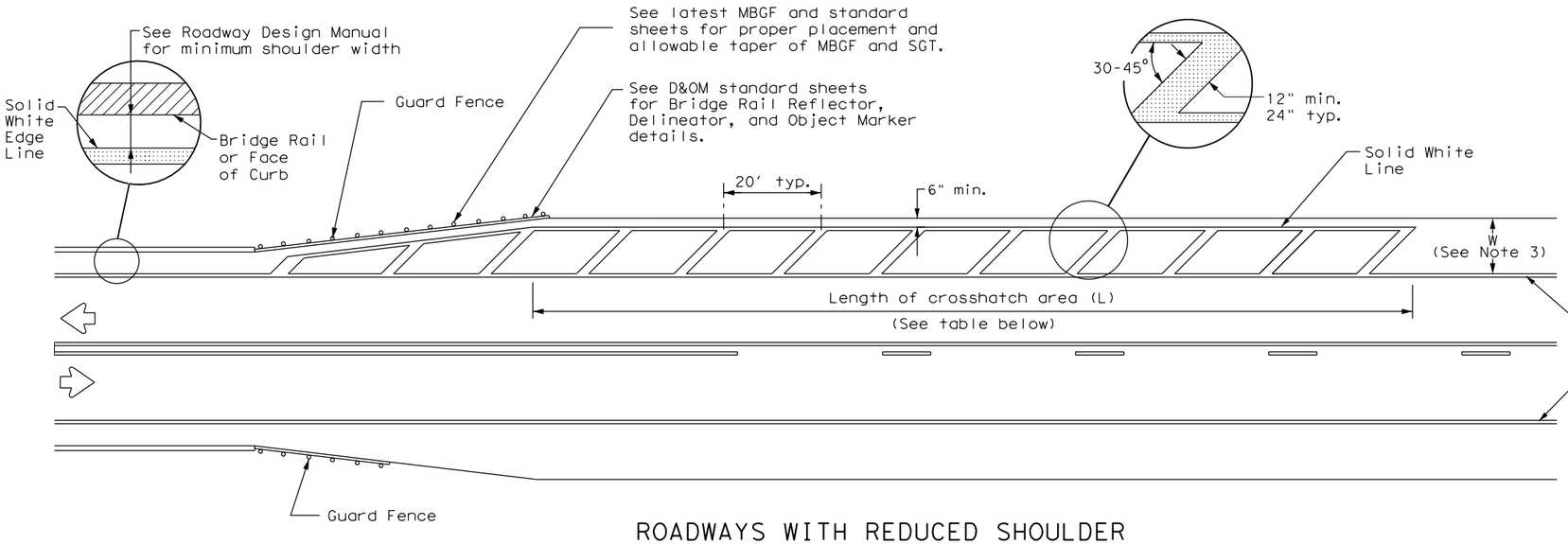
CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
6-20 6-22 12-22	DIST		COUNTY	SHEET NO.
	ELP		ELP, ETC.	127

22D

DATE:
FILE:



ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

CROSSHATCH LENGTH (L)	
Posted Speed (MPH)	L (ft)
30	300 ft
35	
40	
45	
50	500 ft
55	
60	
65	
70	
75	

NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 4 inches from the bridge rail or face of curb or 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions.
2. No-passing zone on bridge approach is optional. If used, the no-passing zone shall be a minimum 500 feet long from the beginning of the bridge.
3. The crosshatching should be required if the shoulder width in advance of the bridge is 4 feet or wider and a reduction of at least 3 feet in shoulder width across the bridge occurs.
4. On divided highways, review both the right and left shoulder widths for the need for narrow bridge pavement markings.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

Texas Department of Transportation

Traffic Safety Division Standard

PAVEMENT MARKINGS FOR ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

PM(5)-22

FILE: pm5-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		128

22E

DATE: 3/26/2024 1:29:19 PM
FILE: pw://KH-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/SMD(GEN)-08.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

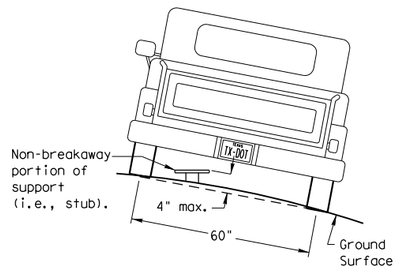
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

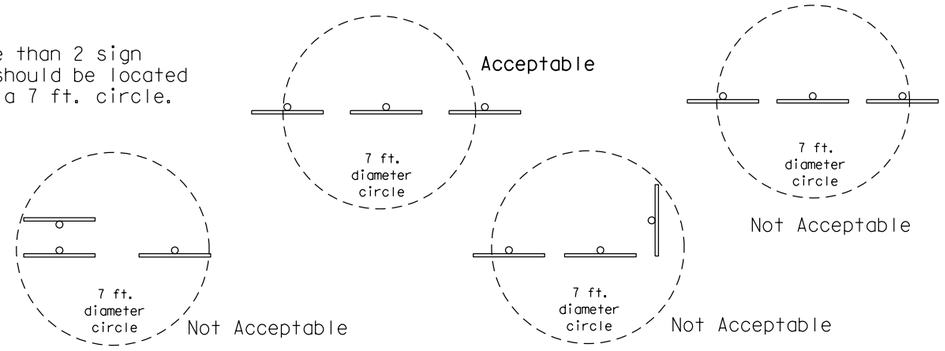
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



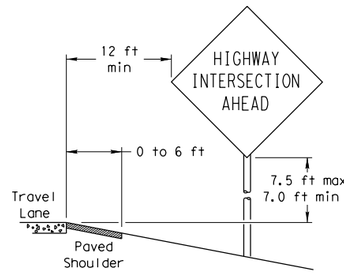
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



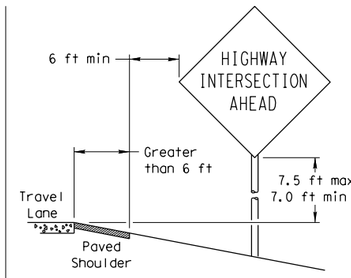
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

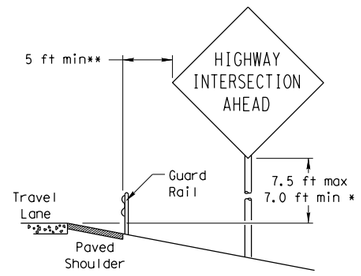
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



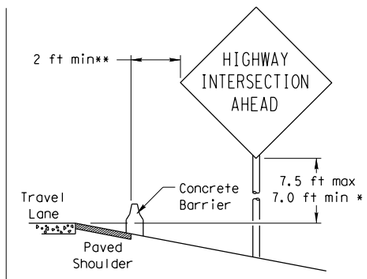
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



