# Plan Preparation Guide

# Chapter 13

# Bridge Information

## 1. Plan Production Criteria for Bridge Replacement Projects

The number of bridge replacement projects has increased and the preparation time set for right of way and letting has been trimmed to a minimum. This will require Road Design to maximize its production efforts in order to meet this desired schedule. The following production schedule has been developed in order to make Road Design successful in meeting these obligation schedules. If you have a project with difficulties that will prevent you from meeting the schedule, please advise the Road Design Bridge Project Facilitator so that changes can be made to the schedule or project in order to make the program successful.

- Start original topography and cross sections within one month after receiving survey. Include wetland delineation from survey on plan sheet by shading and noting wetland area.
- Send two copies of the topography and cross sections within two months after receiving the survey to the Bridge Design Program Manager in order to obtain bridge lengths and elevations and to send to Preliminary Design for alignment relocation and design review and comments.
- Complete Design Field Review (DFR) Plans for field review six weeks after receiving bridge lengths and elevations, and Preliminary Design comments and/or revised design. Perform field review within two weeks of completing DFR Plans.
- Obtain Bridge Construction Access from District personnel on DFR. Show on plan sheet prior to completing right of way plans.
- After field review, complete plan sheets with corrected grades, construction lines, NPDES lines, and new R/W within two weeks. Provide revised plan sheets (not a full set of plans) to Bridge Design Program Manager for Environmental Study.
- If roadway hydrology needs to be designed and/or a NPDES study needs to be completed, send revised plans including cross-sections to the Hydraulic Engineering Section.
- Complete plans for Right of Way and Construction two months after the field review or one month after the hydraulic design and/or NPDES plan information is received.

A scoping review is held for all Bridge Replacement Projects. The roadway representative on these scoping meetings is Road Design's Bridge Project Facilitator. On return from the field review, the Facilitator forwards information to the Preliminary Design Engineer so that a Survey Request can be prepared. After the Preliminary Design Engineer prepares the Survey Request, it is sent back to the Bridge Project Facilitator in Road Design for review. The Facilitator sends the Survey Request to the responsible Program Development Office for review and submittal to Hydraulic Engineering and Traffic Engineering for their review. During this phase of project development, the Facilitator will prepare and provide a roadway cost estimate to the appropriate responsible Program Development Office. After all reviews are completed, the Survey Request is then submitted by the Program Development Office to the Surveys Office. Once the completed survey returns from the field, it is forwarded to Road Design where a Design Group is assigned for plan development.

On all bridge replacement projects, both primary and secondary, the designer will provide quantities for paving under guardrail. See Standard Drawing 403-2 for details. District personnel should determine on the Design Field Review how the paving under guardrail should be set-up. The pay item of "Paving Under Guardrail" by the square yard or additional quantities by the ton of the surface course and liquid binder will be provided on the "General Construction Note" sheet in the plans. The note next to the pay item on the "General Construction Note" sheet should say "For paving under guardrail per Standard Drawing 403-2".

## 2. Bridge Information

Bridges should be accurately drawn on plan sheets and flagged with a note that shows the Length, Type (Precast, Prestressed, R. C., etc.) and station_____ to station_____. (See example)

Generally, a minimum right of way width of 75 feet on each side of the structure centerline to a point 75 feet from each end of the bridge should be provided on all projects that have a single two-lane bridge. Where multilane or divided highway structures are proposed, the "proportional differences" between the existing or proposed roadway approach right of way, and the additional right of way required for the bridges should be established for the specific site conditions. Consideration should be given to construction staging, access for construction, and maintenance in establishing the need for permanent right of way and the need for temporary access for construction. For new location parallel bridges, the right of way should be 75 feet from each bridge centerline to the outside in relation to the position of each parallel bridge.

All applicable guardrail notes should be shown. (Covered under Chapter 10)

The profile should show the bridge thickness with an elevation shown at both ends of the bridge. Also show Toe of fill stations and slopes of fill under the bridge. If Riprap is to be placed along Toe of Fill, notes should be shown for Riprap as shown on the example. Hydrology data and High Water Mark must be shown. Earthwork should be omitted from Toe of Fill to Toe of Fill.

In some cases, it may be necessary to remove portions of old fill. This should be shown by cross hatching and showing as estimated unclassified excavation.

Superelevation should be computed so that no run off occurs on any portion of the bridge wherever possible.

On bridge replacement projects, the Bridge Design Section will be responsible for determining the need for the following bid items:

| | |
|---|---|
| 10508XX | CONSTRUCTION STAKES, LINES, AND GRADES |
| 1090200 | AS-BUILT CONSTRUCTION PLANS |

Road Design will not be responsible for completing the information regarding these items found on the Design Plans Field Review sheet shown in Figure 5-B on page 5-7 of the Plan Preparation Guide. Road Design will not show these bid items on the approach plans or enter the items into the electronic system. Bridge Design will enter them into the system and show them on the bridge plans as applicable.

