

CHAPTER 5 GENERAL DRAWINGS

5-1 General Drawings

General The following general guide shall be used in the transformation of the Preliminary General Drawing into the General Drawing. See Figures 5-1 through 5-5.

In addition to the information provided in the Preliminary General Drawing, include the following:

Section Along Centerline Survey (Bents on Section at Right Angles to Bents)

- Elevation of top of footings and drilled piers
- Size and type of piles to be used

Plan View

- Substructure without out-to-out dimensions
- Berm width at both sides of end bents and berm elevations

Foundation Layout Sketch

- Location of piles, footings, or drilled shafts for end bents and interior bents with respect to the control line through the work points
- Dimensions for piles, footings or drilled shafts
- All notes and details necessary for laying out the foundation without reference to other plan sheets

Long Chord Layout

For bridges on horizontal curves, a drawing similar to that of Figure 5-3 should be included in the plans. The drawing should be large enough to clearly show:

- Angle between a radial line and the workline of one bent or the fill face of an end bent
- Centerline survey long chord between the fill face of the end bents
- Intersection angle between the long chord and workline at bents and the fill face of end bents
- Dimensions along the long chord between its points of intersection with the fill face of end bents and workline of bents

- Dimensions along the workline of bents between its intersection with the long chord and centerline survey. Also, show this dimension as measured along the long chord.
- Intersection angle between short chords and the workline of bents or the fill face of end bents.
- If the bents are parallel, show the perpendicular dimensions from the baseline to the workline of bents and the fill face of end bents.
- Work point numbers and stations of each bent and end bent
- Line designations and the radius of curve
- Short chord length at centerline survey for each span.

Location Sketch

If ~~Design~~ Project Services Unit – Utilities Section indicates there are utility conflicts,

For utility information, see Utility Plans and Special Provisions.

If there are no utility conflicts,

No known utility conflicts.

Other

Include the appropriate bridge number above the title block for all bridge plans. For new alignments or for a bridge that replaces a culvert, place the following over the title block:

Bridge No. _____

For bridge replacement, widening or rehabilitation projects, place one of the following over the title block:

Replaces Bridge No. _____

Widening of Bridge No. _____

Rehabilitation of Bridge No. _____

Widening and Rehabilitation of Bridge No. _____

Do not include the Typical Section as shown in the Preliminary General Drawing.

Show the Total Bill of Material including all quantities in the structure in the same order as they appear in the pay item list. The quantities shall be broken down by superstructure and each substructure unit.

Certain lump sum pay items require station information in the pay item description. The station in the description must always be the identification station of the proposed bridge. For example, the pay item "~~Construction,~~

~~Maintenance and~~ Removal of Existing Structure at Station _____” must reference the identification station of the proposed structure and not the station of the structure to be removed.

When removal of the existing structure in the area of proposed construction is required, the existing substructure’s outline shall be shown by broken lines in the plan and section views based on the best information available. For the plan note, see Section 5-2 “Removal of Existing Structures”.

Stream Crossings In section view, show the rip rap and stone to be placed around the footings for pier scour protection.

When Rock Embankment is used, indicate on both the section and plan views. See Section 7-9.

All Other Structure Types For railroad overheads, grade separations, and widening projects maintain the information contained in the Preliminary General Drawing.

5-2 General Drawing Notes

General Maintain standard notes used in the Preliminary General Drawing and add the following standard notes when applicable:

~~This bridge has been designed in accordance with the by the Strength Design Method as specified in AASHTO LRFD Bridge Design Standard Specifications.~~

For other design data and general notes, see Sheet SN (Sheet SNSM).

For Falsework and Formwork, see Special Provisions.

For Cast-in-Place Concrete Deck Slab Bridges, *see Special Provisions.*

All falsework and forms for the cast-in-place deck slab continuous unit shall remain in place until the entire unit is cast and cured.