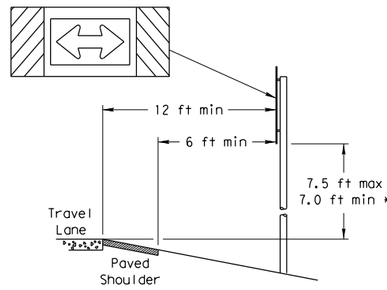
BEHIND GUARDRAIL



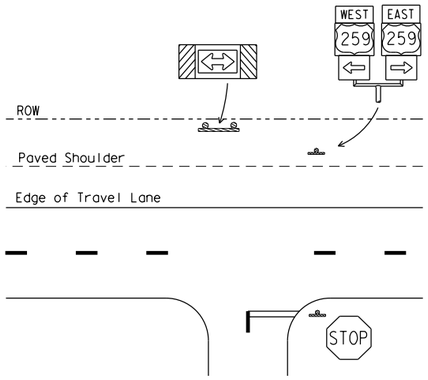
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

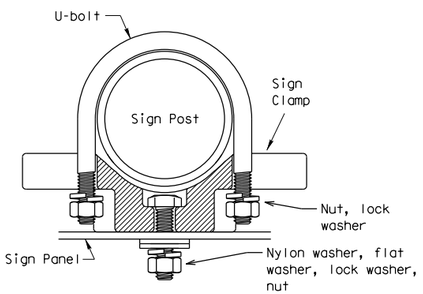
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

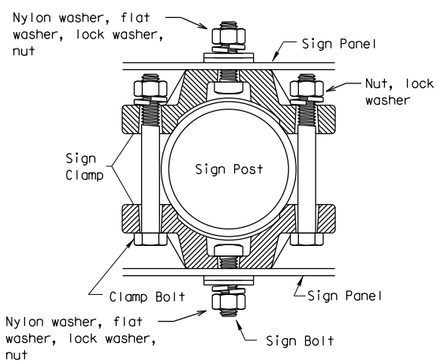


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

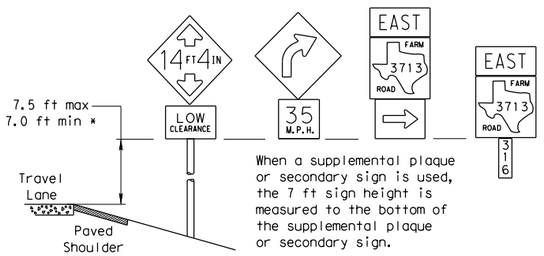
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



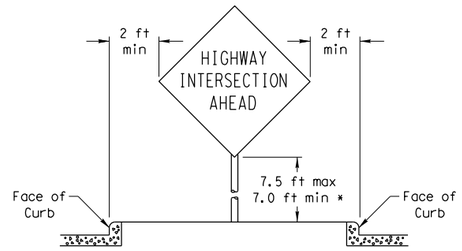
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



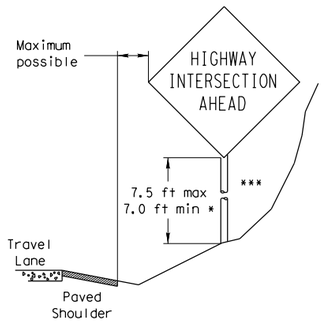
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.
DIST	COUNTY		SHEET NO.
ELP	ELP,ETC.		129

26A

DATE: 3/26/2024 1:29:39 PM
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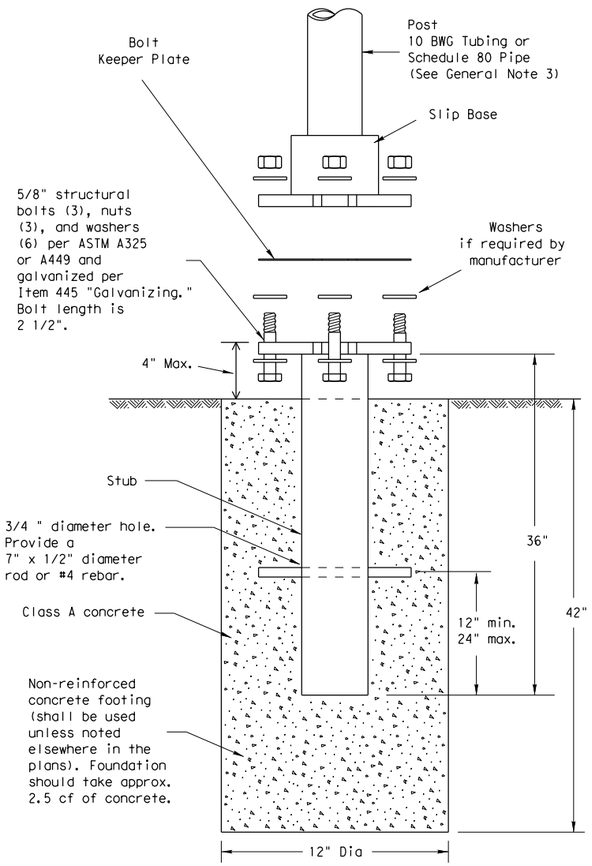
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

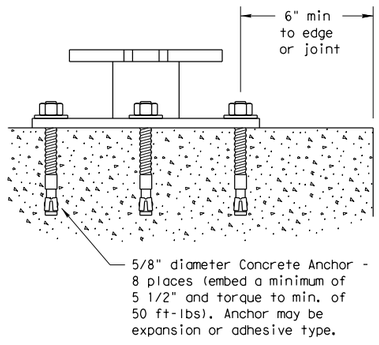
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

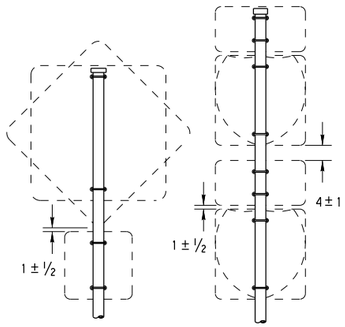
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

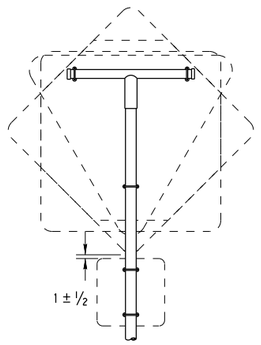
CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.