## 3. Bridge Construction Access

During the construction of bridges, the contractor's equipment has to be positioned near the new bridge site to facilitate construction activities. This location will be at one of the four corners of the new bridge and will be bounded by the body of water, railroad or highway being crossed, the right of way line and a distance to a traverse line 75 feet parallel to the construction centerline from the body of water, railroad, or highway.

In order to provide access to this location for large equipment (e.g., a crane), an access road, a short distance along the right of way line, may have to be made available to the contractor. The access road and equipment set-up site will be noted as the "Bridge Construction Access (BCA)" and will be shown on the plans. During the Design Field Review, the District representative will provide the location of the BCA. The designer will sketch the location on the plans during the field review. The right of way plans will show this access by a unique line that can be found in the custom line style palette and is shown here:


The area within the BCA line will be cleared and grubbed during construction. A silt fence will be installed along the outer most limits of the BCA. Permission should be obtained when the BCA is shown outside the right of way, but may have to be encompassed with permanent right of way due to the amount of work required within its boundaries. A minimum of 20 feet from the fill slope is required to the BCA line for a bridge construction access road. In the area of the new bridge within 75 feet of the water, highway or railroad, a minimum of 25 feet from the fill slope is needed to the BCA line. This width is needed for equipment set-up and material handling and can be increased depending on the type and/or amount of work. This width will be determined on the Design Field Review. The BCA line will only be shown at one corner of the future bridge site, unless conditions require additional access on other corners of the bridge.

## 4. Concrete Transition Curb and Flume At Bridge Ends

The designer will use "Concrete Transition Curb and Flume" with a paved shoulder area on all bridge ends. (The exception to this is the high side of superelevation sections wherein only the paved shoulder areas and concrete transition curbs will be constructed. The flume and riprap will be deleted on the high side of superelevated sections.) "Bridge Concrete Curb and Gutter with Flumes" will not be used.

Due to the complexity of construction and maintenance of the presently used concrete curb and gutter with flume for grades of 1% or greater, the concrete curb and gutter with asphalt flume as detailed by the Road Department will be used on all future projects unless directed otherwise. (See Road Standard Drawing No. 721-1.) Be aware of the two types of bridge ends, with and without a bridge approach slab. In addition, three linear feet of 9" x 15" concrete curb for each corner of the bridge using the concrete transition curb should be placed in the inclusions to be used as determined by the engineer.

Also please be aware of the following: Section C2.6.6.1 of the AASHTO LRFD Bridge Design Specifications states that "A longitudinal gradient on bridges should be maintained. Zero gradients and sag vertical curves should be avoided."

The Hydrology Section is to indicate when the asphalt flume will not be suitable and make recommendations for handling the water.

Liquid Asphalt binder PG64-22 is included in Hot Mix Surface Course for Ditching Paving. Hot Mix Surface Course of the same type used on the roadway shall be used for shoulder paving at an application rate of 500 Lbs./S.Y.

**EXAMPLE FOR TWO BRIDGE ENDS (FOUR CORNERS) ON TANGENT NORMAL CROWN**

**Inclusion Note:**

| | |
|---|---|
| Concrete Transition Curb | (-- LF) for Bridge Ends |
| Hand Placed Rip Rap | (-- Tons) for Bridge Flume Ends |

| | |
|---|---|
| Geotextile for Erosion Control Under Rip Rap (Class 2) Type __ | (-- S. Y.) to be placed under Hand Placed Rip Rap |
| *Hot Mix Surface Course | (-- Tons) for Drives --t (--), Leveling -- t (--) and Bridge Ends -- t (--) |
| *Asphalt Cement in Paving Mixture | (-- Tons) for Drives, Leveling & Bridge Ends |
| #Hot Mix Surf. Course For Ditch Paving | (-- Tons) For Flumes |

*These quantities vary according to shoulder width
#This quantity varies according to fill height and slope

**Note For Plan Sheet (to Be Placed On One Corner Only)**

Construct Shoulder Paving, Bridge End
Concrete Transition Curb And Flume With Riprap
^Erect Thrie Beam Bridge Connector and End Treatment Type T
(Typical Four Corners)

^Bridge end protection note may be modified to fit varying end treatment conditions

**EXAMPLE FOR TWO BRIDGE ENDS (FOUR CORNERS) ON CURVE – SUPERELEVATED**

**Inclusion Note:**

| | |
|---|---|
| Concrete Transition Curb | (-- LF) for Bridge Ends |
| Hand Placed Rip Rap | (-- Tons) for Bridge Flume Ends |
| Geotextile for Erosion Control Under Rip Rap (Class 2) Type __ | (-- S. Y.) to be placed under Hand Placed Rip Rap |
| *Hot Mix Surface Course | (-- Tons) for Drives --t (--), Leveling --t (--) and Bridge Ends --t (--) |
| *Asphalt Cement in Paving Mixture | (-- Tons) for Drives, Leveling & Bridge Ends |
| #Hot Mix Surf. Course For Ditch Paving | (-- Tons) For Flumes |

