

Location:
Large Highway Design Conf. Room/Virtual

Time:
10:00 AM to 11:30 AM

Purpose of Meeting: Third Quarter Meeting 2023

Invitees:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Jennifer Reczek, NHDOT | <input checked="" type="checkbox"/> Chris Cucco, AECOM |
| <input checked="" type="checkbox"/> Angela Hubbard, NHDOT (Co-Chair) | <input checked="" type="checkbox"/> Daniel Taylor, Stantec |
| <input checked="" type="checkbox"/> David Scott, NHDOT | <input checked="" type="checkbox"/> Jaime French, F&O |
| <input type="checkbox"/> Paul Lovely, NHDOT | <input checked="" type="checkbox"/> John Byatt, BETA (Co-Chair) |
| <input checked="" type="checkbox"/> Jason Tremblay, NHDOT | <input checked="" type="checkbox"/> Chris Fournier, HEB |
| <input type="checkbox"/> Levi Byers, NHDOT | <input checked="" type="checkbox"/> Steve Langevin, GPI |
| <input checked="" type="checkbox"/> Tim Boodey, NHDOT | <input checked="" type="checkbox"/> Nicholas Caron, HDR |

Nick Caron was welcomed to the Committee. Jennifer will check with Alex Koutroubas for the other new committee member.

1. Department staff changes (promotions, new-hires, retirements, etc.)

- a. ACEC members:
 - Chris Cucco and Jaime French will be rotating off the committee after this meeting. Alex Koutroubas will be providing two new members to rotate in.
- b. NHDOT Staffing discussion:
 - Jennifer Reczek is the new Bridge Design Administrator.
 - Loretta Doughty is the new Chief of Project Development in Highway Design.
 - Nick Goulas, John Poisson, and Adrian Husemoller have left Bridge Design.
 - Bill Saffian is the new Chief of Existing Bridge Section.
 - Briana Peasley is the new Administrative Secretary in Bridge Design.
 - Still have CE IV's, V's positions open.
 - Tobey Reynolds is the new Assistant Director of Project Development.
 - Bill Lambert is the new State Highway Safety Administrator.
 - Lee Baronas is the new BOT Administrator.
 - Dave Smith is a new Project Manager in Highway Design.
 - Ron Grandmaison is now the head of Roadway and Pavement Section

2. Summary of In-House Design Section staff meetings

- A-Jacks in Woodstock (Statewide 41915) have failed and didn't last one year due to high velocity and boulders in the river hitting the A-jacks since they are unreinforced precast concrete.
 - Do not use in cobbly rivers where boulders could hit and destroy the A-Jacks.

- No more virtual public hearings, in person preferred with a remote option.
- In the past the DES wetland process would not accept arm fund payment for upland impacts as these are considered a priority resource area. Legislation has now changed so they do accept arm fund payments for upland impacts.

3. NHDOT Information for Consultants

- NHDOT has a new internet site.
 - We are restricted to the number of files posted and the size which is why the ACEC Subcommittee page only has this and last year's meeting minutes. Also, it was decided to not post the Bridge Design In-House meeting minutes.
 - The two year storage limit of subcommittee meeting minutes may be revisited
- Bridge Design webpages:
 - Same webpages as before.
 - The Bridge Design Manual has not been updated.
 - All the .dgn files have been converted to MicroStation CONNECT.
 - No V8i drawing are posted and no revisions have been made to the V8i files. If you need a V8i drawing, Angela Hubbard can send it to you.
 - The MicroStation .dgn files do not open when you hit on them in the Edge browser. They work for other browsers. You can also right click and hit on **"Save link as"** to download the .dgn file. DoIT is looking into a fix.
 - Revisions have been made to most of the drawings and the date of the revision is noted.
 - Sample plans are not yet completed.
 - New details have also been posted.
 - The Revisions History documents are have been updated and highlight the changes made.
 - Sample Project Notes and Sign Footings drawings were updated on Sample Plans. I will be updating the other sample plans.
 - Still working on Bearings, Utilities, Precast/Prestressed Details, and unresolved issues.
 - Please let me know if files are mixed up or if you find any errors.
- Thank you for the reviews and comments. Comments are always welcome. I will be sending out the response to comments that were given for the drawings.

3. Technical Topics

- a. Expansion Joint Rebar Hoop Anchor
 - A notice was sent out to Consultants regarding the expansion joint anchors.

- Fabricators have been showing alternative types of anchors on the shop plans and the shop plans have been approved with these alternative types.
 - In order to enforce the contract plan details, we are requiring the rebar hoop anchor shown on the contract plans, to be used for all armored expansion joints. If an alternative anchor is shown on the fabricator's shop plans, please mark up the shop plans to use the anchor detailed on the contract plans.
 - Research has shown that a rebar anchor is more effective in preventing dislodging of the joint from plow impacts.
- b. Major Changes to Drawings:
- Bridge Mounted Sign Supports:
 - A new policy regarding the maximum height of signs and use of post installed mechanical expansion anchor bolts has been implemented.
 - The conflict arises because signs are larger and extend high above the bridge railing. Previously, signs did not extend above bridge rail.
 - Contractors have been post installing mechanical expansion anchor bolts instead of cip as called for on the plans. The use of mechanical expansion anchor bolts are needed for bridge mounted sign structures being replaced on existing bridges. The concern was with the larger sign heights above the deck coping and railing, creating a tension load to the anchors due to wind on the back of the sign. After analysis and discussion, a policy was created to require a maximum height of 3.5' above the deck coping for sign attached to the sign supports, which brings the maximum sign height to the top of T3 bridge railing.
 - Angela shared pictures where the conflict occurred and post-installed anchors were used. In one instance, only one side of the connection was attached to the bridge deck and the engineer was not notified of the change.
 - Contractors may use post installed mechanical expansion anchors and shall provide the anchor design for approval in accordance with the special provision.
 - A new special provision will be created for use of mechanical anchors.
 - Note #9 states that designers shall confirm sign height and location. Confirm the bridge mounted sign support anchors do not conflict with the bridge railing base plates and the girder web connection does not conflict with web connector plates on the opposite side.
 - Bridge and Approach Railing:
 - The maximum spacing of 5'-6" to the 1st approach rail is noted.
 - The minimum distance from the last bridge post to the end of deck or wingwall is 1'-6" to provide adequate room for the required hoop reinforcing outside the post.

- There was discussion regarding the items in Section A-A that need to get quantified. Further consideration is required to determine the most appropriate location for these items to be represented in the contract documents.
 - *Subsequent of the meeting: A new Bridge Approach Curb Detail was added to the Bridge Details webpage: [Bridge Details | Department of Transportation \(nh.gov\)](#). As noted on the detail, it should be placed with roadway details since it shows the Contractor how the approach curb showed be installed and the items. The items need to be quantified.*
 - Bridge Rail Detail: A minimum distance is required to fit the 7 hoop bars as shown on the plans.
- Expansion Joints:
 - Many changes to the expansion joint sheets.
 - The vertical sidewalk curb plates need to be dimensioned and detailed.
 - Show on upper and lower views for sidewalks
 - Sidewalks and higher skews can make the plates long, 10' – 12' making the plates require stiffeners
 - It was found that plates are welded together during fabrication at 90 degrees, which does not account for the cross slope. This can result in a bump at the joint for the public. There is a new detail showing the required angle for slope for fabrication.
 - The full expansion joint should be shown to show the spacing of the anchorage and support plates.
 - The sidewalks need to be detailed.
 - There are more locations where there are XX's that need to be filled in.
 - The finger joint shape is changing, along with how to detail the fabric trough. I'm still working on those details.
- New Details:
 - There are new details in some of the previous categories and new categories.
- c. Contract Plan Sheets:
 - Individual plan sheets no longer need to be submitted, except for the Front Sheet.
 - Submission should include the Front Sheet, full 11x17 set, and full 22x34 set.
 - Jennifer said that this information should be sent out to consultants. Currently, it is being communicated on a by project basis. Due to varying level of experience, all consultants should be told in via email. (see enclosed memo).
- d. Guardrail and Bridge Approach Guidance and Reduce Post Spacing Memos:
 - Memo regarding guidance for attaching beam guardrail to existing bridge rail (see enclosed).

- Memo regarding guidance on reduced guardrail post spacing (see enclosed).

4. Business Topics

- Jennifer commented on staffing verses the number of projects. DOT will need to get creative to make up the difference, such as possibly extending the role of consultants to complete more projects. In addition, the consultant may be asked to do more coordination that has previously been handled by the Department. It would help remove DOT staff from being the middle person between departments.
 - John mentioned a COE program used by Connecticut DOT up to Preliminary Design. John will provide the CT COE contact information to Jennifer.
 - Chris F. indicated that consultants have experience handling everything on municipal projects.

5. Potential NHDOT and Consultant bridge training opportunities

- Jennifer indicated that a new NBIS “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges” is coming.
 - The changes will require new training.
 - A NHI class will be required for inspection with the new code starting January 2025. The training is needed in 2024 for both NHDOT and consultants.

6. Bridge Bureau workload and anticipated consultant support needs

- Possible Action Projects

7. Subcommittee membership rotation / new members


John Byatt, Daniel Taylor, Jason Tremblay, Paul Lovely	Sept. 2021 to Sept. 2024
Chris Fournier, Stephen Langevin	Sept. 2022 to Sept. 2025
Nicholas Caron, Anna Giraldi	Sept. 2023 to Sept. 2026

8. Upcoming meeting - scheduled Fridays from 10:00 to 11:30 AM

- December 8, 2023
- March 8, 2024 (calendar invites will be sent out)
 June 14, 2024
 September 13, 2024
 December 13, 2023

STATE OF NEW HAMPSHIRE
INTRA-DEPARTMENT COMMUNICATION

DATE: July 20, 2023

FROM: James A. Marshal, P.E. 
Administrator

AT (Office): Department of Transportation
Bureau of Highway Design

FROM: Loretta Girard Doughty, P.E. 
Administrator

AT (Office): Department of Transportation
Bureau of Bridge Design

SUBJECT: Electronic Contract Plan Sheets

TO: Bureaus of Highway Design, Bridge Design, Construction, Turnpikes, TSMO, Traffic, Planning & Community Assistance, Materials & Research, Environment, Front Office, and Print Shop

MEMORANDUM

The purpose of this memo is to create a Department wide method of preparing electronic contract plans sheets for advertising, printing, and archiving.

Currently, electronic contract plan sheets are created individually and as combined sets and with different naming conventions. After reviewing this matter with the Specifications Committee, it has been determined that individual electronic plan sheets are no longer necessary. Only complete sets of contract plans need to be created. Contractors and the Bureau of Construction have requested complete contract plan sets to be saved at half-scale (11x17) due to the ease of printing on 11x17 sheets in job trailers. Archiving electronic plan sets will be at full-scale (22x34) to provide the option of printing both full-scale plans and manually changing the print scale to 50% for 11x17 prints.