DIST	COUNTY	SHEET NO.
ELP	ELP,ETC.	130

DATE: 3/26/2024 1:29:59 PM
FILE: pw://kn-pw.bentley.com:kn-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standard



SM RD SGN ASSM TY XXXXX(1)XX(P)



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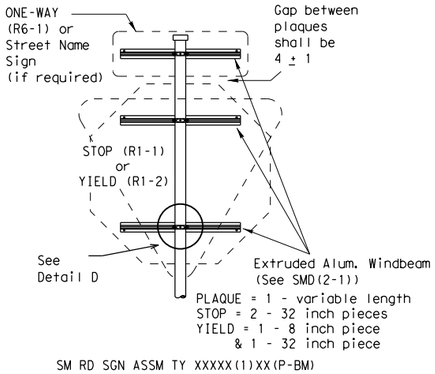

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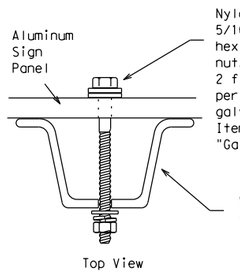
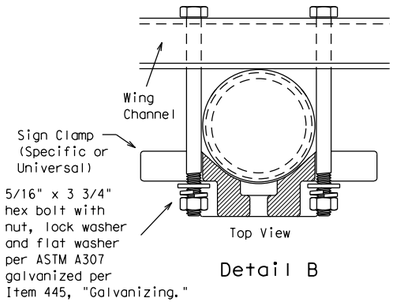
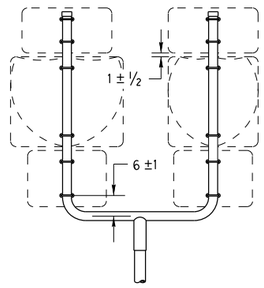


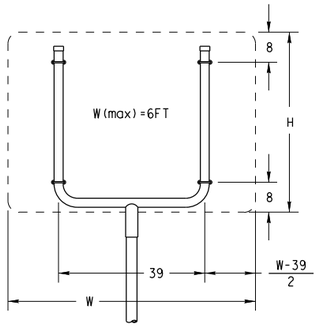
Detail A



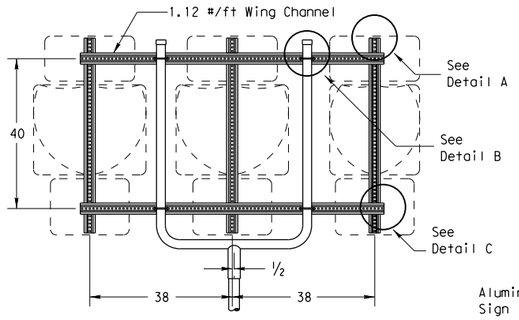
Detail B



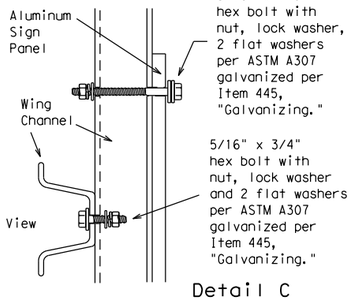
SM RD SGN ASSM TY XXXXX(1)XX(U)



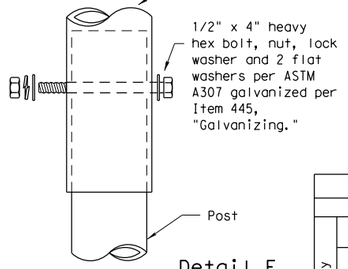
SM RD SGN ASSM TY XXXXX(1)XX(U)



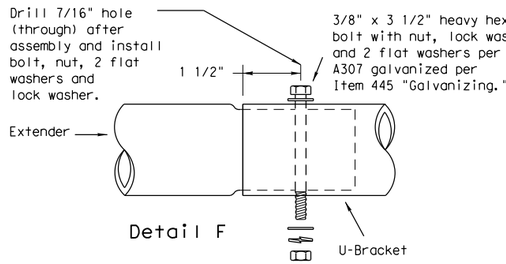
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



Detail C

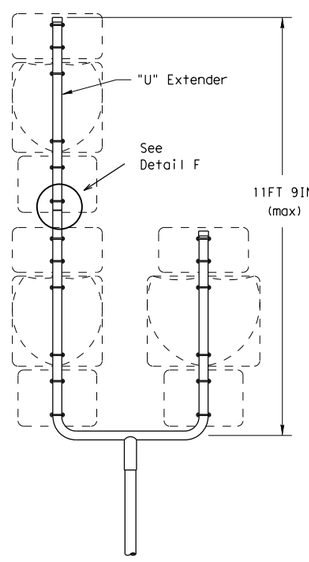


Detail E

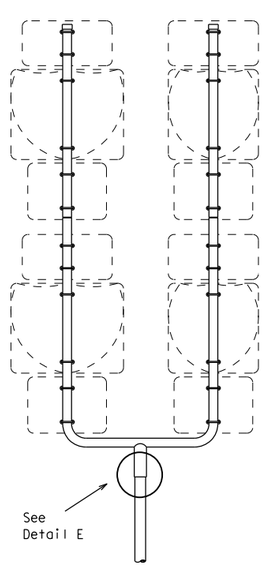


Detail F

Splices shall only be allowed behind the sign substrate.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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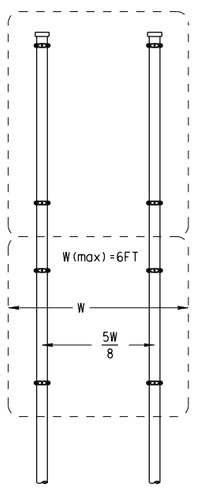
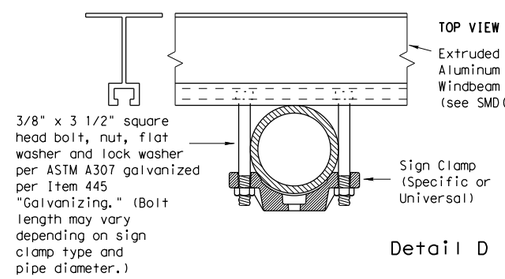
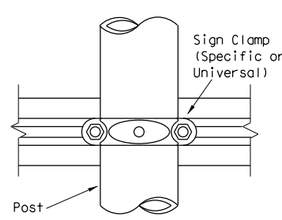


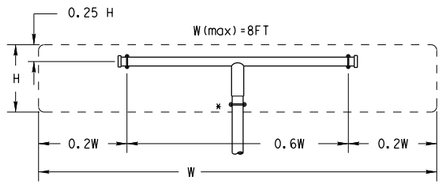
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

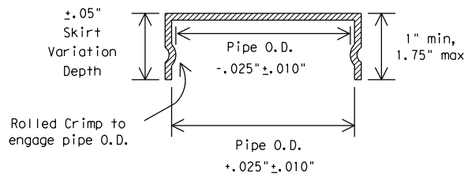




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

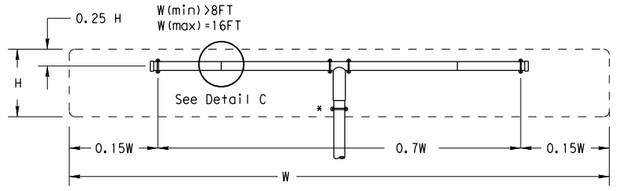
CONT	SECT	JOB	HIGHWAY
0001	04	102,ETC.	US62,ETC.

