Document II. Drawings and Standards

Bridge 69 Reconstruction

Felix Dominguez Mayans
Escola de Camins, Canals i Ports de Barcelona. UPC
Febrero 2015
Drawings
STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
No. 1294-099-008-01

IH 635 MANAGED LANES PROJECTS
IH 635
DALLAS COUNTY
SEGMENT 3
IFC BRIDGE 69 PLANS

PROJECT LOCATION MAP
N.T.S.
<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>SHEET TITLE</th>
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**CHS PLAN & PROFILE RAMP EXTENSION**

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**RAILWAY AERIALS 3 TOP PHASE 3**

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<td>EC-SS 110008</td>
<td>PHASE 8</td>
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GENERAL STRUCTURAL STEEL REQUIREMENTS

8. SUBSTRUCTURES
8.1 SEE SHEET LAYOUT SHEETS FOR SUBSTRUCTURE 
8.2 SEE SHEET LAYOUT SHEETS FOR BRICK OR CEMENT DETAILS 
8.3 SEE SHEET LAYOUT SHEETS FOR HOUSE AND FEET DETAILS 
8.4 COFFERED SLANT VERTICAL VENTS 

8.5 TOP AND BOTTOM OF SOIL CAPS ARE LEVELED, RECCENTIAL HEIGHTS 
8.6 THE TOP OF THE RECCENTIAL CAPS ARE LEVELS, AND THEIR HIGHEST POINT IS SURFACE THE HOUSE DOORS TO THE SIDE OF THE RECCENTIAL CAPS

GENERAL STRUCTURAL STEEL REQUIREMENTS TABLE 2

<table>
<thead>
<tr>
<th>SHEET SIZE</th>
<th>WIDTH</th>
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<tr>
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<td>#2</td>
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</tr>
<tr>
<td>#7</td>
<td>8'</td>
<td>20'</td>
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SHEET SIZE: 8'x20'
TYPICAL SECTION @ ABUTMENT — STAGE 1

STAGE 1 / STAGE 2:
- INITIAL TEMPORARY BARRIERS
- REMOVE WEAKENED PORTIONS OF EXISTING BRIDGE
- CONSTRUCT PROPOSED BRIDGE

TYPICAL SECTION @ PIER — STAGE 1

STAGE 1 / STAGE 2:
- INITIAL TEMPORARY BARRIERS
- REMOVE WEAKENED PORTIONS OF EXISTING BRIDGE
- CONSTRUCT PROPOSED BRIDGE

TYPICAL SECTION @ ABUTMENT — STAGE 2

STAGE 2 / STAGE 3:
- MOVE TRAFFIC TO PROPOSED BRIDGE
- REMOVE WEAKENED PORTIONS OF DECK AND BEAMS

TYPICAL SECTION @ PIER — STAGE 2

STAGE 2 / STAGE 3:
- MOVE TRAFFIC TO PROPOSED BRIDGE
- REMOVE WEAKENED PORTIONS OF DECK AND BEAMS
**GENERAL NOTES:**

- Designed for heat loading in accordance with AWS D1.1 specifications, 9th edition and external factors.
- All concrete must be class C, f'c = 3000 psi.
- All reinforcing bars must be Grade 60.
- Bearing surface must be clean and free of all loose material before placing bearing pad.
- For bearings see sheet layout sheet.