Please follow the below guidance for preparing the electronic contract plans:

- 1) Electronic .pdf contract plans shall have the following **naming convention**:
 - Use only dashes between numbers/words. No periods, spaces, underscores, or other non-alpha-numeric characters.
 - Need to include project number, document type, and plan size.
 - Document Type:
 - ROW: Right-of-Way Plans
 - WET: Wetland Plans
 - POP: Contract Plans (“Plans of Proposed”)
 - RAP: Revision After Proposal Plans
 - ASB: As-Built Plans
 - PROPOSAL: Contract Proposal

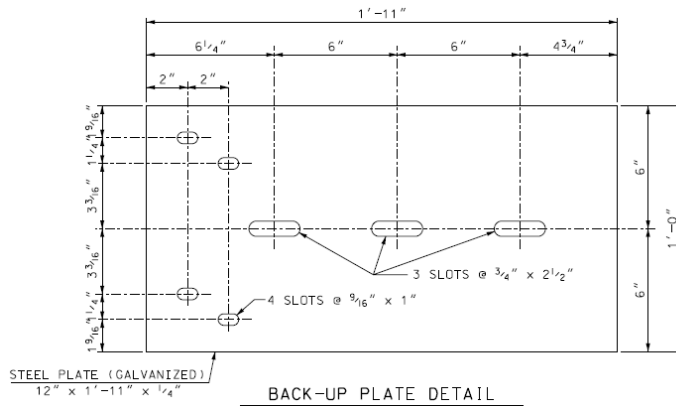
- ADDENDUM: Addendum Notice
 - Examples: 12345-POP-22x34.pdf; 12345-RAP1-22x34.pdf
- 2) Electronic contract plans for **Advertising (POP)**:
- Designers shall place a complete set of full-scale (22x34) contract plans (including cross-sections) on the S:\Global\B14-FinanceContracts\!Print_Shop_Requests\BXX
 - The plans set shall be named: 12345-POP-22x34.pdf
 - If the total plan set exceeds 400 sheets, the contract plans need to be split into sets (Volume 1, Volume 2, etc.). Name file: 12345-POP-Volume1-22x34.pdf. The maximum number of sheets is 400 for posting on the GIS Plan Inventory site.
 - The Print Shop will reduce the full-scale plans to half-scale (50%) for advertising, printing, and the Bureau of Construction. The half-scale plans are printed on 12x18 sheets. Full-scale plans (22x34) will also be printed as noted on the Distribution Form.
- 3) Electronic contract plans for **Addenda (ADD)**:
- If required, the Designer shall email Specifications Section the revised or new, full-scale (22x34) addenda plan sheet(s) along with the addendum notice.
 - The Specifications Section will insert the revised/new plan sheet(s) into the complete set of contract plans and note “SSD” on the replaced contract plan sheet(s), if required.
 - The revised/new plan sheet number should be designated as an “A” sheet and continue sequentially (i.e. sheets “B”, “C”, etc. (i.e., 8A, 8B, 8C)).
 - The Specifications Section will provide GIS Section the addenda plan set and the updated contract plan set for posting on the NHDOT Plan and Proposal Inventory website.
- 4) Electronic contract plans for **Revision after Proposal (RAP)**:
- If required, the Designer shall email Specifications Section the revised or new, full-scale (22x34) RAP plan sheet(s). The revised/new sheet(s) shall also be sent to Bureau of Construction along with a RAP memo.
 - The revision after proposal plans shall be named 12345-RAP1-22x34.pdf.
 - The revised plan sheet number should be designated as “8 RAP1” for revisions to sheet number 8 of the first RAP. If there is a second RAP, the sheet number should be designated as “8 RAP2”. If a sheet is added, the sheet number should be designated as “8A RAP1”.
 - The Specifications Section will provide GIS Section the RAP1 plan set for posting on the NHDOT Plan and Proposal Inventory website.

5) Electronic contract plans for **Archiving**:

- The Specifications Section places the complete full-scale (22x34) contract plan set (including revisions and cross-sections), contract proposal, addenda, and RAPs in the GIS folder for posting on [NHDOT Plans and Proposals](#) (GIS Plans Inventory webpage).

Noted by: A. Hubbard

Designers need to determine if the back-up plate at the aluminum bridge approach rail and beam guardrail connection is damaged or has large areas of corrosion. If the back-up plate needs to be replaced, Item 565.001 - Miscellaneous Bridge Approach Rail Components, should be added to the estimate along with the details for a replacement back-up plate. See **Figure 2 and attachments for details.**

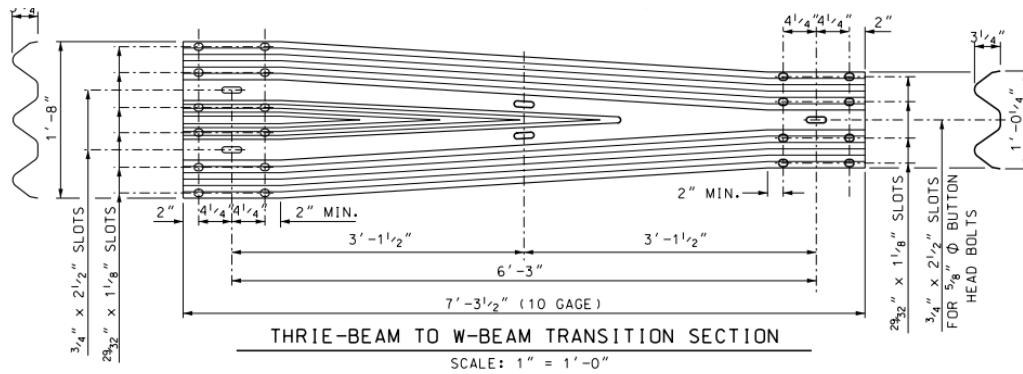


Aluminum Bridge Back-up Plate

Figure 2

2) Existing Steel Bridge Approach Rail and Concrete Parapets 32-in. to 34-in. Height:

When attaching new standard beam guardrail to existing steel bridge approach railing or concrete parapets with heights between 32-in. and 34-in., a symmetrical w-beam to thrie-beam transition panel should be used. Item 606.332 - Single-Faced Thrie Beam Transition Rail, Steel Post, should be added to the contract along with *Standard Plan GR-14*. See **Figure 3 and attachment for details**.

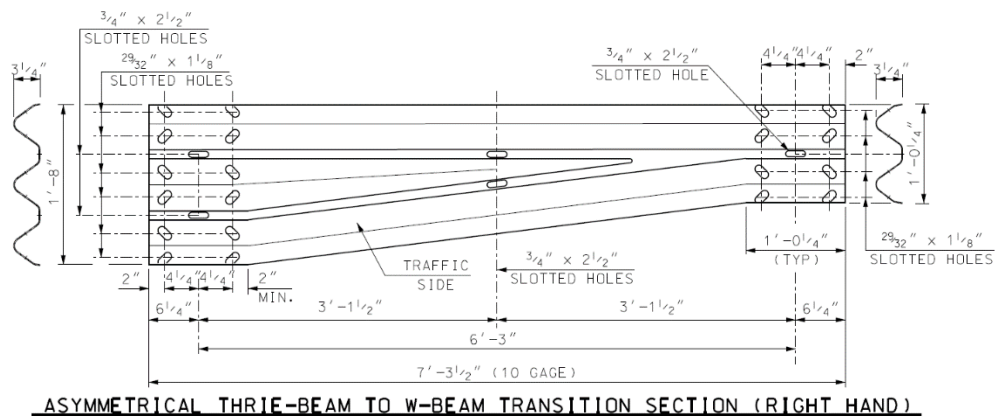


Thrie-Beam Transition Rail Section

Figure 3

3) Existing Steel Bridge Approach Rail and Concrete Parapets < 32-in. Height:

When attaching new standard beam guardrail to existing steel bridge approach railing or concrete parapets with heights < 32-in., an asymmetrical w-beam to thrie-beam transition panel should be used to transition the height difference. Item 606.34201 - Single-Faced Asymmetrical Transition Rail, Left (Steel Post), for the left side and Item 606.34202 - Single-Faced Asymmetrical Transition Rail, Right (Steel Post), for the right side should be added to the estimate along with Detail – “Single Faced Asymmetrical Transition Rail, Steel Post”. **See Figure 4 and attachment for details (contact Bureau of Highway Design Specialty Section for the CADD detail).** The asymmetrical transition panel will accommodate up to a 4-in. height differential. If additional height is needed, the difference can be obtained by transitioning the new standard beam guardrail. **See attached Special Attention.**

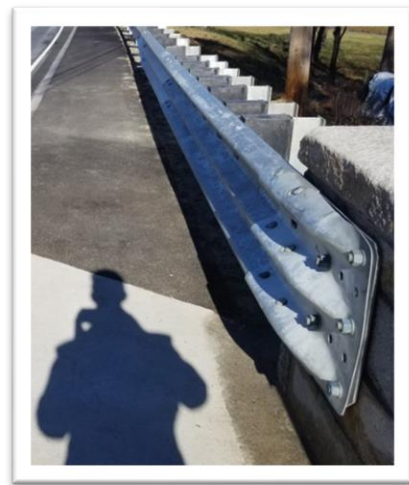
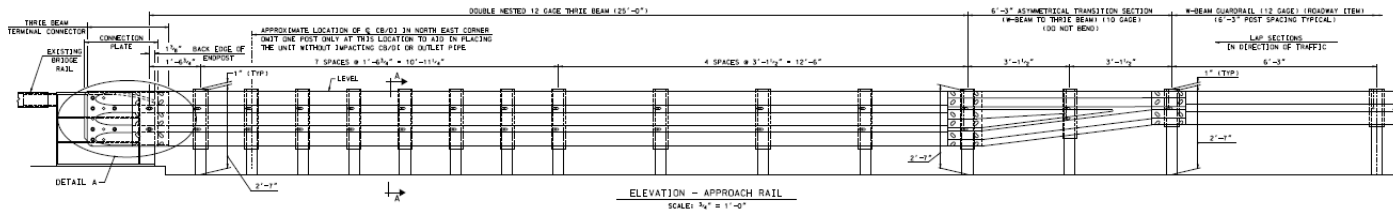


Asymmetrical Transition Rail Section

Figure 4

4) Existing Steel or Existing/New Stone Masonry Bridge Rail:

When attaching new standard beam guardrail to existing steel or stone masonry bridge railing *without* steel bridge approach railing, use Item 565.92, Bridge Approach Rail, Asymmetrical Thrie Beam Transition (Steel Posts) or Item 565.91, Bridge Approach Rail, Thrie Beam Transition (Steel Posts) for a symmetrical transition section. These items include both the approach section and the asymmetrical/symmetrical thrie beam transition for a total length of 33'-1 3/4". See Figure 5 and attachment for details (contact Bureau of Bridge Design for the CADD details).