~~For Falsework and Forms Over or Adjacent to Traffic, see Special Provisions.~~

For Federal Aid projects,

The Contractor shall provide independent assurance samples of reinforcing steel as follows: For projects requiring up to 400 tons (360,000 kg) of reinforcing steel, one 30 inch (760 mm) sample of each size bar used, and

for projects requiring over 400 tons (360,000 kg) of reinforcing steel, two 30 inch (760 mm) samples of each size bar used. The bars from which the samples are taken must then be spliced with replacement bars of the size and length of the sample plus a minimum lap splice of thirty bar diameters.

When traffic is to be maintained beneath the proposed structure,

For Maintenance and Protection of Traffic Beneath Proposed Structure, see Special Provisions.

For all prestressed concrete girder bridges detailed with metal stay-in-place forms and satisfying the conditions outlined in Section 6-2 regarding the use of prestressed concrete deck panels,

Prestressed Concrete Deck Panels may be used in lieu of metal stay-in-place forms in accordance with Article 420-3 of the Standard Specifications.

For plans detailed with metal stay-in-place forms,

Removable forms may be used in lieu of metal stay-in-place forms in accordance with Article 420-3 of the Standard Specifications.

For projects with navigable waterways,

For Securing of Vessels, see Special Provisions.

When top-down construction is required ~~on cored-slab bridges,~~

This bridge shall be constructed using top-down construction methods. The use of a temporary causeway or work bridge is not permitted.

For Railroad overpass projects,

The railroad track top of rail elevations shown on the plans are from the best information available. Prior to beginning bridge construction, verify the top of rail elevations and report any variations to the Engineer. Any plan revisions necessary to achieve the required minimum vertical clearance will be provided by the Department.

When bicycle lanes are on bridges,

All pavement marking will be in accordance with the pavement marking plans and shall provide for bicycles.

When the fills at the bridge approaches are to be placed by the Division of Highways,

Roadway work will be done by the Division of Highways.

When the wearing surface on widened bridges is to be placed by the Division of Highways,

Wearing surface will be placed by the Division of Highways.

When Rock Embankment is required,

For Rock Embankment and Core Material in areas of End Bents, see Roadway Plans.

Work on End Bents shall not be started until approach rock embankment and core material in the area of end bent piles have been placed.

For removing existing pavement and scarifying roadbed, see Section 12-3,

The existing pavement within the area of the end bent piles shall be removed and the roadbed scarified to a minimum depth of 2'-0" (610 mm).

When a causeway is detailed,

At the Contractor's option, and upon removal of the causeway, the Class II rip rap used in the causeway may be placed as rip rap slope protection. See Special Provisions for Construction, Maintenance and Removal of Temporary Access at Station _____.

When needle beam supports are not required,

Needle beams will not be allowed unless otherwise called for on the plans or approved by the Engineer. (Prestressed concrete and structural steel superstructures only)

Steel

For weathering steel,

All structural steel shall be AASHTO M270 Grade 50W (345W) and painted in accordance with System 4 of Article 442-7 of the Standard Specifications unless otherwise noted on the plans.

For non-weathering steel,

All structural steel shall be AASHTO M270 Grade 50 (345) and painted in accordance with System 1 of Article 442-7 of the Standard Specifications unless otherwise noted on the plans.

For projects which include the removal of, or attachment to, an existing structure which has a lead based paint system,

Inasmuch as the paint system on the existing structural steel contains lead, the Contractor's attention is directed to Article 107-1 of the Standard Specifications. Any costs resulting from compliance with applicable state or federal regulations pertaining to handling of materials containing lead based paint shall be included in the bid price for "Removal of Existing Structure at Station _____".

Corrosion Protection

Corrosion protection measures shall be highlighted on the General Drawing using the notes below, as dictated by Section 12-13,

The Class AA concrete in the bridge deck shall contain fly ash or ground granulated blast furnace slag at the substitution rate specified in Article 1024-1 and in accordance with Articles 1024-5 and 1024-6 of the Standard Specifications. No payment will be made for this substitution as it is considered incidental to the cost of the Reinforced Concrete Deck Slab.

All metallized surfaces shall receive a seal coating as specified in the Special Provision for Thermal Sprayed Coatings (Metallization).