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**BEARING SEAT ELEVATIONS**

<table>
<thead>
<tr>
<th>ELEVATION</th>
<th>DIMENSION</th>
<th>OPERATIONAL</th>
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<tr>
<td>DEPTH 8</td>
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<td>100'</td>
</tr>
<tr>
<td>DEPTH 9</td>
<td>100'</td>
<td>100'</td>
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</tbody>
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**ELEVATION SCALE:**

- ELEV. = 1" = 1'-0"

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**PLAN SCALE:**

- PLAN SCALE: 1" = 1'
THREE-BEAM TERMINAL CONNECTION
(SEE GENERAL NOTES A & B FOR REQUIRED HARDWARE)

THREE-BEAM TRANSITION
TO W-BEAM (10 Gauge)

SECTION A-A
SECTION B-B

TRANSITION SECTIONS
TxDot Standards

Bearing Pads

Precast Panels

Permanent Metal Deck Forms

Thickened Slab Ends

Sealed Expansion Joints

Approach Slab

C221 Rail

Illumination
PLAN VIEW OF SOLE PLATE DETAILS

SOLE PLATE NOTES:
Provide constant thickness elastomeric bearings with beveled and embedded sole plate. In accordance with these details when the
sole plate exceeds 5 percent or 16 otherwise required in the
shop. Provide for all girders in the application.

On the shop drawings, dimension sole plates to the nearest 1/8 inch required or dimension of bearing and slope of girders.
Thickness tolerance variation from the shop drawings 1 1/8 inch
except variation from a plus or minus tolerance of the shop
surface tolerance 1/8 inch. Sheet metal surface tolerance listed in
that provides 16 embedded sole plates before galvanizing.

Sheet plate must conform to ASTM A 36, A 915 or 56, or 106 or 36
or 56, or 34 or 56. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if a portion of screw holes and studs are necessary for a beveled girders, minimum clearance from screw or stud centerline to plate edge is 1/2 inch.

Top threads in the embedded plate only, drill and tap too far to galvanizing.

Screw screws must be galvanized, anchor planer no counter sunk cap
screws pattern as per ASTM F 815, galvanizing must conform to
ASTM B 633, galvanizing must conform to
ASTM B 515, galvanizing must conform to
ASTM B 515, galvanizing must conform to
ASTM B 515, galvanizing must conform to

SIDE ELEVATION

END ELEVATION

GIRDER DETAILS

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTRESSED CONCRETE I-GIRDERS

TX Department of Transportation
Bridge Division

H9303 Sheet 3 of 3

IGEB

Note: All dimensions are in inches. Adjustments may be necessary for individual projects.
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion.

DATE: FILE:

NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

PRESTRESSED CONCRETE I-BEAMS

See PCP-FAB standard for Min and Max dimensions based on Min/Group type.

PRESTRESSED CONCRETE I-GIRDERS

See PCP-FAB standard for Min and Max dimensions based on Min/Group type.

PRESTRESSED CONCRETE X-BEAMS

Transverse top slab

STEEL BEAMS

Provide clear cover as indicated unless otherwise shown on Span Details.

Parts of bedding strip together with adhesive. Cuts grooves, approx 1/4" deep, in the top of the bedding strips at 8" O.C.

Equally space additional bar if more than 1'-3" Max.

The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for Prestressed Concrete U-Beams and Steel Beams). Bearing Steel Elevations or finished grade may be adjusted.

Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at 24" o.c. only.

Location of concrete placement sequence boundaries and bonded field splice should be considered by the contractor in determining panel limits.

POLYSTYRENE VOID FORM

Provide clear cover as indicated unless otherwise shown on Span Details.

Parts of bedding strip together with adhesive. Cut v-notches, if necessary to maintain clear cover.

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Location of concrete placement sequence boundaries and bonded field splice should be considered by the contractor in determining panel limits.
OCPN泾T泾 allowing Bm/Girder End in Adacent Span.

**TABLE OF REINFORCING STEEL**

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<tr>
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**Special Option 2 Construction Notes:**
- Place first P panel to slab edge first. Field bend as needed.
- End panels may be set up to 2'' lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2'' thick.
- Place panel within 1/2'' of slab edge.
- Top thickness: 3/4'' thick board.
- Thick timber board, leave in place. Place straight, within 1/2'' of centerline of joint.
- Permanent galvanized steel sheet form. Removable formwork is acceptable.
- Place panel within 1/2'' of expansion joint opening.
- Place additional #4 bar 2'-6'' in length between every slab bar 1 Center #4 bars on joint.
- Place additional #4 bar continuous 2'-6'' beyond each side of Inverted-T stem between every slab bar 1.