DIST	COUNTY	SHEET NO.
ELP	ELP,ETC.	131

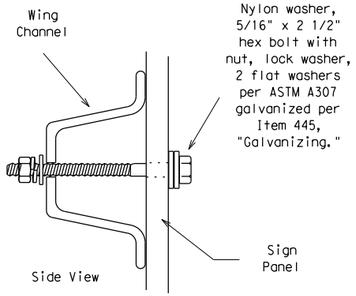
9-08 REVISIONS

26C

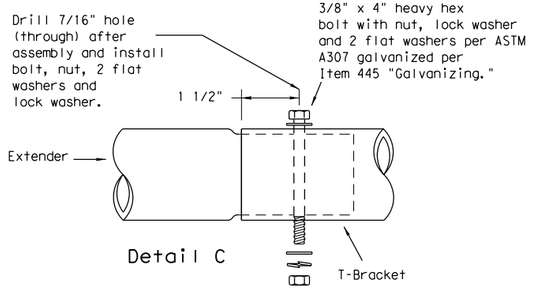
DATE: 3/26/2024 1:30:20 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/8. Traffic/Standards/SMD (SLIP-3)-08.dgn



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



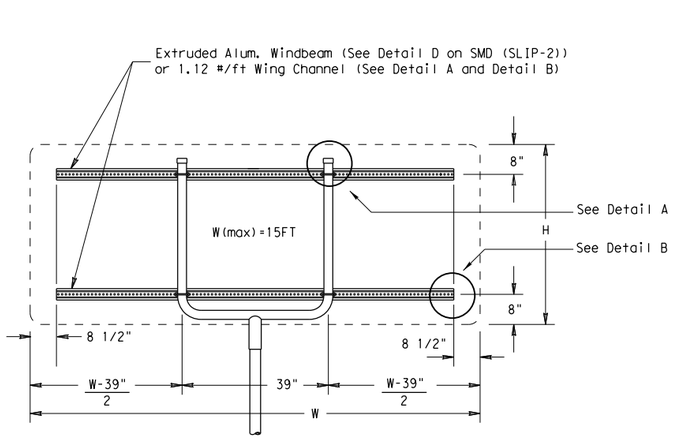
Detail C

Splices shall only be allowed behind the sign substrate.

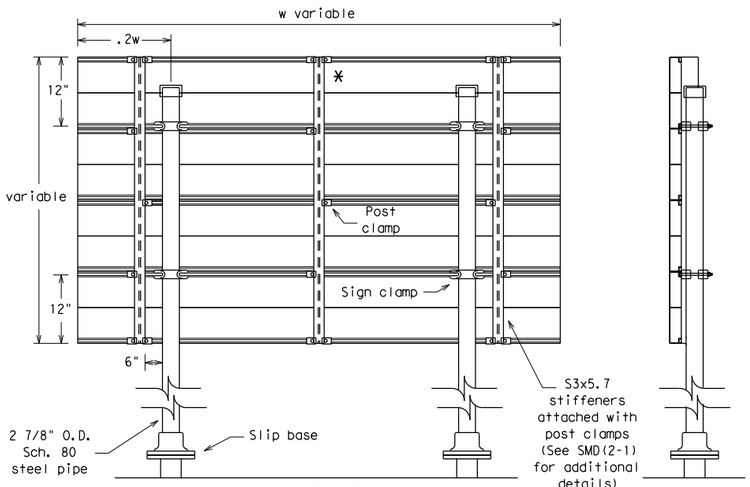
GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



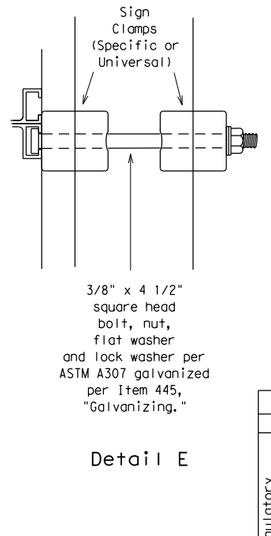
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Typical Sign Mount

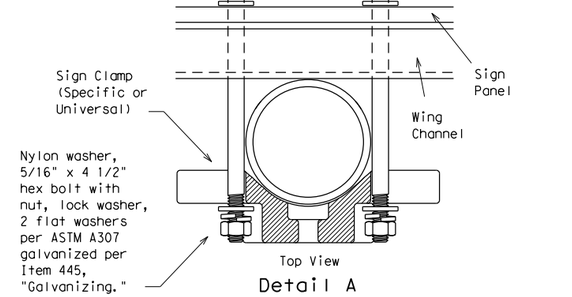
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

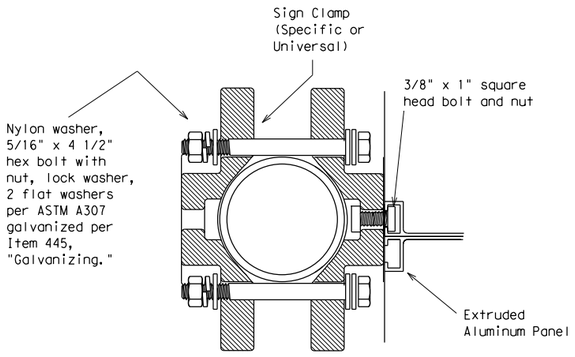


Detail E

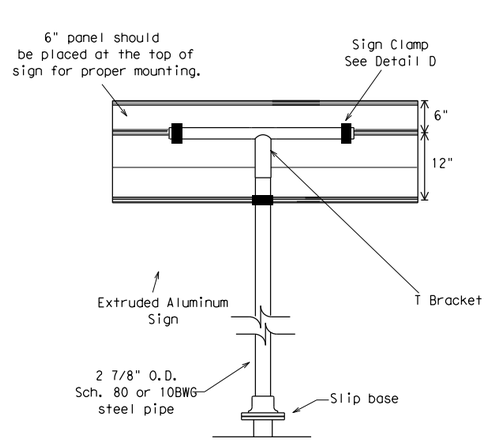
See Detail E for clamp installation



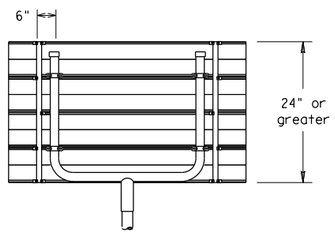
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0001	04	102,ETC.	US62,ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP,ETC.		132

26D

DATE: 3/26/2024 1:30:40 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-0646029/Traffic/Standards/tsr3-13.dgn

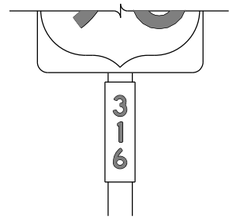
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

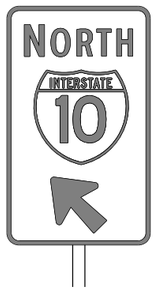
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