Class AA concrete shall be used in all cast-in-place columns, bent caps, pile caps, and footings, and shall contain calcium nitrite corrosion inhibitor. For Calcium Nitrite Corrosion Inhibitor, see Special Provisions.

All bar supports used in the (barrier rail, parapet, sidewalk, deck, bent caps, columns, pile caps, footings) and all incidental reinforcing steel shall be epoxy coated in accordance with the Standard Specifications.

The concrete in the (columns, bent caps, pile caps, footings, and/or piles) of Bent No. _____ shall contain silica fume. Silica Fume shall be substituted for 5% of the portland cement by weight. If the option of Article 1024-1 of the Standard Specifications to partially substitute Class F fly ash for portland cement is exercised, then the rate of fly ash substitution shall be reduced to 1.0 lb (1.0 kg) of fly ash per 1.0 lb (1.0 kg) of cement. No payment will be made for this substitution as it is considered incidental to the various pay items.

General Foundation Geotechnical I

All general foundation, pile, drilled pier, and footing notes will be provided in the Foundation Recommendations. These notes shall be placed on the general drawings. A list of standardized foundation recommendation notes is available on the Structure Design website. ~~When the Soils and Foundation Section Geotechnical Engineering Unit indicates on the Foundation Recommendations that the bent may be constructed prior to placing the fill,~~

~~*At the contractor's option, Bent No. _____ may be constructed prior to placing the fill. Fill shall be placed in accordance with the requirements of Article 410-9 of the Standard Specifications.*~~

~~For all stream crossings, place the appropriate notes:~~

~~*This structure has been designed in accordance with HEC-18, "Evaluating Scour at Bridges", November, 1995.*~~

~~*The scour critical elevation for Bent(s) No. _____ is the bottom of footing. The scour critical elevations are for use by Maintenance Forces to monitor possible scour problems during the life of the structure. (Spread footings)*~~

~~The scour critical elevation for Bent(s) No. _____ is elevation _____. The scour critical elevations are for use by Maintenance Forces to monitor possible scour problems during the life of the structure. (Pile bents, footings on piles, or drilled piers)~~

Piles

~~Piles for End Bent No. _____ (and/or Bent No. _____) shall be driven to a minimum bearing capacity of _____ tons (kN) each. (Insert allowable load from Foundation Recommendations.)~~

~~Piles at Bent(s) No. _____ shall be driven to an elevation no higher than _____ and satisfy the bearing capacity of _____ tons (kN) each.~~

Where drilling may be required for pile penetration,

~~Piles for End Bent No. _____ (and/or Bent No. _____) shall be driven to a minimum bearing capacity of _____ tons (kN) each with penetration at least to El. _____. The Contractor's attention is called to the fact that it may be necessary to drill in order to attain this penetration. If drilling is required, the pile shall be placed in the drilled hole and driven to a minimum bearing capacity of _____ tons (kN) each.~~

~~Shaft excavation shall be utilized to install piles to elevation _____ at End Bent No. _____ (and to elevation _____ at Bent No. _____). See Shaft Excavation Special Provision.~~

Use the following notes when directed by the **Soils and Foundation Section** Geotechnical Engineering Unit on the Foundation Recommendations:

~~Augering for end bent piles will not be required.~~

~~Jetting will (may) be required to install the _____ piles at Bent No. _____ (and/or Bent No. _____).~~

~~The contractor shall determine the pile length such that the final top and tip elevations will be as indicated.~~

~~For Pile Load Test, see Special Provisions.~~

~~Steel pile points (with teeth) are required for piles at End Bent No. _____ (and/or Bent No. _____). See Special Provision for Steel Pile Points.~~

~~Steel pile tips are required for _____ in (mm) prestressed concrete piles at End Bent No. _____ (and/or Bent No. _____). See Special Provision for Steel Pile Tips. The Contractor, at his option, may substitute 12" (305 mm) prestressed concrete piles with steel pile tips in lieu of HP 12x53 (HP 310x79) steel piles at no additional cost to the Department.~~

~~The Contractor, at his option, may substitute HP 12x53 (HP 310x79) steel piles in lieu of 12" (305 mm) prestressed concrete piles at no additional cost to the Department.~~