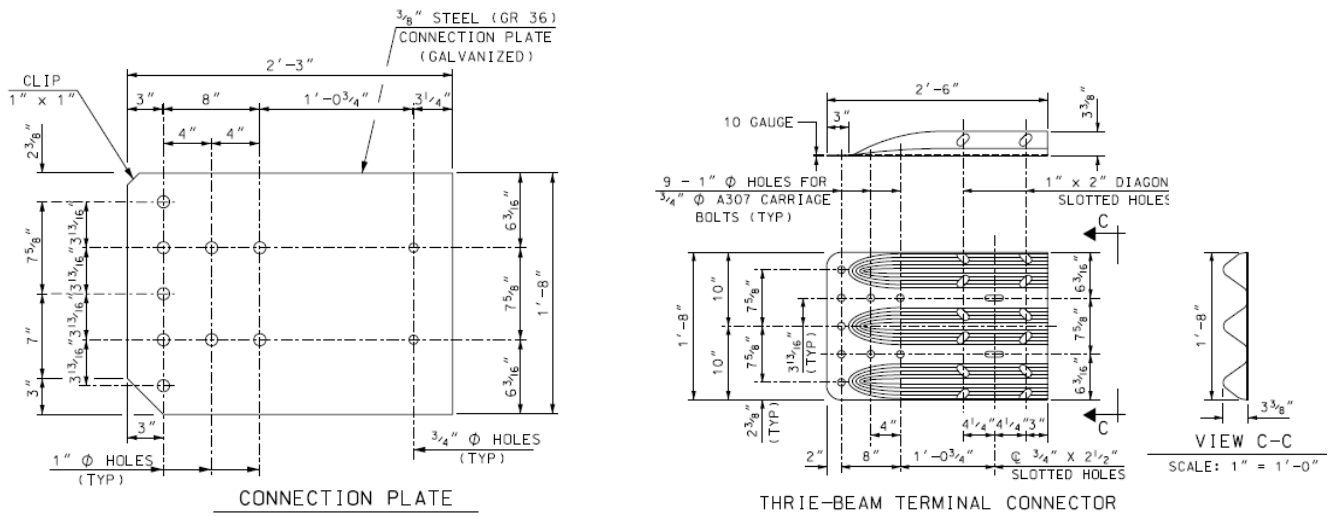


Connection Plate and Thrie-Beam Terminal Connector

Figure 5

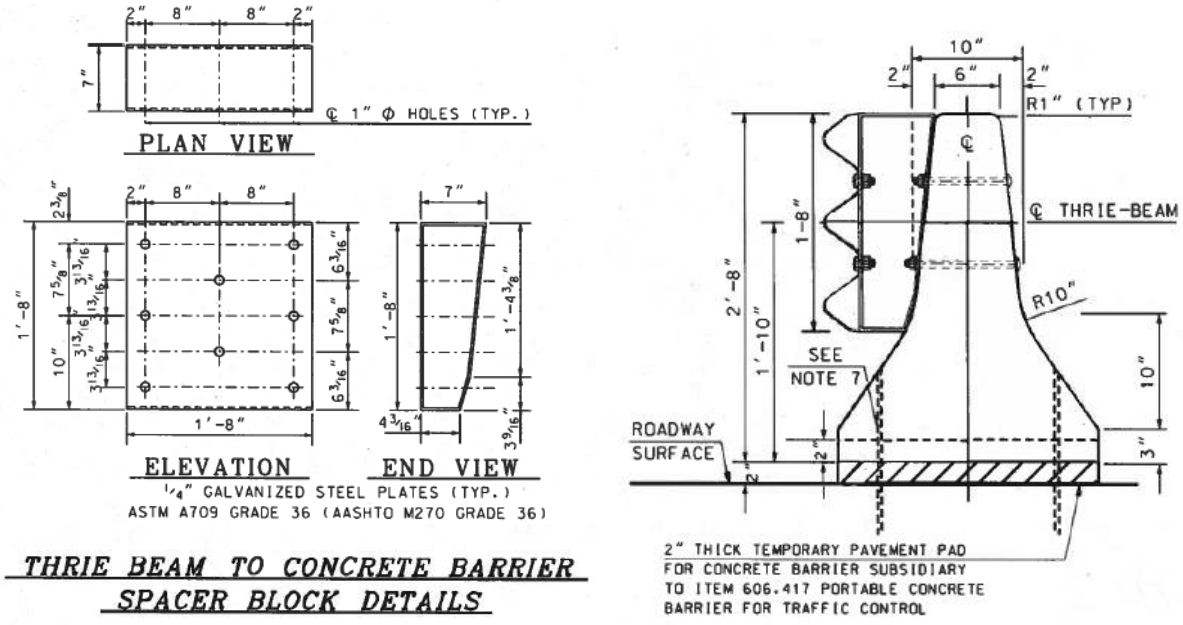
5) Connector Components:

Designers need to determine if there is an existing connection plate, spacer block, and/or a thrie-beam terminal connector, and assess their condition, to determine if new components are needed. If new or replacement components are needed, the detail(s) should be included in the contract plans with the thrie-beam transition or asymmetrical transition rail detail and is subsidiary to the corresponding transition section. **See Figures 6 & 7.** These plates allow for attachment of rail to the plate, and then, plate to the structure or other hardware, where direct attachment of rail to structure could not be made. The re-use or fabrication of new plates/spacer blocks/connectors should be noted in the guardrail notes. The components can vary in size, shape, and bolt pattern. See the As-Built plans for the existing plate or spacer block dimensions.



Connection Plate and Thrie-Beam Terminal Connector

Figure 6



Example of Spacer Block

Figure 7

Noted by: A. Hubbard

Attachments: Section 606 Special Attention, Aluminum Rail Back Up Plate Details, Standard GR-14, Asymmetrical Transition Section, Bridge Approach Rail-Asymmetrical

05/03/23

SSD: 09/01/05, 04/07/09, 11/30/10, 06/01/13, 06/11/20

SPECIAL ATTENTION**SECTION 606 – GUARDRAIL****W-BEAM GUARDRAIL**

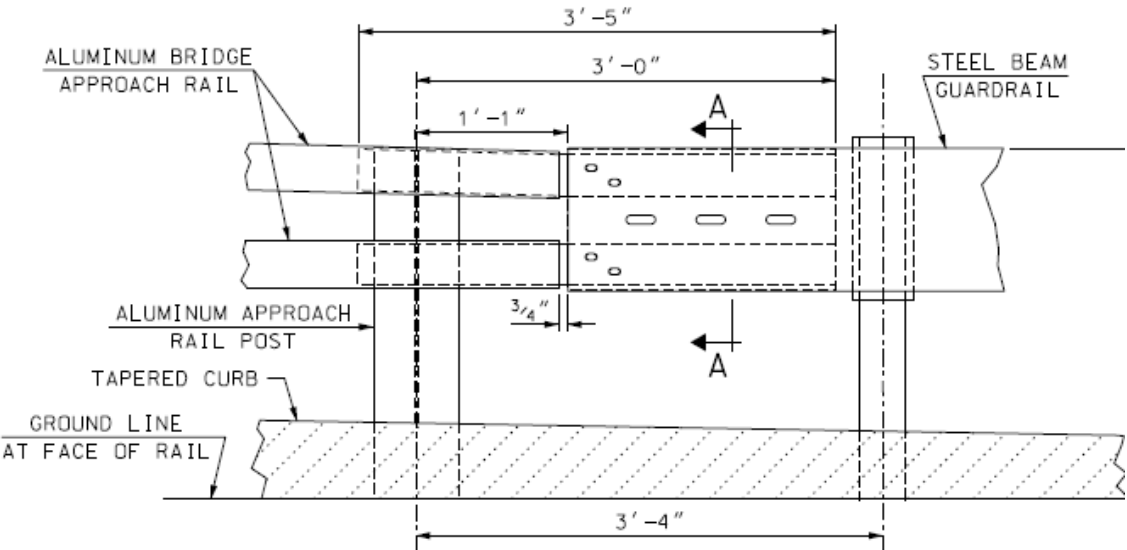
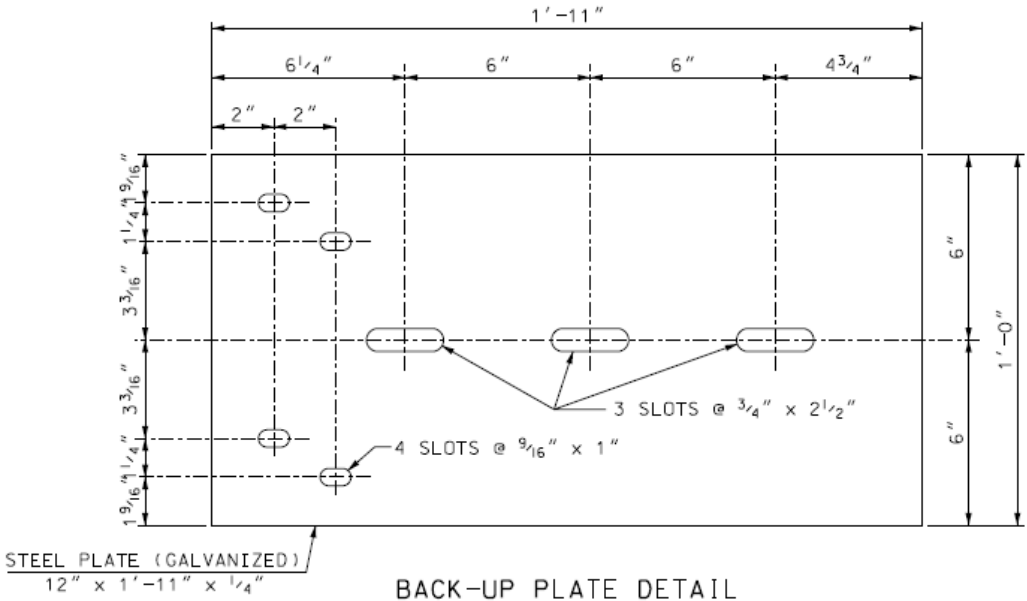
Situations for connecting new standard beam guardrail to existing guardrail installations may include:

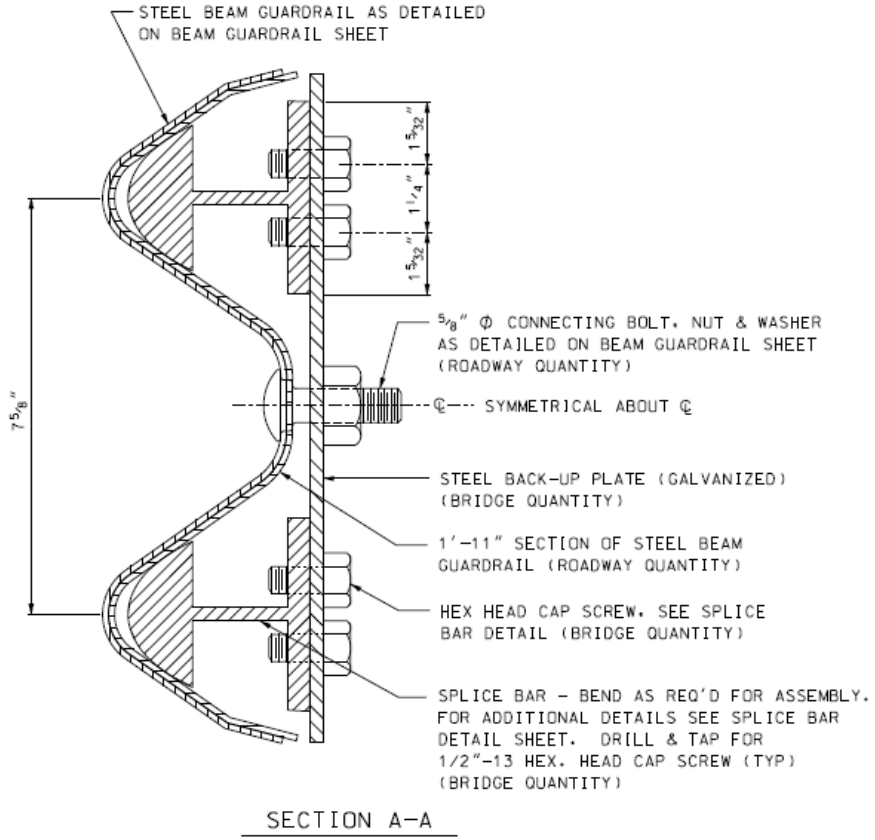
- 1) New standard beam guardrail, set at 31 inches high as required by the mid-splice guardrail system, to be connected to beam guardrail terminals that have been crash tested at 27 inches high or bridge approach units that were designed at a lower height.
- 2) New standard beam guardrail to be connected to existing beam guardrail that is not at the same height.