**OPTION 2 ~ PLAN OF SLAB**

(for above beams, other beams similar)

**OPTION 2 ~ ELEVATIONS AT BEAM ENDS**

- Top flanges are shown for flange edge supporting a panel. Not applicable to flange edges on exterior sides of fascia beams/girders.

- Use Span Details and Thinned Slab End Details for top slab reinforcement and shear transfer. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- Spacing as listed unless otherwise shown.
- End panels may be set up to 2'' lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2'' thick.
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- Place additional #4 bar 2'-6'' in length between every slab bar 1. Center #4 bars on joint.
- Place additional #4 bar continuous 2'-6'' beyond each side of Inverted-T stem between every slab bar 1.

**OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKews OVER 5'**

- Showing 1 beam girder, 3 beams and Steel Beam similar.

**SPECIAL OPTION 2 CONSTRUCTION NOTES:**
- Place panels adjacent to expansion joint and beam centerlines prior to completing interior panel placement. Shown panel to fill is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 1/2''.
- Do not extend the longitudinal panel reinforcement into the cast-in-place slab.
- Bedding strips on skewed bridges must be modified as shown in this drawing. The Contractor is responsible for modifying this modification with the beam fabricator prior to submitting shop drawings for approval.
- Bending of anchor studs of expansion joints shown on shop drawings is permissible if necessary to clear top of end panel. The Contractor is responsible for coordinating modifications with the fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.
- Embed ends under panels must conform to the requirements of Item 425 except their minimum compressive strength must be 60 psi. Precast slabs AA, G, I, K and OA from standard (TSS5000) in the slab.
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by Tx DOT for any purpose whatsoever. Tx DOT assumes no responsibility for the conversion.

Position hangers are flush with edge of beam.

Field trim angle if necessary.

PMDF

PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS

PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

U-BEAMS WITH STIRRUP LOCKS

U-BEAMS WITH WELD ANCHORS

STEEL BEAMS AT COMPRESSION FLANGES

STEEL BEAMS AT TENSION FLANGES

Typical Transverse Sections

Design Notes:

As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psi for construction loads. Flexural stresses due to these design loads must not exceed 3 percent of the steel's yield strength. The steel's yield strength of PMDF in compression flanges must be used in the calculation of flexural stresses. The design value of the yield strength of PMDF in compression flanges must be 50,000 psi. The steel's yield strength of PMDF in tension flanges must be 50,000 psi.

General Notes:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to A572 Gr. 50 Structural Steel (SS) with coating designation 035-6. Steel must have a minimum yield strength of 25 ksi. Minimum thickness of PMDF is 0.035 inches. All support angles and a minimum thickness of 0.035 inches. All support angles must be made of the same material as the PMDF. Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to A572 Gr. 50 Structural Steel (SS) with coating designation 035-6.

Types of End Closures

Note: In spans where PMDF forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

Section thru construction joint

><.'

Locate concrete in direction of lap.

Stirrup Locks

 NOTE: This type is to be used for skewed ends only.

Typical Transverse Sections

Series: 2015-12-8

Purpose: To form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructure".

C TxDOT

Permit No.

Sheet

1

Type

PMDF

COUNTY

JOB

SHEET NO.

1

DESCRIPTION

Permanent Metal Deck Forms

CONSTRUCTION NOTES:

For PRESTR CONC U-BEAM BRIDGES:

Size, spacing, and arrangement of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat back and 1/8" to 3/8".

Place concrete in direction of lap.