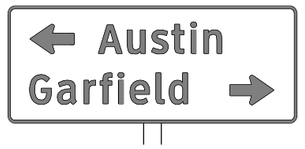
TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING







TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ELP	ELP,ETC.		133

3

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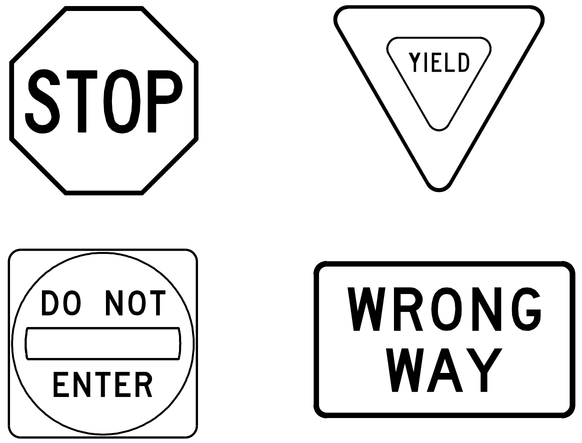
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

GENERAL NOTES

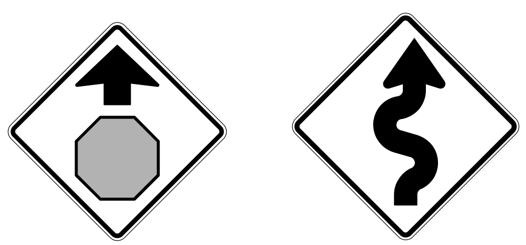
1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

Texas Department of Transportation
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0001	04	102, ETC.	US62, ETC.
	DIST		COUNTY	SHEET NO.
	ELP		ELP, ETC.	134

4

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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer′s name, and logo on shop drawings. Include on manufacturer′s shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

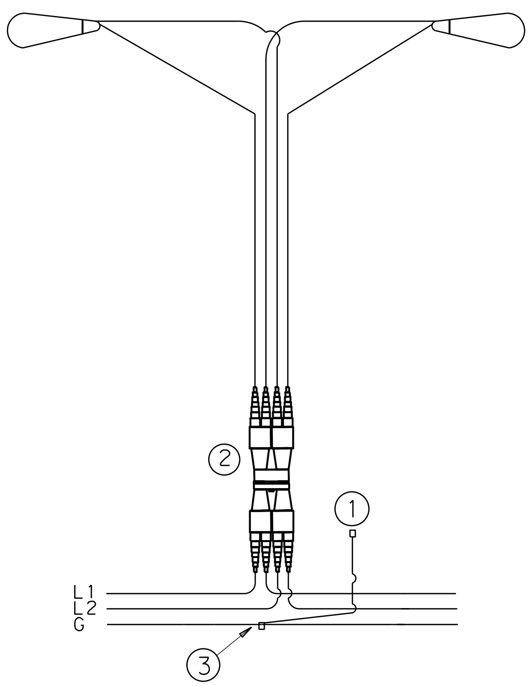
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

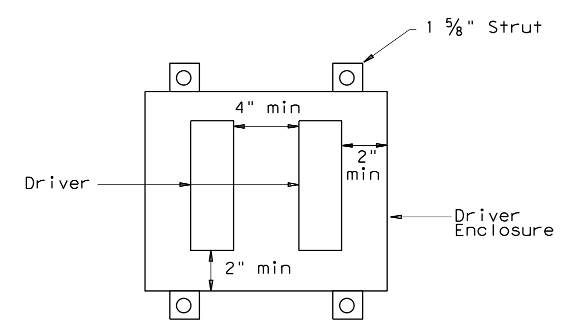
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation

Traffic Safety Division Standard

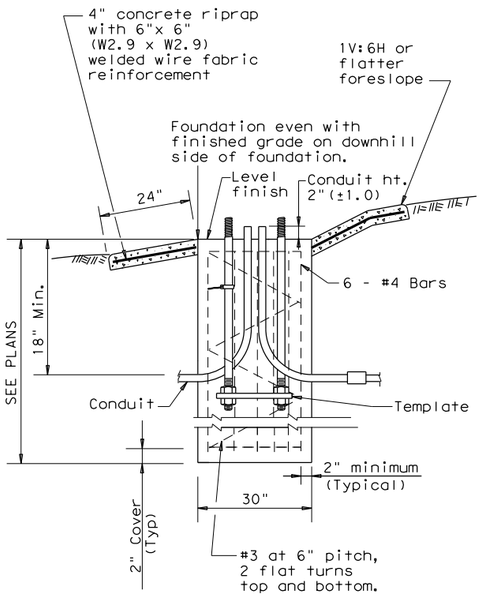
ROADWAY ILLUMINATION DETAILS

RID(1)-20

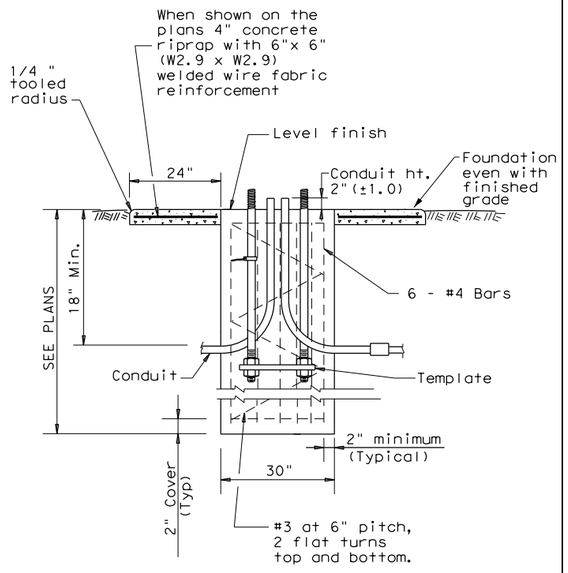
FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102,ETC.	US62,ETC.
7-17 12-20	DIST		COUNTY	SHEET NO.
	ELP		ELP,ETC.	135

72A

DATE: 3/26/2024 1:31:43 PM
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-0046029 Traffic/Standards/rid2-20.dgn



SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1
ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2
RECOMMENDED FOUNDATION LENGTHS (See note 1)

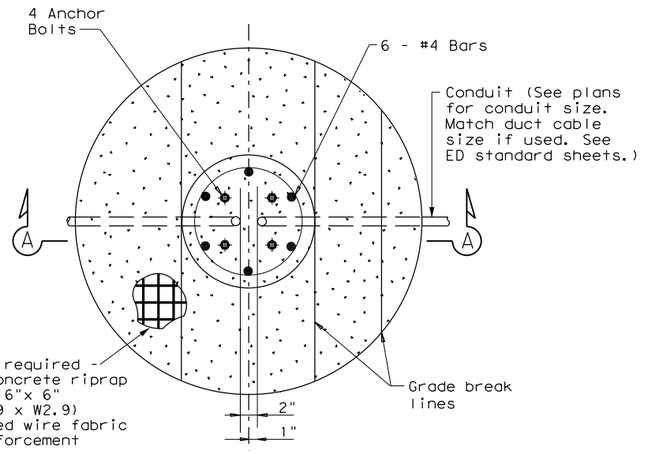
MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3
PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