Additional items may be included in the contract to make up the height difference (e.g., three-beam transition panel shape unit, etc.), or to aid in connection between systems (e.g., back-up plate for aluminum approach railing, etc.). These items will be noted on the contract plans. Another means for making up the height difference is transitioning the height of the new standard beam guardrail over 50 feet to connect to the existing rail, terminal unit, or bridge approach unit.

Set the EAGRT heights according to the manufacturer's recommendation, as accepted under the Manual for Assessing Safety Hardware (MASH) - 2016 criteria. All other terminals, including, but not limited to, ELT, MELT, and CRT, shall be set at the crash acceptance height of 27-inch unless otherwise accepted under crash test acceptance for a higher height.

Steel Back-Up Plate Details for Aluminum Bridge Approach Rail

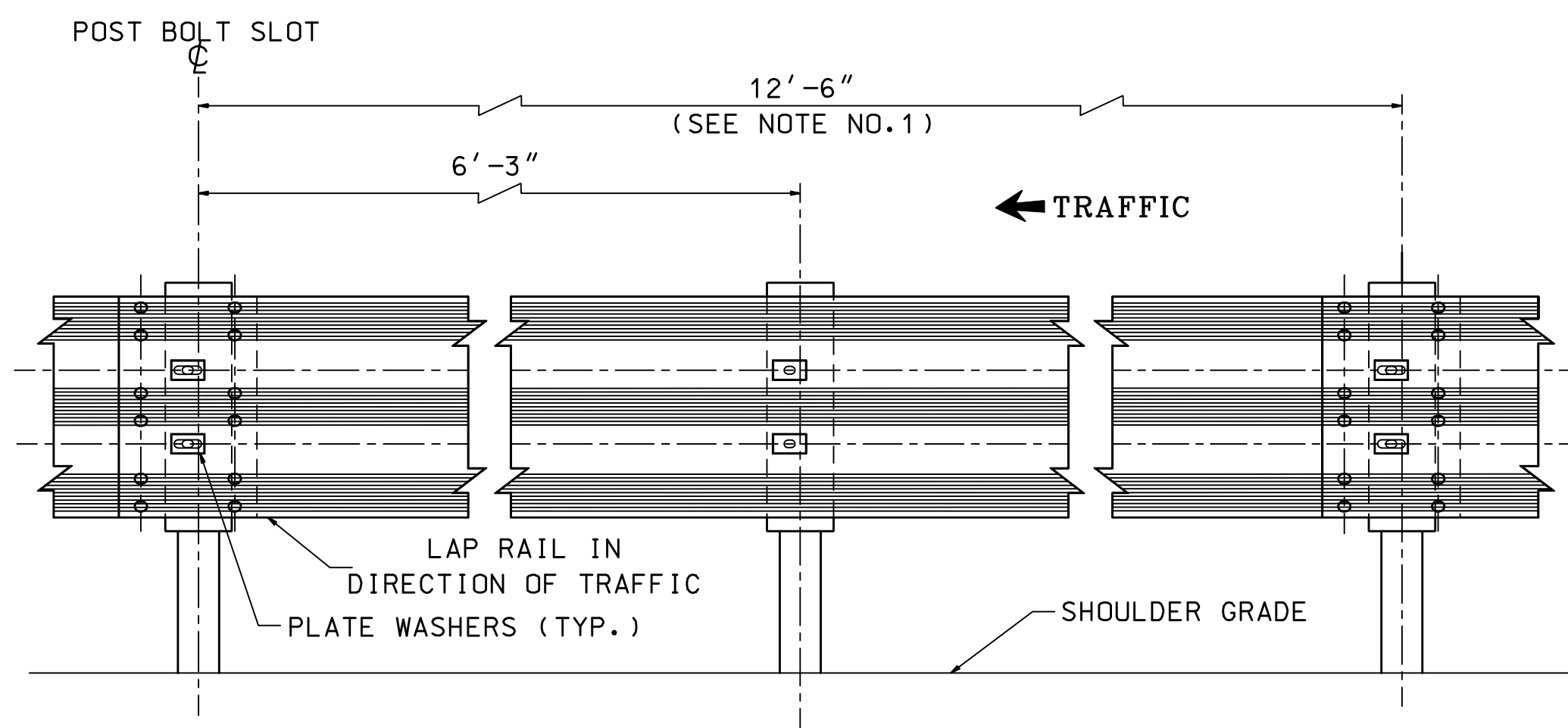




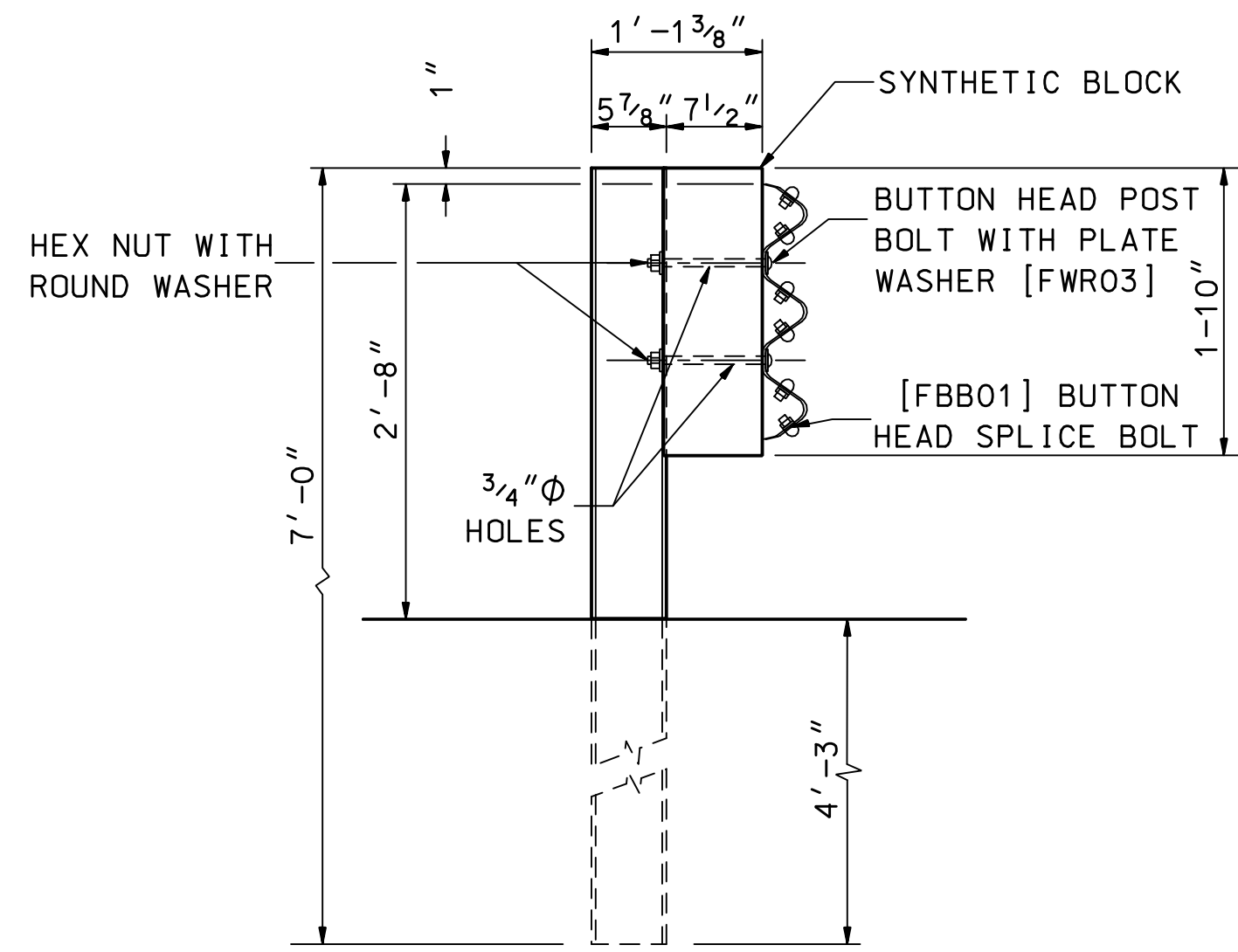
REVISION DATE
06-16-2010
11-05-2010
05-03-2011