*These quantities vary according to shoulder width
#This quantity varies according to fill height and slope

**Note For Plan Sheet (to Be Placed On One Corner Only)**

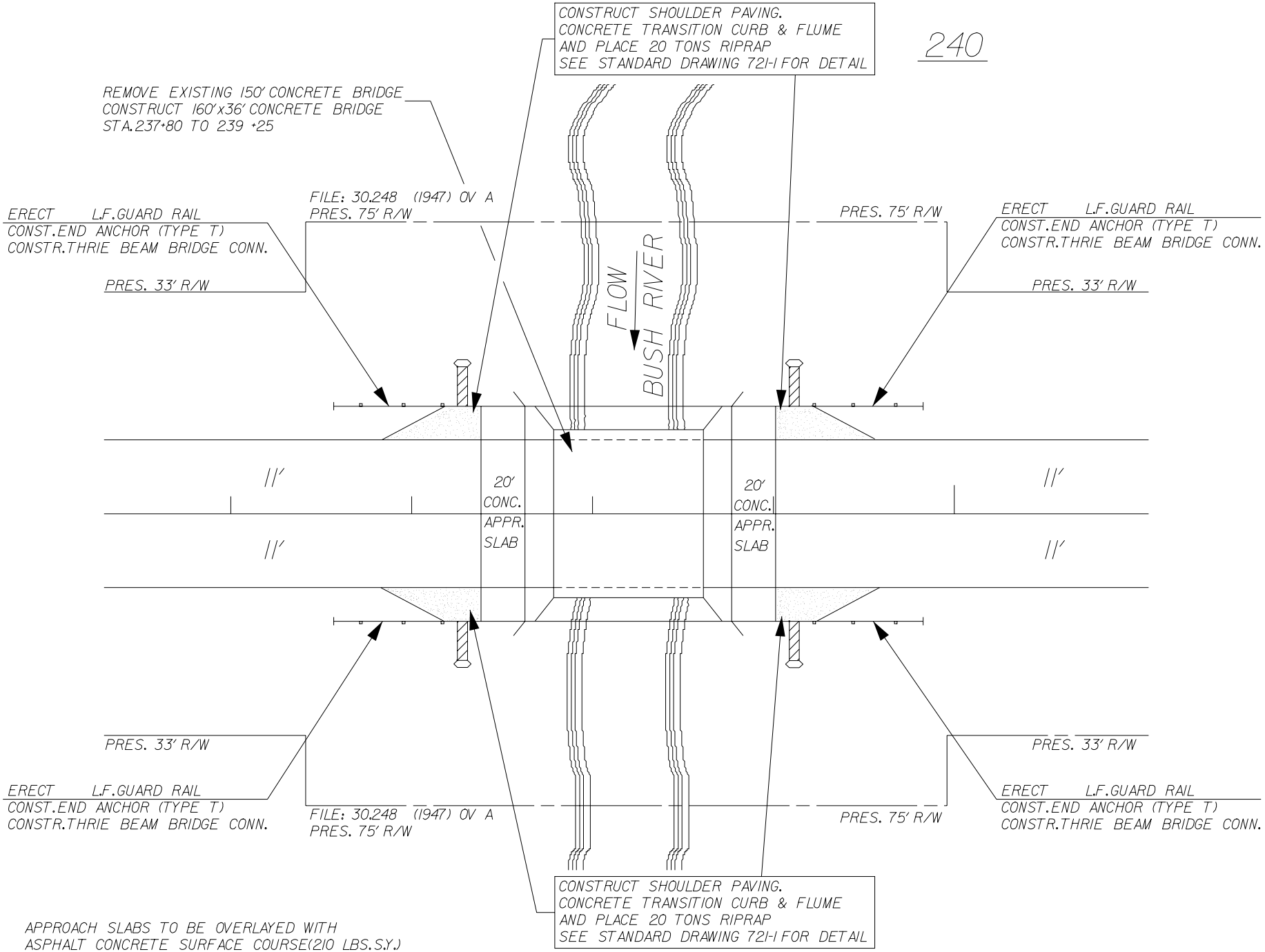
Construct Shoulder Paving, Bridge End
Concrete Transition Curb And Flume With Riprap
^Erect Thrie Beam Bridge Connector and End Treatment Type T
(Typical Four Corners)

^Bridge end protection note may be modified to fit varying end treatment conditions.

Do not place “Concrete Transition Curb and Flume” on the high side of a superelevated bridge. Paved shoulder will be included on high side of superelevation.

See the following sheets for an example of a bridge location.

# EXAMPLE OF BRIDGE WITH APPROACH SLABS




APPROACH SLABS TO BE OVERLAYED WITH
ASPHALT CONCRETE SURFACE COURSE(210 LBS.S.Y.)
SEE BRIDGE PLANS.FLOWABLE FILL TO BE PLACED
WHERE DIRECTED BY THE ENGINEER.

# EXAMPLE OF BRIDGE WITHOUT APPROACH SLABS