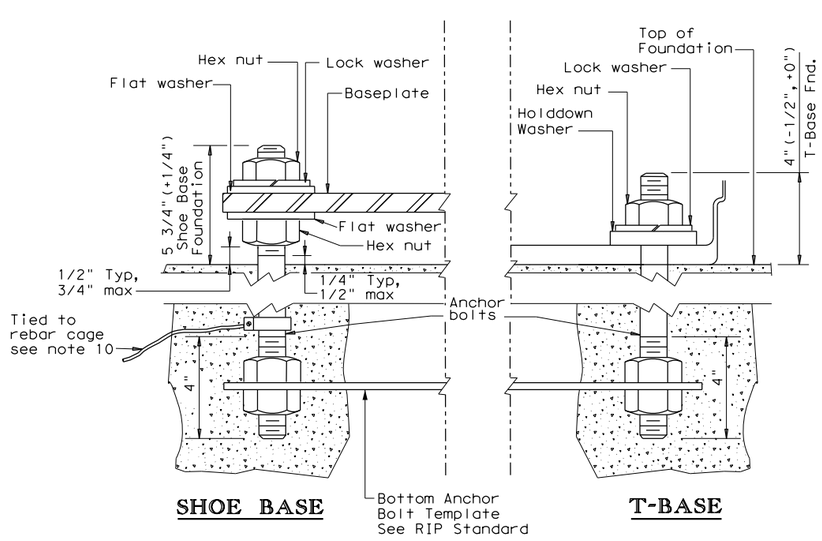
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

TABLE 4
BREAKAWAY POLE PLACEMENT (See note 6)

ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)

RID(2)-20

FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
1-11	DIST	COUNTY		SHEET NO.
7-17	ELP	ELP, ETC.		136
12-20				

72B

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
☒ Bio Erosion Control Logs	☐ 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.

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.

LEAD-CONTAINING PAINT ON PEDESTRIAN TRUSS BRIDGE REMOVALS

1. Provide a structure removal and an abatement plan, including all certifications, to the State for approval.
2. Submit required notifications to DSHS.
3. Abatement operations are to follow all Local, State, and Federal Regulations.
4. Use mechanical methods (unbolting and/or mechanical shearing) to dismantale painted steel structural components.
5. Any torch cutting, welding, burning, or grinding on structure requires abatement and removal of lead containing paint.
6. Transport materials in a manner to prevent accidental release of dust.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR			
	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.	0001	04	102, ETC.		US62, ETC.		
	DIST	COUNTY			SHEET NO.		
	ELP	ELP, ETC.			137		

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and 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 project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0001-04-102, ETC. FEDERAL AID PROJECT NO. F 2B24(190)

1.2 PROJECT LIMITS:

From: SEE TITLE SHEET

To: SEE TITLE SHEET

1.3 PROJECT COORDINATES:

BEGIN: (Lat) SEE TITLE SHEET, (Long) SEE TITLE SHEET

END: (Lat) SEE TITLE SHEET, (Long) SEE TITLE SHEET

1.4 TOTAL PROJECT AREA (Acres): 14.8

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.455 (max per location)

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Improvement of traffic signals and pedestrian hybrid beacons

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Fine sandy loam, 0 to 2% slopes	Well drained, low runoff class
Very gravelly loam, 1 to 8% slopes	Well drained, high runoff class
Very gravelly loam, 3 to 8% slopes	Well drained, high runoff class
Gravelly sandy loam, 1 to 12% slopes	Well drained, low runoff class

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:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s
N/A	N/A

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 2.3.)

☐ Mobilization
☐ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☒ Other: PROPOSED DRILLED SHAFTS
☐ Other:
☐ Other:

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ 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
N/A	N/A

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other:
☐ Other:

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other:
☐ Other:
☐ Other:

4/8/2024
STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER
Carlye Lide

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2B24(190)		138
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	ELP, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0001	04	102, ETC.	US62, ETC.

STORMWATER POLLUTION PRVENTION 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
- X ☐ 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

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		

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- X Haul roads dampened for dust control
- X 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
- X Debris and Trash Management
- ☐ Dust Control
- X Sanitary Facilities
- ☐ 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		

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X 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 2.3 of this SWP3 .

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 2.3 of this SWP3.

4/8/2024

STATE OF TEXAS
CARLYE L. LIDE
149671
LICENSED
PROFESSIONAL ENGINEER

Carlye Lide

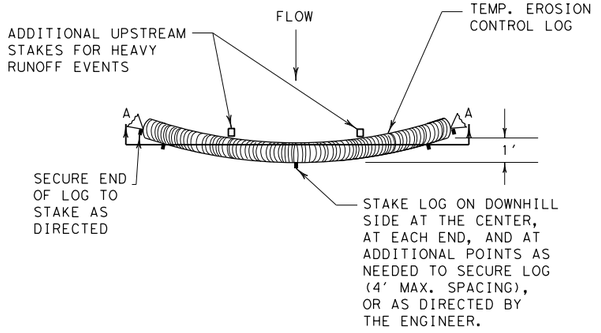
STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

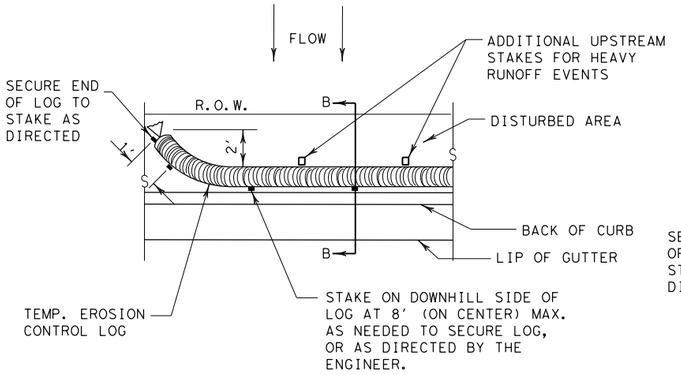
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2B24(190)		139
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	ELP, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0001	04	102, ETC.	US62, ETC.