~~At the Contractor's option, HP 12x53 (HP 310x79) steel piles may be used in lieu of HP 10x42 (HP 250x62) steel piles at no additional cost to the Department.~~

For timber piles,

~~Timber piles shall be treated to retain _____ lbs (kg) of Chromated Copper Arsenate per cubic foot (cubic meter) of material.~~

Footings

~~Pier scour protection shall be required at Bent No. _____. Rip rap is not to be placed above the stream bed.~~

If the footing of an interior bent is in a fill section,

~~Work shall not be started on Bent No. _____ until fill has been placed.~~

For spread footings,

~~The required bearing capacity of the spread footing(s) at Bent No. _____ is _____ TSF (kPa). The required bearing capacity shall be verified. (Insert allowable load from Foundation Recommendations.)~~

For footings on stream crossings, including foundation seals with or without piles,

~~To provide protection from possible scour, the footing(s) shall not be constructed at an elevation higher than shown on the plans.~~

For footings on bridges other than stream crossings, no note concerning footings is required unless specifically recommended by the ~~Soils and Foundation Section~~ Geotechnical Engineering Unit where lateral forces are to be considered.

For arch culvert footings subjected to significant lateral forces,

~~Footings shall be keyed at least 12 inches (300mm) into rock with minimum thickness as shown on the plans.~~

For footings under retaining walls, abutments or other structures where significant lateral forces are to be considered, an appropriate note will be provided by the ~~Soils and Foundation Section~~ Geotechnical Engineering Unit.

Drilled Piers

For all drilled piers, as directed by the Foundation Recommendations,

~~For Drilled Piers, see Special Provisions.~~

~~Drilled Piers at Bent No. _____ shall extend to an elevation no higher than _____ and satisfy the required tip bearing capacity.~~

~~Drilled Piers at Bent No. _____ shall extend to an elevation no higher than _____, satisfy the required tip bearing capacity, and have a minimum~~

~~penetration of ___ ft (m) into rock as defined by the Drilled Piers Special Provision.~~

~~The location of the construction joint in the drilled piers is based on an approximate ground line elevation. If the construction joint is above the actual ground line elevation, the Contractor shall place the construction joint 1 ft (300 mm) below the ground line.~~

~~Drilled piers for Bent No. _____ have been designed for an applied load of _____ tons (kN) each at the top of the column. (Insert allowable load from Foundation Recommendations.)~~

~~Slurry construction shall not be used for this project.~~

~~Slurry construction shall be used for this project. See Drilled Piers Special Provision.~~

~~SID inspections are required to determine the bottom cleanliness of the drilled piers at Bent No. _____ and Bent No. _____. See Drilled Piers Special Provision.~~

~~SID inspections are not required to determine the bottom cleanliness of the drilled piers at Bent No. _____ and Bent No. _____. See Drilled Piers Special Provision.~~

~~CSL tubes are required and CSL testing is required for the drilled piers at Bent No. _____ and Bent No. _____. See Special Provision for Crosshole Sonic Logging.~~

When the pier capacity is based solely on skin friction, the required tip bearing capacity will be zero;

~~The drilled piers at Bent No. ___ have been designed for skin friction only. No tip bearing capacity is required.~~

When the pier capacity is based solely on tip bearing;

~~The drilled piers at Bent No. ___ have been designed for tip bearing only. The required tip bearing capacity is _____ TSF (kPa). (From Foundation Recommendations)~~

When the pier capacity relies on both skin friction and tip bearing;

~~The drilled piers at Bent No. ___ have been designed for both skin friction and tip bearing. The required tip bearing capacity is _____ TSF (kPa). (From Foundation Recommendations)~~

When a Standard Penetration Test (SPT) is required;

~~SPT Testing is required to determine the tip bearing capacity of the drilled piers at Bent No. ___ (and Bent No. ___). See Drilled Piers Special Provision.~~

~~For additional notes regarding permanent steel casing, refer to the Foundation Recommendations.~~

**Excavation
and
Shoring**

For excavation at the ends of bridges, show a cross-hatched area extending to the top of the rip rap or slope protection.