Intermittent Weld

Note: In spans where PMDF forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

General Notes:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to A572 Gr. 50 Structural Steel (SS) with coating designation 035-6. Steel must have a minimum yield strength of 25 ksi. Minimum thickness of PMDF is 0.035 inches. All support angles and a minimum thickness of 0.035 inches. All support angles must be made of the same material as the PMDF. Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to A572 Gr. 50 Structural Steel (SS) with coating designation 035-6.
### PIPE SPLICE DETAILS

**Location:**
- HSS Rail
- Sleeve Members

**Installed WWR may rest on top of slab or wall.**

#### BAR Splices

<table>
<thead>
<tr>
<th>BARS U (#4)</th>
<th>BARS WU (#4)</th>
<th>BARS S (#4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; Dia Pin</td>
<td>3/8&quot; Dia Pin</td>
<td>3/8&quot; Dia Pin</td>
</tr>
<tr>
<td>(Driving Pin)</td>
<td>(Driving Pin)</td>
<td>(or welded lug)</td>
</tr>
</tbody>
</table>

**Traffic Side:**
- 3/8" Dia Pin Bonding Pin

**Side Traffic:**
- 3/8" Dia Pin Bonding Pin

**VERTICAL WIRE OPTIONS**

#### WWR (ASTM A1064)

**Maximum Wire Area:**
- Size Differential

**Total Wire Area:**
- 1.067 Sq In.

**Spacing:**
- 2.267 Sq In. per Ft

**Anchor Bolt Options:**

- HSS 2.375 x 0.354
- HSS 2.375 x 0.254

**Additional Items:**
- #4 = 1'-5"
- #4 = 2'-1"

### GENERAL NOTES

- This rail is shown with HSS rail, and has been evaluated and accepted for use with reinforcing steel unless otherwise shown on plans.
- Include Class C concrete. Provide Class C (HPC) if required elsewhere.
- Provide ASTM A1085 or A360 Grade B or A53 Grade B for all HSS.
- Anchor bolts must be 5/8" Dia ASTM 334 fully threaded rods with one hex nut, one hardened steel washer, and one fully threaded reinforcing steel stud (or A36 threaded rods). See "Material Notes" for anchor bolt information.
- Provide bar laps, where required, as follows:
  - #4 = 1'-5"
  - #4 = 2'-1"

### MATERIAL NOTES

- Industrial steel components except reinforcing steel unless otherwise shown on plans.
- Provide ASTM-A307 Grade A bolts.
- Embed threaded rods into parapet wall with a Type III Class C epoxy anchorage system. Minimum embedment depth is 3" - Anchor bolts should be able to resist ultimate tensile strength equal to or greater than 8.4 kips per bolt. The Contractor must provide evidence to the Engineer that this can be achieved.
- Expose reinforcing steel if slab bars are epoxy coated.
- Provide Class C concrete. Provide Class C (HPC) if required elsewhere.
- Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than those shown are acceptable if conditions in the field are satisfactory.

### CONSTRUCTION NOTES

- This railing may be constructed with slip-form or as welded pipe splices for horizontal curves. The Engineer and when epoxy adhesive anchor bolts are used. Slip-form parapets are not allowed if anchor bolts are cast with parapet wall. Provide staggered cut or for both top and bottom. Tack welding to provide bracing for slip-form operations is acceptable. Welding can be performed at a maximum spacing of 12" between the base plates and one additional Hex Head Anchor Bolt (ASTM A307) with one hardened steel washer must be furnished for each threaded bolt.
- Do not use this railing on bridges with expansion joints providing more than 3" movement. Rail anchorage details shown on this standard may require modifications for such structures. See "Material Notes" for anchor bolt information.
- Provide Class C concrete. Provide Class C (HPC) if required elsewhere.
- Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than those shown are acceptable if conditions in the field are satisfactory.
- Epoxy coat all rail reinforcement if slab bars are epoxy coated.
- Provide Grade 60 reinforcing steel.
- Provide Class C concrete. Provide Class C (HPC) if required elsewhere.
- Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than those shown are acceptable if conditions in the field are satisfactory.
### Shipping Parts List - Poles and Luminaire Arms