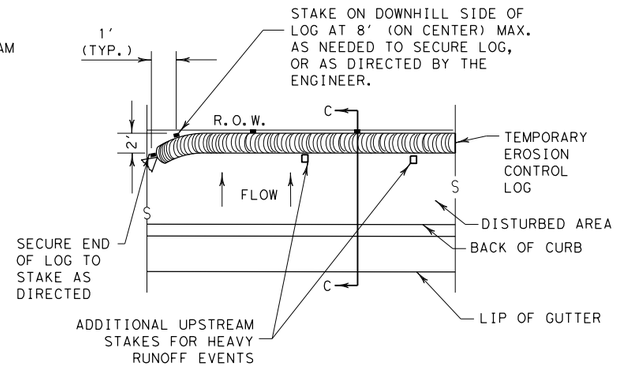
DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - 064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/9. Environmental/ec916.dgn



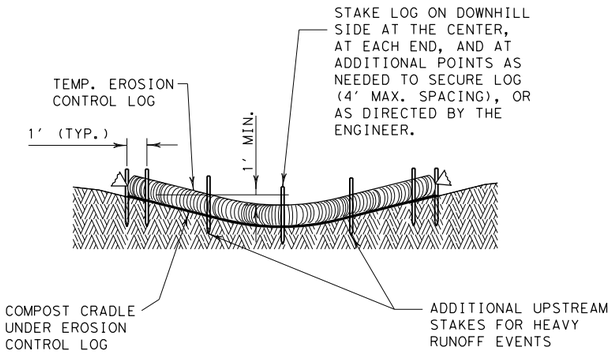
PLAN VIEW



PLAN VIEW



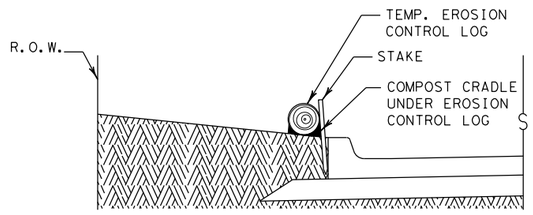
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

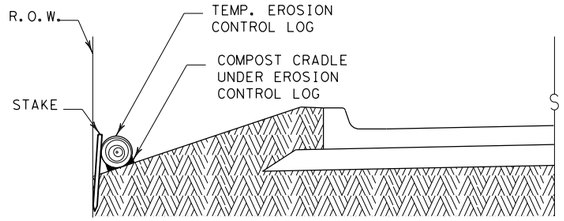
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



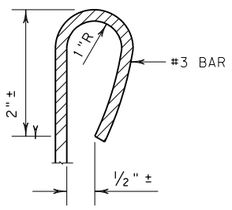
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

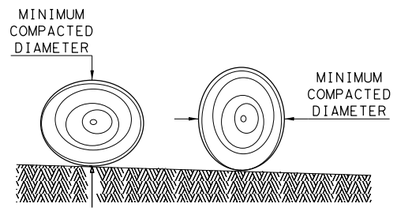
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

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.

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

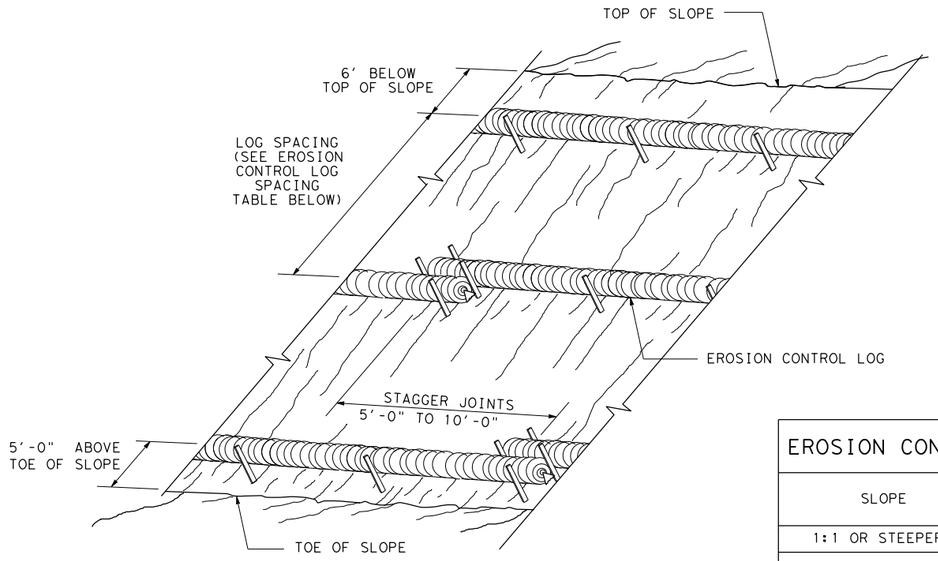
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

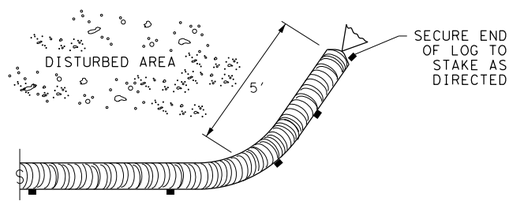
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		140

DATE: 3/26/2024
FILE: pw://kh-pw.bentley.com:kh-pw-01/Documents/01 Active Projects/TX-RCH-064602702 - TxDOT ELP Signal Designs/4 - Design/Plan Set/Package 2 - PHB and RRFB, 102/9. Environmental/ec



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

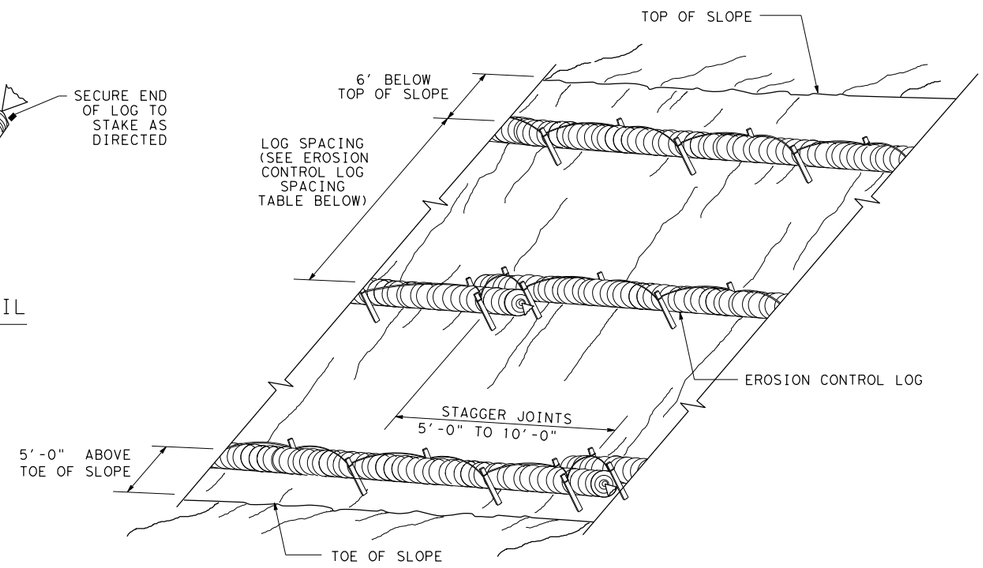
CL-SST



END SECTION RAP DETAIL

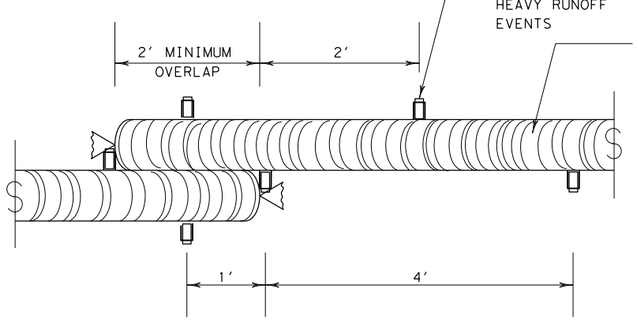
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