For an estimated quantity of unclassified Structure Excavation of 500 yd³ (380 m³) or more,

The material shown in the cross-hatched area shall be excavated for a distance of _____ ft (m) each side of centerline roadway as directed by the Engineer. This work will be measured and paid for ~~as~~ at the contract unit price per cubic yard (cubic meter) for Unclassified Structure Excavation.

For an estimated quantity of less than 500 yd³ (380 m³),

The material shown in the cross-hatched area shall be excavated for a distance of _____ ft (m) each side of centerline roadway as directed by the Engineer. This work will be paid for at the Contract Lump Sum price for Unclassified Structure Excavation. ~~For Unclassified Structure Excavation, See Special Provisions.~~ See Section 412 of the Standard Specifications.

For bridges over highways or railroads in cut sections,

Work shall not be started on this bridge (or specific parts of bridge) until roadway section has been excavated.

For foundation excavation on railroad right of way, when applicable, see Section 12-12.

For Temporary Railroad Shoring, See Special Provisions.

The Contractor's attention is called to the fact that the shoring and excavation plans have been submitted to the Railroad by the State. As of the time of plan printing for advertisement for bids, Railroad approval has not been received. When such approval is received, the Contractor will be notified by addendum. In the event Railroad approval is not given prior to submission of bids, the Contractor shall submit bids based on the contract plans. The Contractor shall not begin excavation at the locations shown on these plans until notified of Railroad approval.

When shoring is required adjacent to existing bridges,

Steel sheet piling required for shoring shall be hot rolled.

Temporary shoring will be required in the areas indicated in the Plan View. See Special Provisions for Temporary Shoring. (Pay item included in Structure plans.)

When shoring is required for maintenance of traffic,

For limits of Temporary Shoring for Maintenance of Traffic, see Traffic Control Plans. For pay item for Temporary Shoring for Maintenance of Traffic, see Roadway Plans.

Temporary Structures

When a temporary structure is required,

The Contractor will be required to construct, maintain and afterwards remove a temporary structure at Station _____ for use during construction of the proposed structure. For Construction, Maintenance and Removal of Temporary Structure, —See Special Provisions—~~for Construction, Maintenance and Removal of Temporary Structure.~~

When $ADTT < 500$, also include,

For Sand Seal, see Special Provisions.

When a TL-3 barrier rail is required, place the following note on the plans:

The bridge rails on the temporary structure shall be designed for the AASHTO LRFD Test Level 3 (TL-3) crash test criteria. For Construction, Maintenance and Removal of Temporary Structure, see Special Provisions.

Removal of Existing Structures

(After serving as a temporary structure) the existing structure consisting of (number, length and type of spans; clear roadway width and type of floor) on (type of substructure) and located (distance up or downstream from proposed structure) shall be removed. The existing bridge is presently posted below the legal load limit. Should the structural integrity of the bridge further deteriorate, this load limitation may be reduced as found necessary during the life of the project. (When a special circumstance exists warranting a Special Provision, add to the note: See Special Provision for _____.)

(After serving as a temporary structure) the existing structure consisting of (number, length and type of spans; clear roadway width and type of floor) on (type of substructure) and located (distance up or downstream from proposed structure) shall be removed. The existing bridge is presently not posted for load limit. Should the structural integrity of the bridge deteriorate during construction of the proposed bridge, a load limit may be posted and may be reduced as found necessary during the life of the project. (When a special circumstance exists warranting a Special Provision, add to the note: See Special Provision for _____.)

For removal of an existing structure in the area of proposed construction,

The substructure of the existing bridge indicated on the plans is from the best information available. Since this information is shown for the convenience of the Contractor, the Contractor shall have no claim

whatsoever against the Department of Transportation for any delays or additional cost incurred based on differences between the existing bridge substructure shown on the plans and the actual conditions at the project site.

For removal of an existing bridge, or portion thereof, over water,

Removal of the existing bridge shall be performed so as not to allow debris to fall into the water. The Contractor shall remove the bridge and submit plans for demolition in accordance with Article 402-2 of the Standard Specifications.