*DGN FILE NAME
GR-14

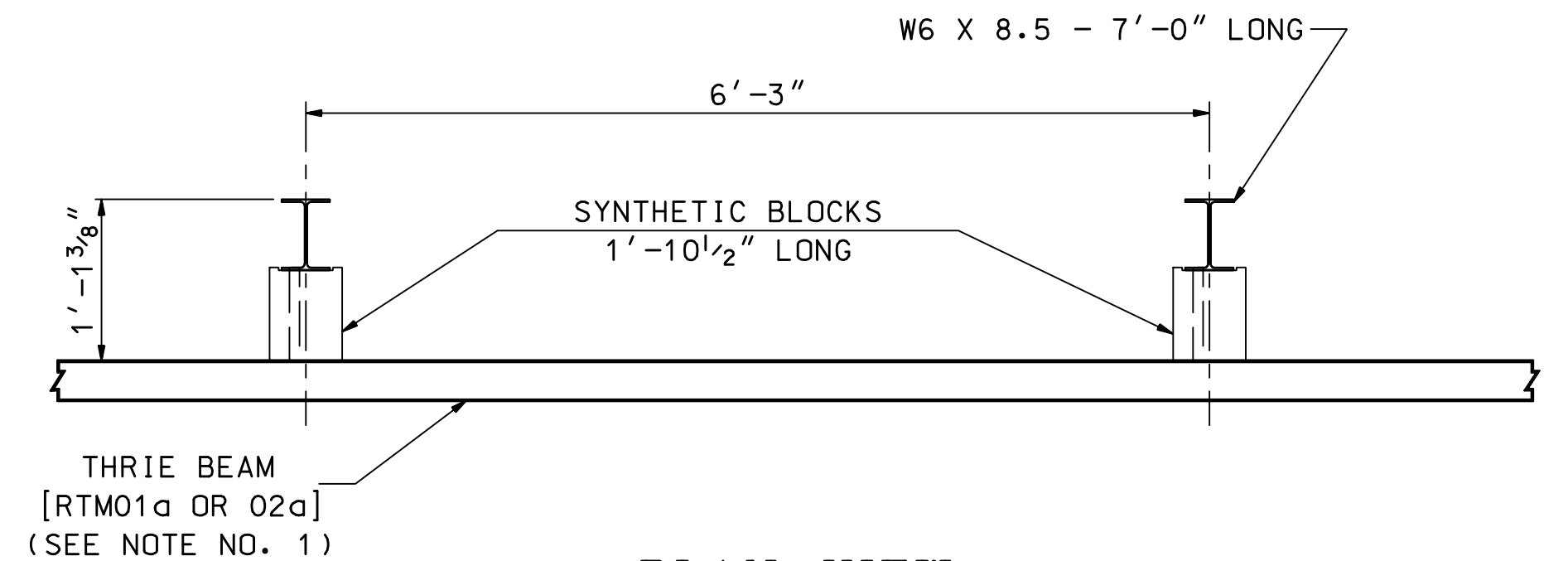
STANDARD PLANS



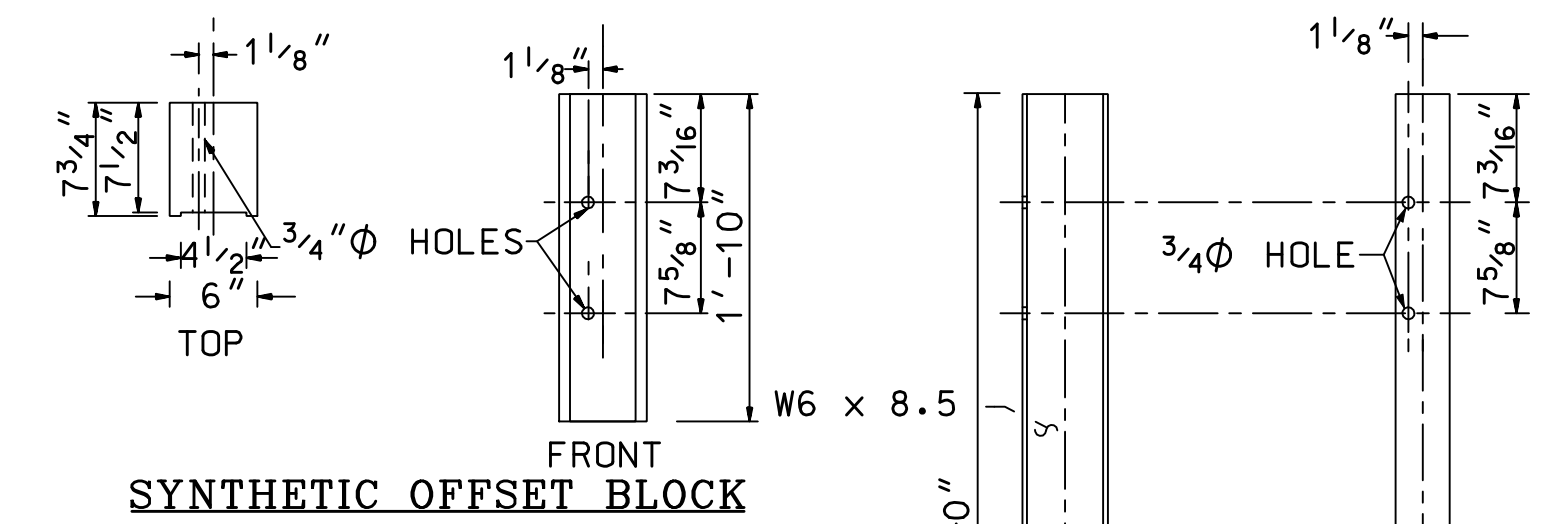
ELEVATION VIEW



SIDE VIEW AT SPLICE POST



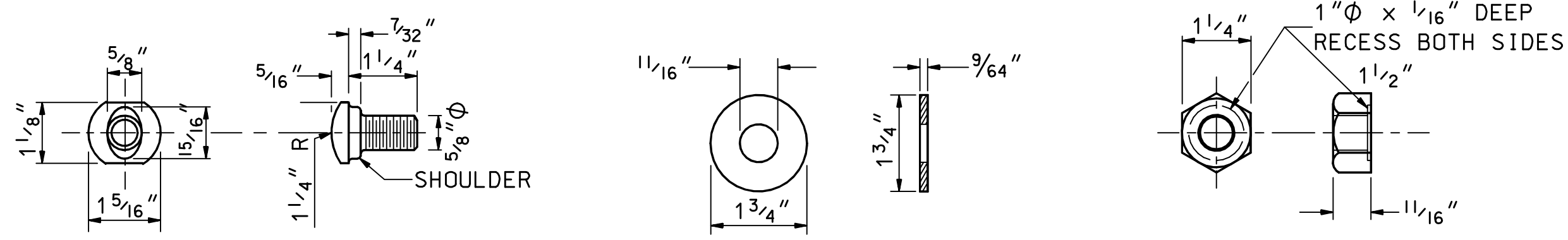
PLAN VIEW



SYNTHETIC OFFSET BLOCK

STEEL POST

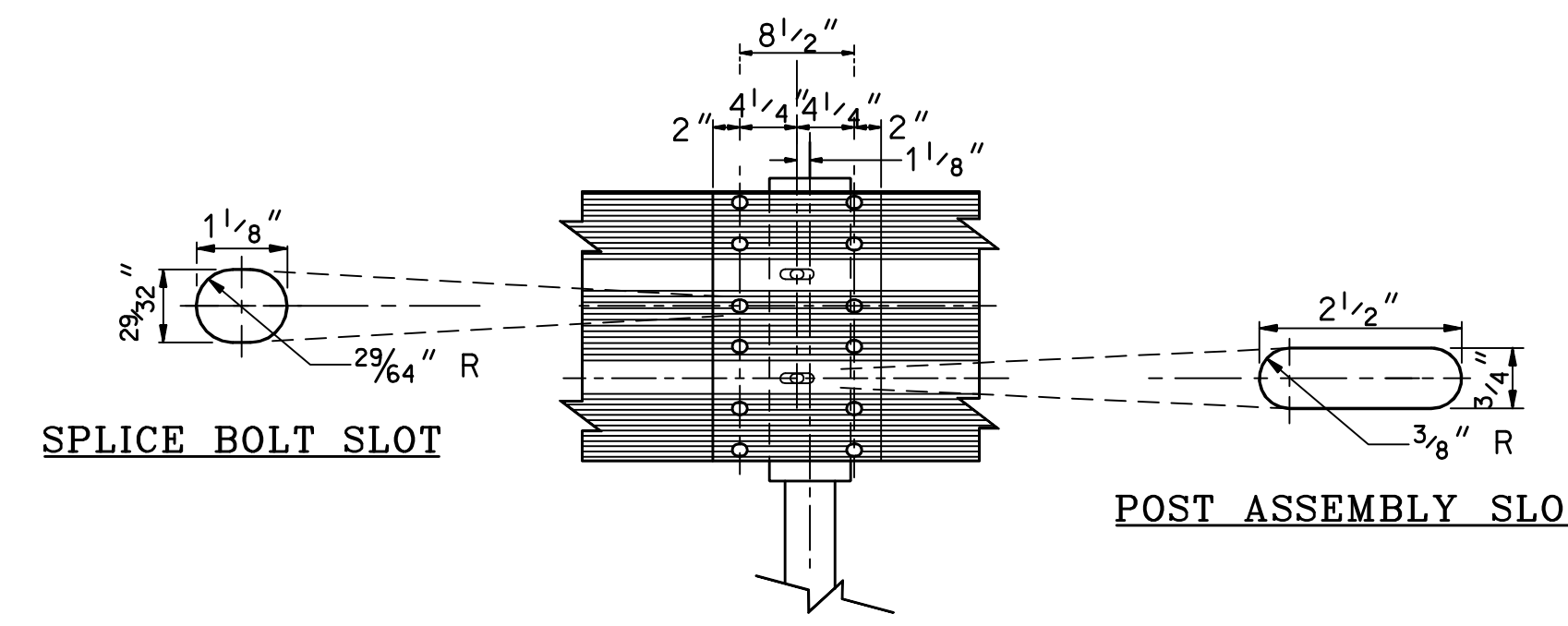
STRUCTURAL SHAPE STEEL POST & BLOCK



SPLICE BOLT [FBB01] (12 REQ'D PER SPLICE)

ROUND WASHER [FWR16a]

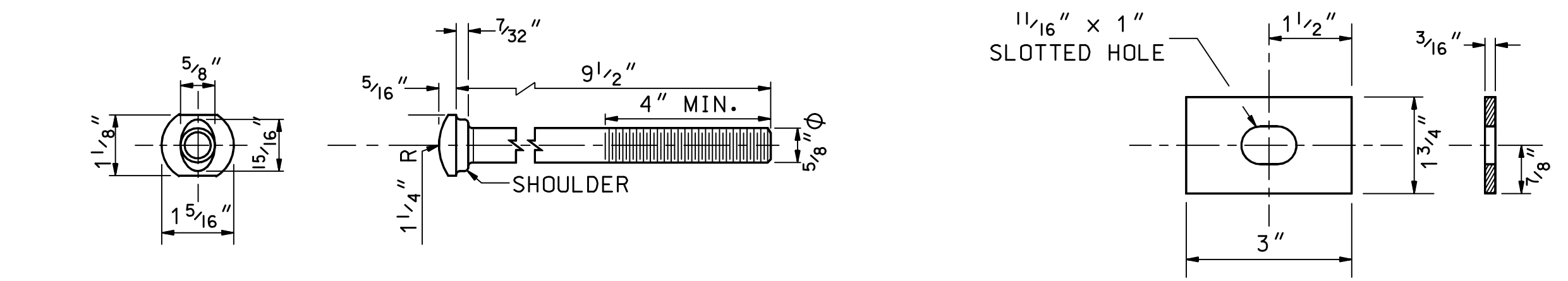
NUT FOR SPLICE & POST BOLTS [FBB01]