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<th>Nominal Weight (lb)</th>
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<th>42</th>
<th>Luminaire</th>
<th>Quantity</th>
<th>SAE Type</th>
<th>41</th>
<th>42</th>
<th>Luminaire</th>
<th>Quantity</th>
<th>SAE Type</th>
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<td>1.595</td>
<td>5</td>
<td>Type SA</td>
<td>25</td>
<td>25</td>
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<td>1.595</td>
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<td>Type SA</td>
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<td>50</td>
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</table>

### General Notes
- All work, materials, and services not shown in the plans shall be performed, furnished, and installed by the contractor. Quality fabrication or poor workmanship in material, equipment, or installation will be considered justification for rejection. Manufacturers provide warranties or guarantees as a customary trade practice. Contractor shall furnish to the Department such warranties or guarantees.
- The location of poles and fixtures is diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Direction and/or location of poles and luminaries, including location and number of poles, are subject to change without prior notice.
- All electrical work shall be accomplished by a qualified electrician, and all electrical systems shall be installed in conformance with the National Electrical Code and applicable state and local codes. The contractor shall consult with the appropriate utility company prior to beginning such work.
- Standard Steel Pole Designs:
  - Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs, submittal of shop drawings and design calculations for standard designs is not required.
- Optional Steel Pole Designs:
  - Stainless steel poles may be allowed as optional designs. Steel poles are permitted or required, pending approval by the Department as outlined below.

### Standard Steel Pole Design
1. Shop Drawings: Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer registered in the State of Texas. The Engineer in Charge shall review shop drawings and design calculations, and notify the Contractor of any required changes. Shop drawings and design calculations will not be accepted for any deviation from the pre-approved shop drawings. Any deviation from the shop drawings will be required to be submitted and approved by the Engineer in Charge. The Engineer in Charge shall approve any deviation from the shop drawings.

### Structural Support Design for Poles
- Lighting support structures shall be designed for a 25-year design life in accordance with the latest American Society for Testing and Materials (ASTM) Standard Specifications and the latest American Iron and Steel Institute (AISI) Specification for Structural Steel Buildings. The design calculations shall be submitted to the Engineer in Charge for review. The Engineer in Charge shall approve any deviation from the shop drawings.

### Anchor Bolt Assembly
- Anchor bolt assemblies for optional designed poles shall be the same as those shown herein.

### (To be completed by the Engineer in Charge)
- bolts shall be located to provide the necessary capacity to resist the loads and effects of the wind.
- bolts shall be located to provide the necessary capacity to resist the loads and effects of the wind.
- bolts shall be located to provide the necessary capacity to resist the loads and effects of the wind.
- bolts shall be located to provide the necessary capacity to resist the loads and effects of the wind.

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### EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SAE</th>
<th>T-X</th>
<th>X</th>
<th>L-1400</th>
<th>S</th>
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</thead>
<tbody>
<tr>
<td>5A2</td>
<td>Pole and mast arm may be steel or aluminum.</td>
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<td></td>
<td></td>
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<td>5A1</td>
<td>Pole and mast arm must be steel.</td>
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<tr>
<td>5A3</td>
<td>Pole and mast arm must be aluminum.</td>
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<tr>
<td>5A4</td>
<td>Pole and mast arm must be stainless steel.</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Two numerical digits denote mounting height in feet.
- Next letter denotes type of pole, (S=Shoe Base, T=Transformer Base, B=Base Bridge Mount).
- First number denotes length of mast arm in feet.
- Use of second mast arm is indicated by second dashed number which denotes length in feet.

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### Roadway Illumination Poles

- Sheet 1 of 4
- State of Texas Department of Transportation
- Traffic Operations Division
- Sheet Date: 04-20-2019

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<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Designation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Design</td>
<td>No additional requirements</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

- Last letter indicates the type of lamp: D=Daylight, H=High Pressure Sodium, L=Low Pressure Sodium.