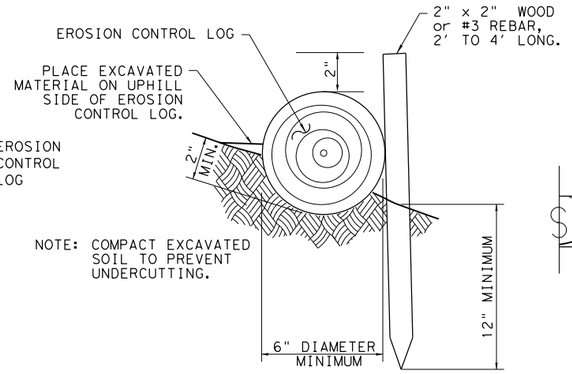
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

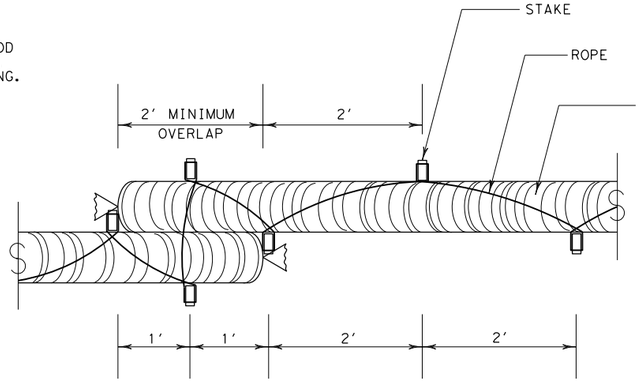


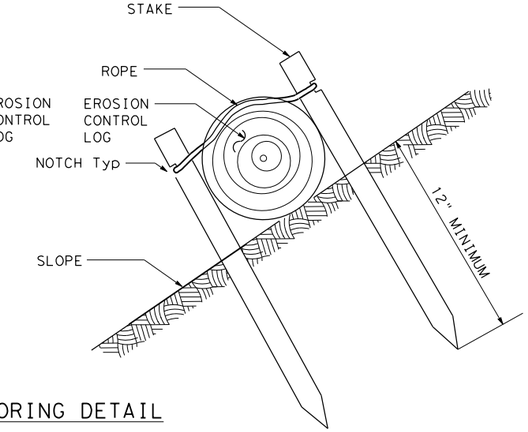


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

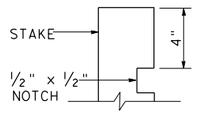
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0001	04	102, ETC.	US62, ETC.
	DIST	COUNTY		SHEET NO.
	ELP	ELP, ETC.		141

DATE: 3/26/2024
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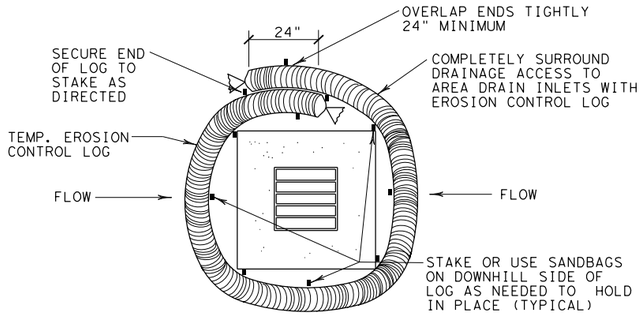
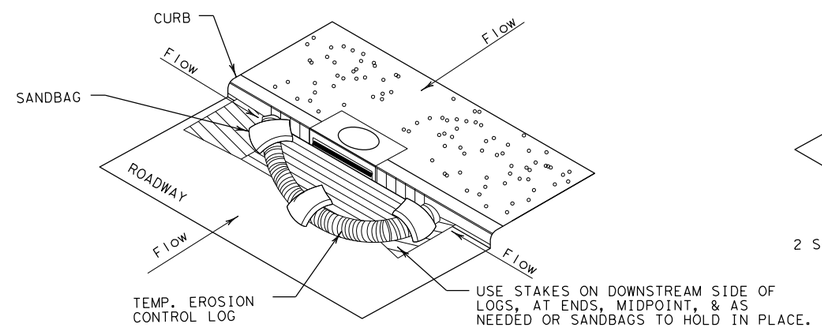


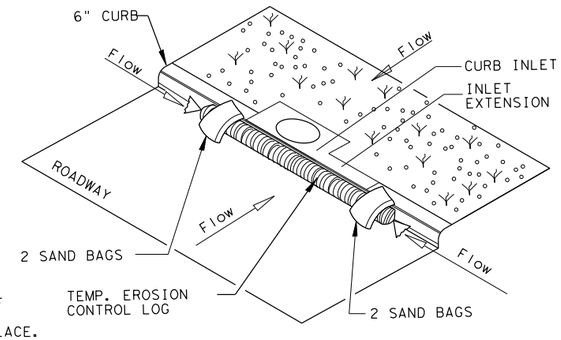
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

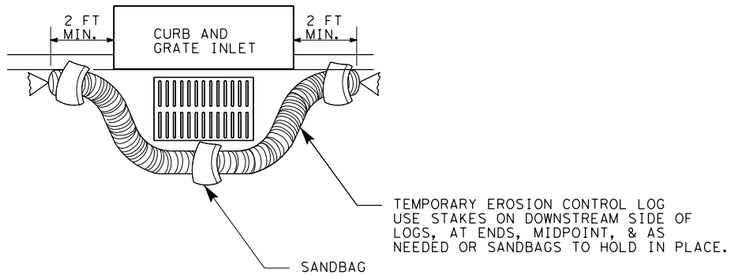
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

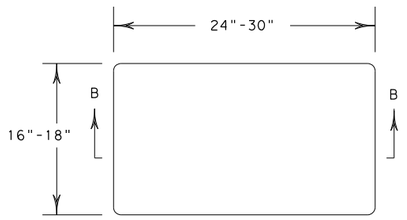
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

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	0001	04	102, ETC.	US62, ETC.			
	DIST	COUNTY		SHEET NO.			
	ELP	ELP, ETC.		142			