SPLICE BOLT SLOT

POST ASSEMBLY SLOT

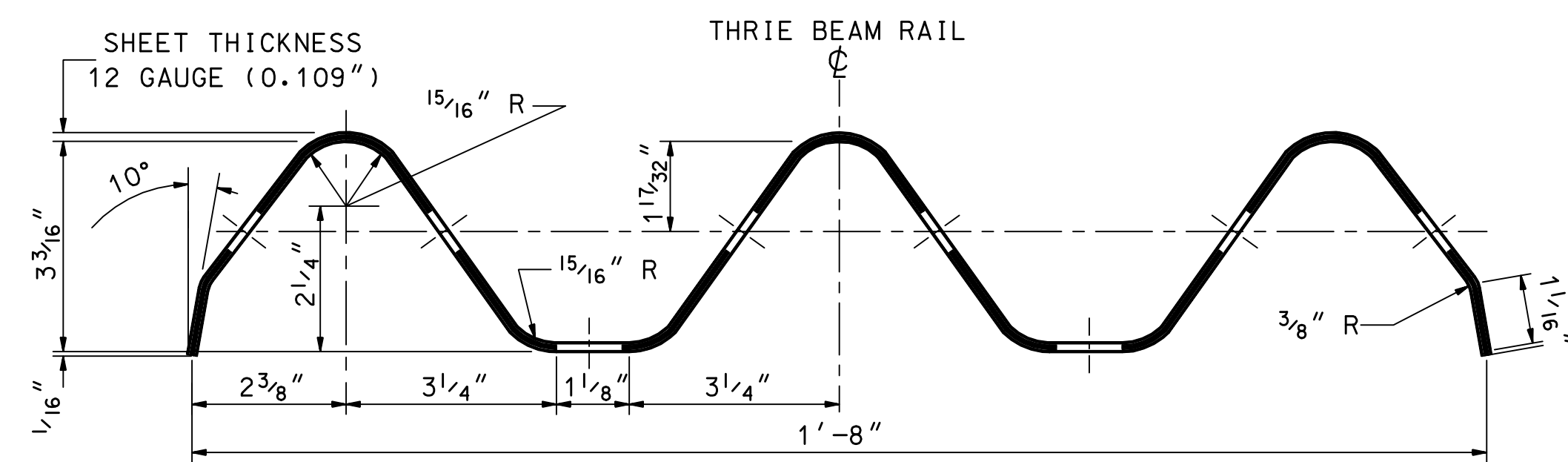
BEAM SPLICE



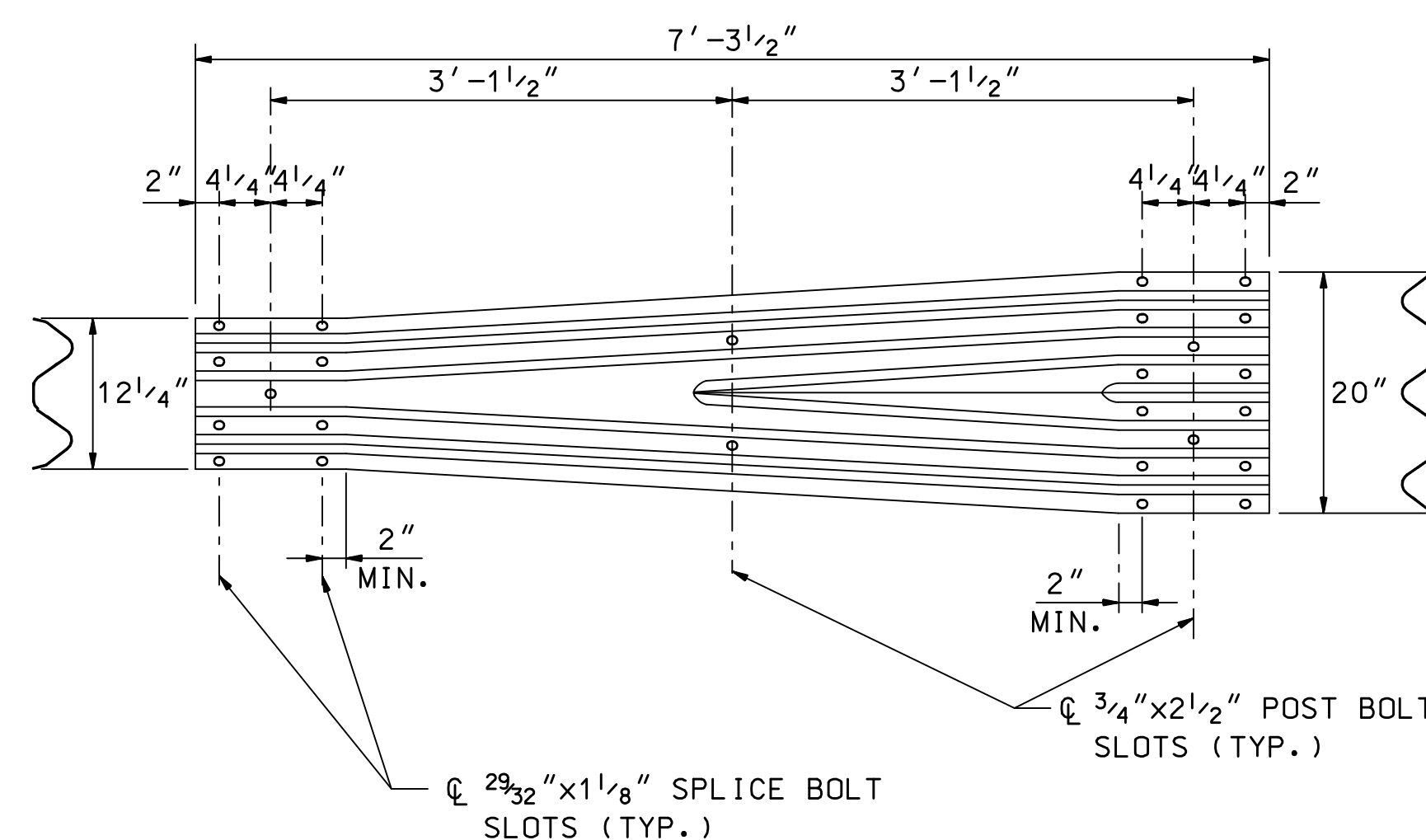
POST BOLT

PLATE WASHER [FWR03]

NOTE: LONGER ERECTION BOLTS MAY BE REQUIRED.



THRIE BEAM RAIL SECTION [RTM01a & RTM02a]

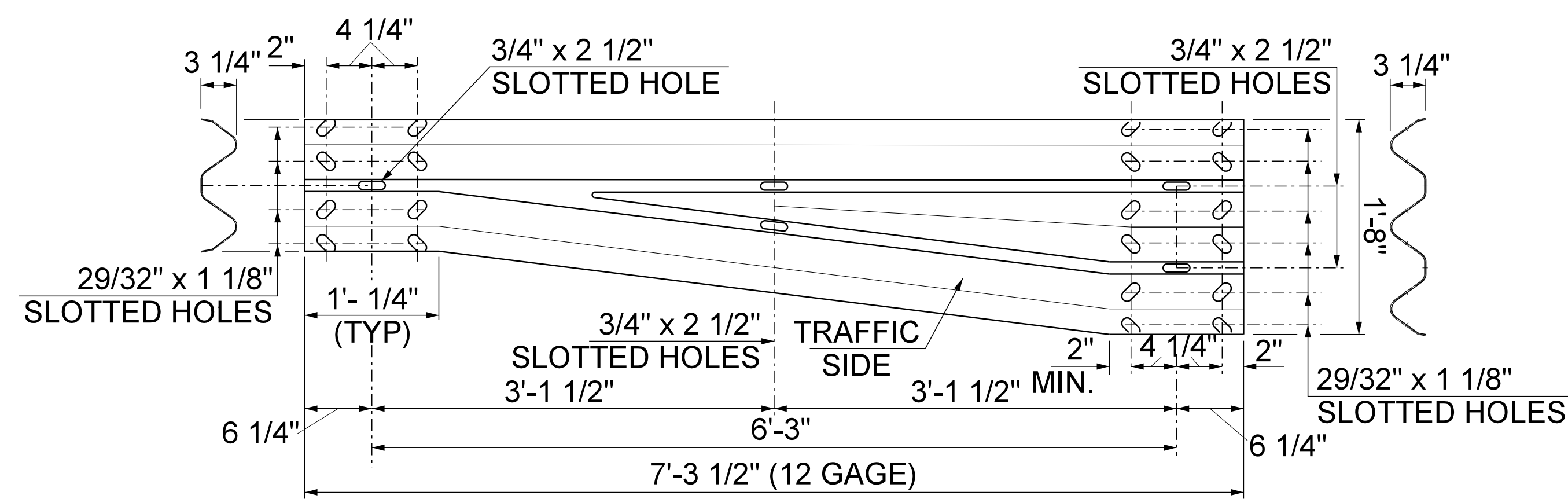


W-THRIE BEAM TRANSITION SECTION [RWT01a]

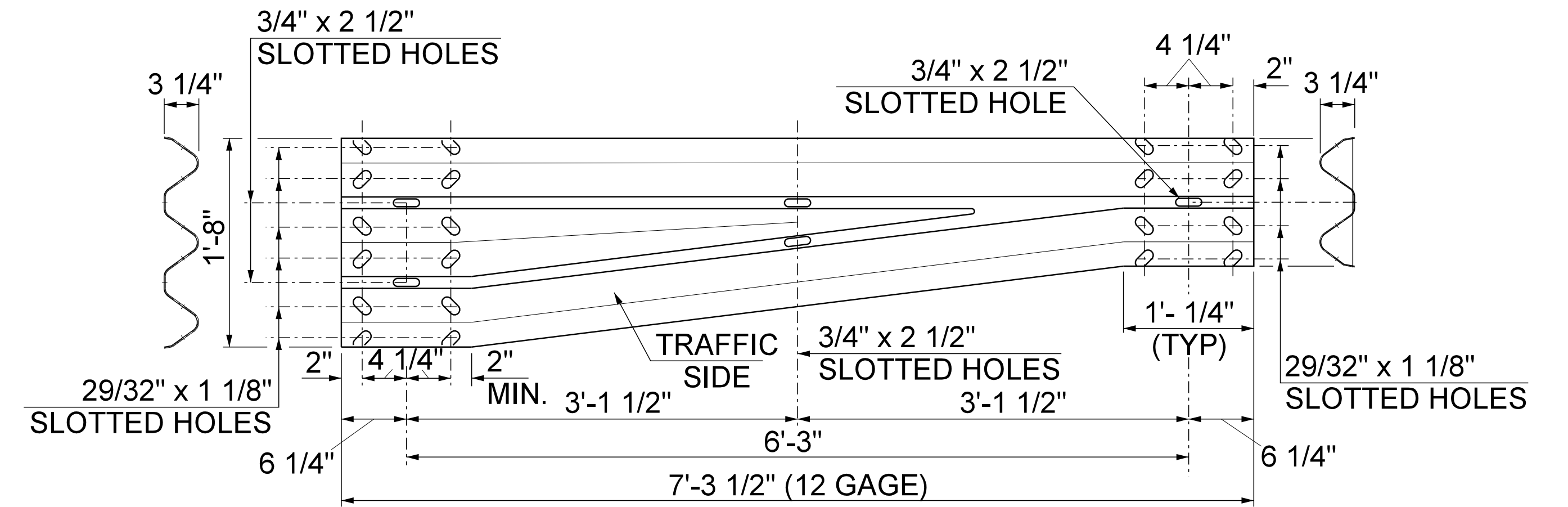
GENERAL NOTES

- 25'-0" RAIL PANELS MAY BE USED IN PLACE OF 12'-6" PANELS, EXCEPT ON CURVES WITH A RAIL RADIUS OF LESS THAN 300 FT.
- GUARDRAIL HEIGHT SHALL BE SET FROM THE GRADE AT THE FACE OF RAIL.
- DESIGNATIONS PROVIDED IN BRACKETS [] REFERENCE STANDARD ELEMENTS DETAILED IN A *GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE*, LATEST ADOPTED VERSION, AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.
- SEE STD. NO. DL-1 FOR BEAM GUARDRAIL DELINEATORS.
- PAID FOR UNDER APPROPRIATE 606 ITEMS, OR AS SHOWN ON PLANS.
- DIMENSIONS OF PLASTIC AND SYNTHETIC BLOCKOUTS ARE AS SHOWN ON MANUFACTURER'S DRAWINGS.
- POSTS SHORTER THAN THE 7'-0" INDICATED ON THE DETAIL, BUT NOT LESS THAN 6'-6", MAY ONLY BE USED WHEN
 - THE SLOPE BEHIND THE GUARDRAIL IS NO STEEPER THAN 4:1
 - WHERE THE DISTANCE FROM THE BACK OF THE POST TO THE BREAK OF THE SLOPE IS A MINIMUM OF 2'-0"
 - AND THEN ONLY AS APPROVED OR SPECIFICALLY SHOWN ON THE PLANS.

GUARDRAIL STANDARD
BEAM GUARDRAIL THRIE
BEAM SINGLE-FACED (STEEL)



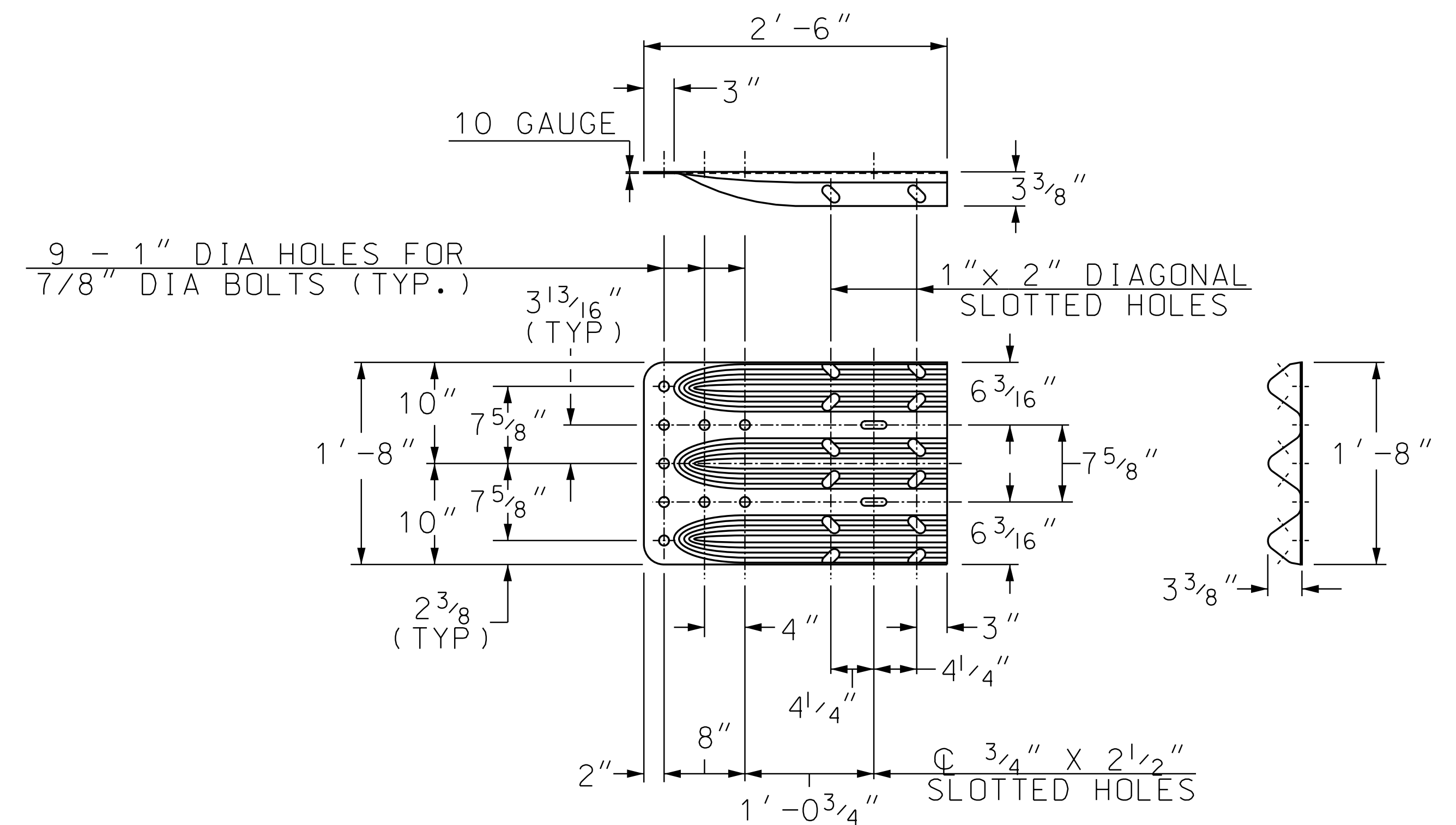
**SINGLE FACED ASYMMETRICAL
TRANSITION RAIL, LEFT
STEEL POST
ITEM 606.34201**



**SINGLE FACED ASYMMETRICAL
TRANSITION RAIL, RIGHT
STEEL POST
ITEM 606.34202**

NOTES:

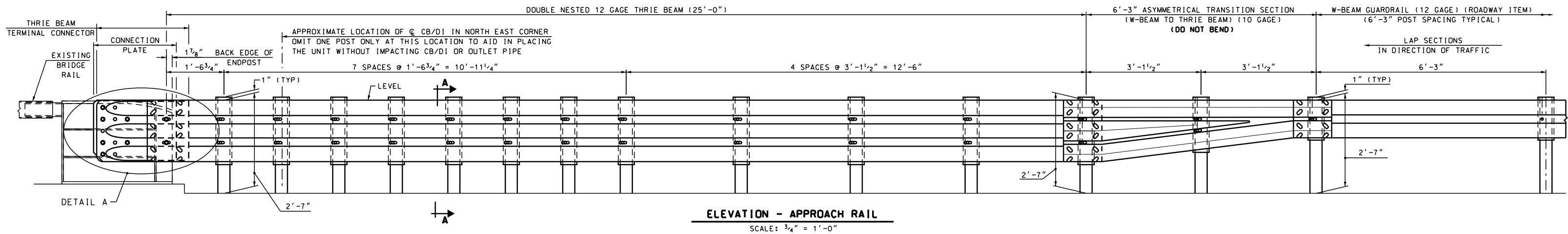
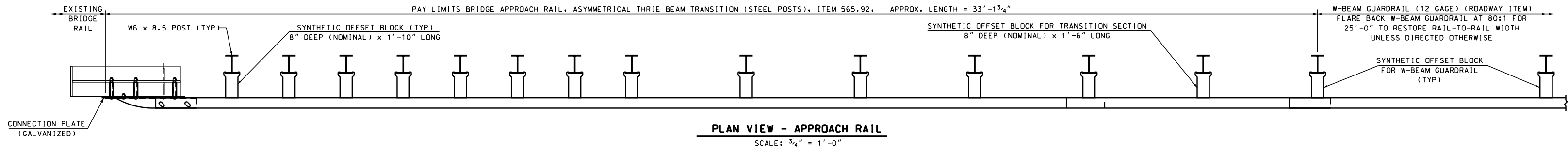
- (1) ITEM 606.3420(1,2), SINGLE FACED ASYMMETRICAL THRIE BEAM TRANSITION (STEEL POSTS) SHALL INCLUDE RAIL POSTS, OFFSET BLOCKS, ASYMMETRICAL THRIE BEAM TRANSITION SECTIONS AND ALL BOLTS, NUTS, AND WASHERS.
- (2) WHEN NECESSARY, ONE (1) THRIE-BEAM TERMINAL CONNECTOR IS SUBSIDIARY TO EACH SINGLE FACED ASYMMETRICAL TRANSITION RAIL ITEM AND SHALL INCLUDE ALL REQUIRED BOLTS, NUTS, AND WASHERS.
- (3) ALL STEEL COMPONENTS SHALL BE GALVANIZED AFTER FABRICATION IN CONFORMANCE TO AASHTO M232 (ASTM A153) AND AASHTO M111 (ASTM A123). THE GALVANIZING KETTLE SHALL HAVE 0.05 TO 0.09 PERCENT NICKEL. GALVANIZED SURFACES SHALL BE PROPERLY STORED. IF PAINTING IS REQUIRED SEE SPECIAL PROVISIONS FOR 708.
- (4) ANCHOR BOLTS SHALL BE ASTM A325, AND NUTS SHALL BE ASTM A563 GRADE A OR BETTER (GALVANIZED). HOLES TO RECEIVE ANCHOR BOLTS SHALL BE CORE DRILLED.
- (5) RAIL POSTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572 GR 50.
- (6) ALL DIMENSIONS SUBJECT TO MANUFACTURER'S TOLERANCES.



THRIE-BEAM TERMINAL CONNECTOR

NOT TO SCALE

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
SINGLE FACED ASYMMETRICAL TRANSITION RAIL, STEEL POST				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
A 1/17/09	asym-trans-sect	00000	12	



STATE OF NEW HAMPSHIRE
INTRA-DEPARTMENT COMMUNICATION

DATE: June 12, 2023

FROM: Kirk Mudgett *KOM*
Chief of Specialty Section

AT (OFFICE): Department of Transportation
Bureau of Highway Design

SUBJECT: Reduced Beam Guardrail Post Spacing Layout - Pay Items and Use

TO: All Project Development Bureaus and Design Consultants

MEMORANDUM

The purpose of this memo is to provide designers guidance for the intended use of reduced w-beam guardrail post spacing and the associated pay items for locations on non-NHS roads. (Applicable on NHS with Assistant Commissioner approval as a MASH design exception)

Recently there has been confusion related to the proper use of some pay items. In 2004, Item 606.184 – 31” W-Beam Guardrail (Reduced Post Spacing) was created for use when a section of guardrail would need to be stiffened as it passed closely in front of a utility pole or other hazard. However, the intention for use of this item has been lost over time, and it appears the result has been unclear direction for designers and contractors. Therefore, this item has been removed from use.

If reduced w-beam guardrail post spacing is needed, the following guidance showing different applications shall be used:

1) Stiffening for a Utility Pole with Offset Between 4 and 6 Feet:

Stiffening, or reduced post spacing, for a utility pole or other tall hazard, is still based on the original NCHRP-350 testing of mid-splice rail (or the MGS system). The detail, “*Mid-Splice Guardrail Stiffening Detail*” is shown on the Highway Design’s external website. This detail shows 8 posts spaced at 3’-1½” on the approach, and 4 posts spaced at 3’-1½” on the departure (if outside clear zone of opposite direction). **See Figure 1 below & attachment.**

As noted on the detail, use Item 606.012 – W6x9 Steel Post Replacement for Beam Guardrail and Item 606.0122 - Steel Post Assemblies for Beam Guardrail Posts. These items account for extra posts used beyond the standard 6’-3” spacing of Item 606.18001 - 31” W-Beam Guardrail. When this layout is used, this detail shall be provided in the contract plan set with the appropriate number of posts and post assemblies included in the estimate.

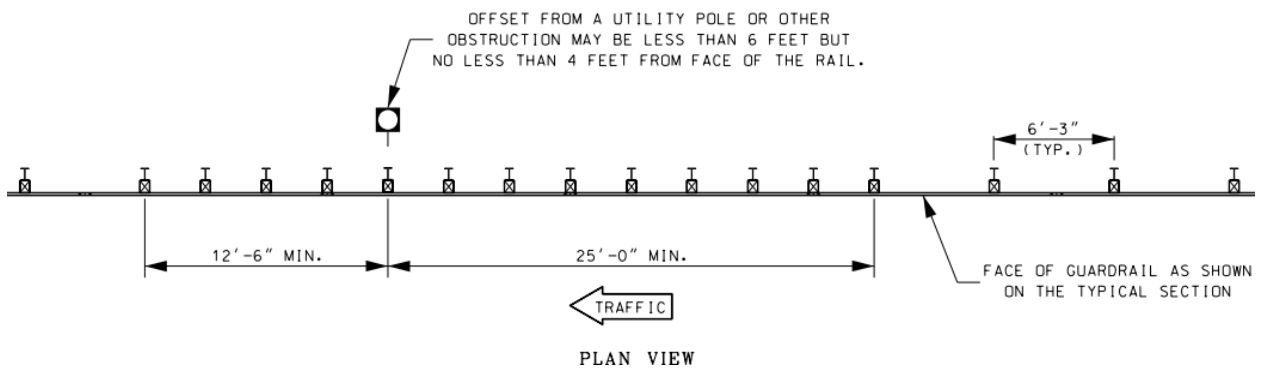


Figure 1 – Utility Pole Stiffening Detail

2) W-Beam Transitions:

On maintenance rehabilitation projects (e.g., resurfacing, guardrail improvements, bridge rehabilitation), existing bridges with non-compliant bridge railing (w-beam) may contain attached highway guardrail that requires updating or replacement. **See Figure 2 examples below.**



Figure 2 – Examples of W-Beam Bridge Rail in Need of Transition

The proposed replacement for this bridge railing is usually still some kind of w-beam railing due to the limitation of the designed structure. See a) through c) below for three typical encountered types of w-beam bridge railing and their approach transition rehab pay items.

Note: Proposed options shown below do not meet the current guidelines of MASH. However, if there is confined space due to a side road or driveway on a limited scope project, guardrail improvements noted below are a significant safety improvement to the existing condition.

a). T-101 With Reduced Approach Transition Length:

If the existing or proposed bridge railing is T-101 (w-beam backed with a steel tube) and is constrained by a nearby driveway or side road such that standard T-101 approach railing will not fit, a reduced transition can may be proposed. **See Figure 3 below & attachment of guardrail note example.**

Use Item 606.012 - W6x9 Steel Post Replacement for Beam Guardrail and Item 606.0122 - Steel Post Assemblies for Beam Guardrail Posts, along with Item 606.18001 - 31" W-Beam Guardrail (standard layout). Item 606.012 and 606.0122 shall be used to account for the additional posts beyond the standard 6'-3" layout of Item 606.18001. A detail shall be provided in the contract plan set showing the intended transition and the appropriate number of extra posts and extra post assemblies shall be included in the estimate.



Figure 3 – Existing Bridge Steel Rail and Reduced Length W-Beam Transition Example

b). Double Nested W-Beam Approach Transition, Reduced Length:

If the existing or proposed bridge railing is double nested w-beam that is in a constrained location, a shortened transition may be needed. **See an example of shortened w-beam transition in Figure 4 below.**

Include separate post and post assemblies items in the contract. Item 606.012 - W6x9 Steel Post Replacement for Beam Guardrail and Item 606.0122 - Steel Post Assemblies for Beam Guardrail Posts shall be used, along with Item 606.18001, 31" W-Beam Guardrail (standard layout). Item 606.012 and 606.0122 shall be used to account for the additional posts beyond the standard 6'-3" layout. A detail shall be provided in the contract plan set showing the intended transition and the appropriate number of extra posts and extra post assemblies shall be included in the estimate.



Figure 4 – Existing Bridge W-Beam Rail and Reduced Length W-Beam Transition Example

c). Double Nested W-Beam Approach Transition, Full Length:

If the existing or proposed bridge railing is double nested w-beam, and is *not* constrained, there is no standard MASH transition developed to apply. However, there is a similar application of MASH tested transition that could serve in the meantime. This transition is 25 feet long and has rub-rail to reduce snagging the vertical face of concrete barrier in the tested case. **See Figure 5 below.** The applied layout for steel post bridge rail would not require the rub-rail. The steel bridge post layout would have 7 spaces at 1'-6³/₄", followed by 4 spaces at 3'-1¹/₂", equaling 25 ft long. The nested rail would extend a distance from the bridge rail, depending on the layout of posts, but at least 6'-3". **See Figure 6 below.** Perhaps a steel post future test would lead to a shorter length, but for now the concrete barrier MASH test length will be used.

If at some point a detail is accepted, a separate unit item may be created for the w-beam transition. Until then, separate post and post assemblies items shall be included. Item 606.012 – W6x9 Steel Post Replacement for Beam Guardrail and Item 606.0122 – Steel Post Assemblies for Beam Guardrail Posts shall be used along with Item 606.18001 - 31" W-Beam Guardrail (standard layout). Item 606.012 and 606.0122 shall be used to account for the additional posts beyond the standard 6'-3" layout. A detail shall be provided in the contract plan set showing the intended transition and the appropriate number of extra posts and extra post assemblies included in the estimate.

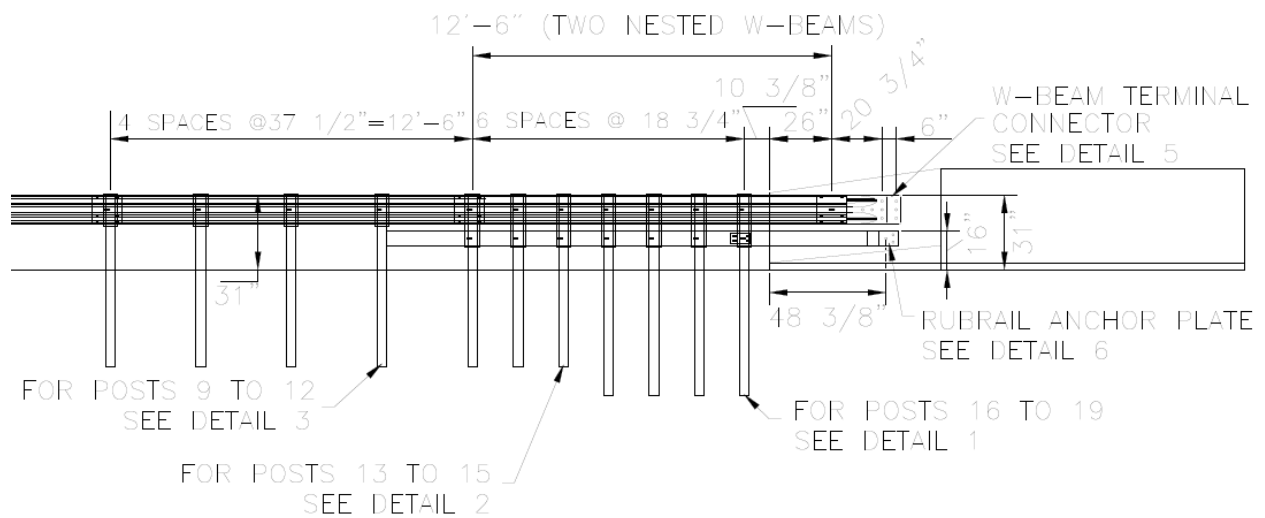


Figure 5 – MASH W-Beam Transition to Concrete Barrier

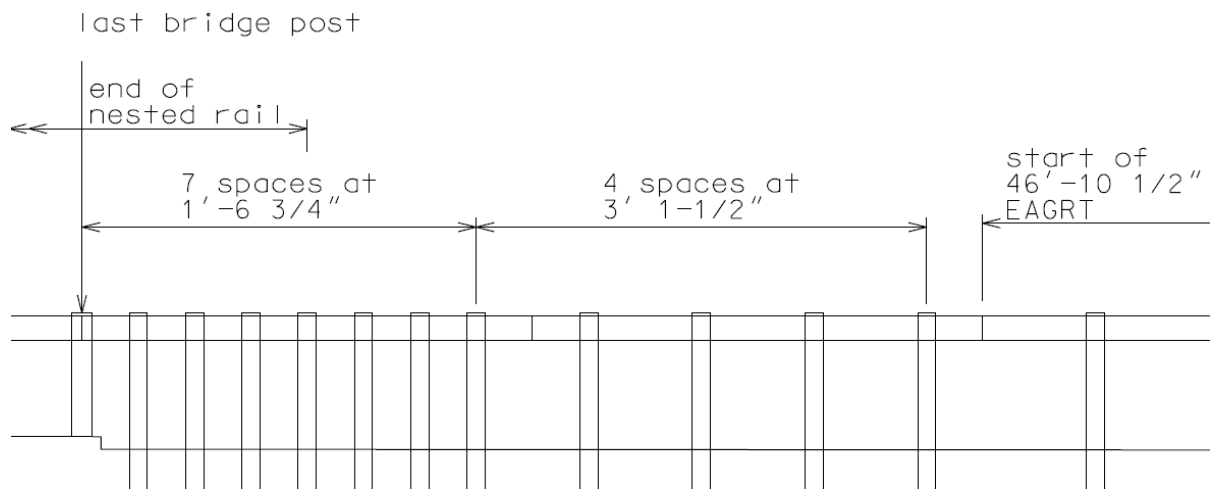
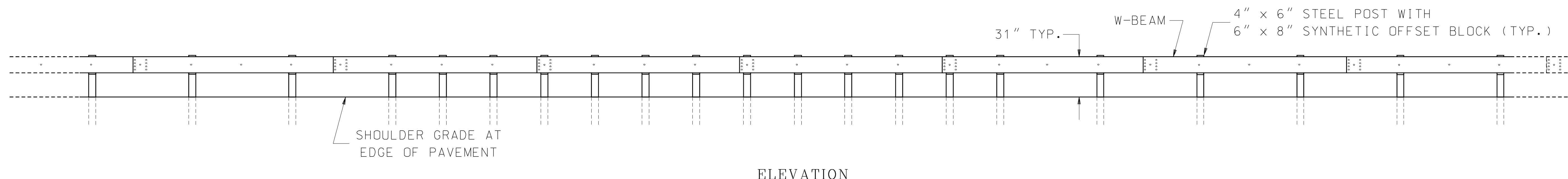
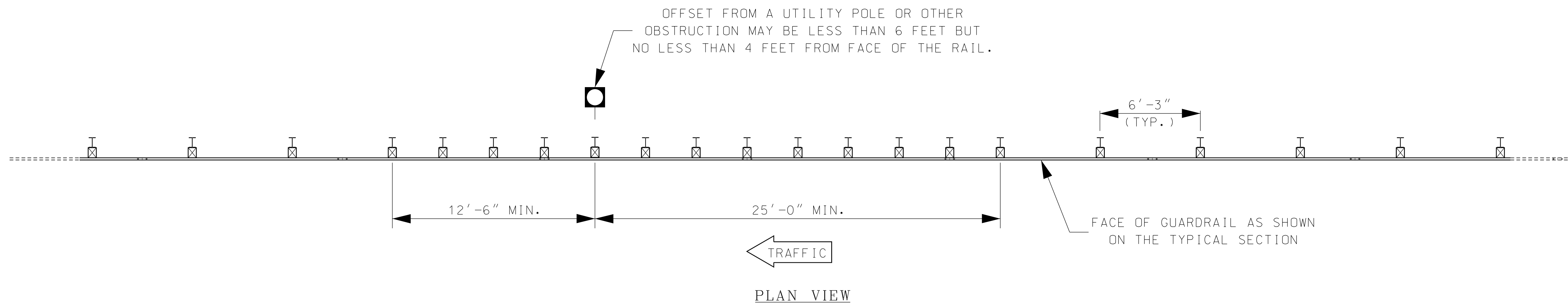


Figure 6 – Draft Steel Rail Full Length W-Beam Transition

Attachments: Mid-Splice Guardrail Stiffening Detail, Reduced Post Notes Example

Noted by: ABH & LRBC



STANDARD SECTION

GENERAL NOTES

- 1) THIS TREATMENT IS ONLY TO BE USED WHEN THE OBSTRUCTION CANNOT PRACTICALLY BE MOVED OR OTHERWISE BE MADE SAFE WITHIN THE ZONE OF INTRUSION AS NORMALLY REQUIRED. ADDITIONAL ITEMS NEEDED TO CONSTRUCT THIS DETAIL WILL BE PAID FOR UNDER:
- 2) ITEM 606.012 - W6x9 STEEL POST REPLACEMENT FOR BEAM GUARDRAIL.
ITEM 606.0122 - STEEL POST ASSEMBLIES FOR BEAM GUARDRAIL POSTS.
- 3) DETAIL ABOVE REFLECTS USE OF GUARDRAIL BEAM PANELS WITH HOLES FOR ATTACHING POSTS AT 3'-1 1/2" C.C. SPACING.
- 4) 12'-6" W-BEAM PANELS SHOWN, 25'-0" ALLOWED.

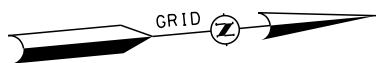
STATE OF NEW HAMPSHIRE SPECIAL DETAILS				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
MID-SPLICE W-BEAM GUARDRAIL STIFFENING DETAIL				

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
2-25-2015	gr-stiff-detail	-	6	12

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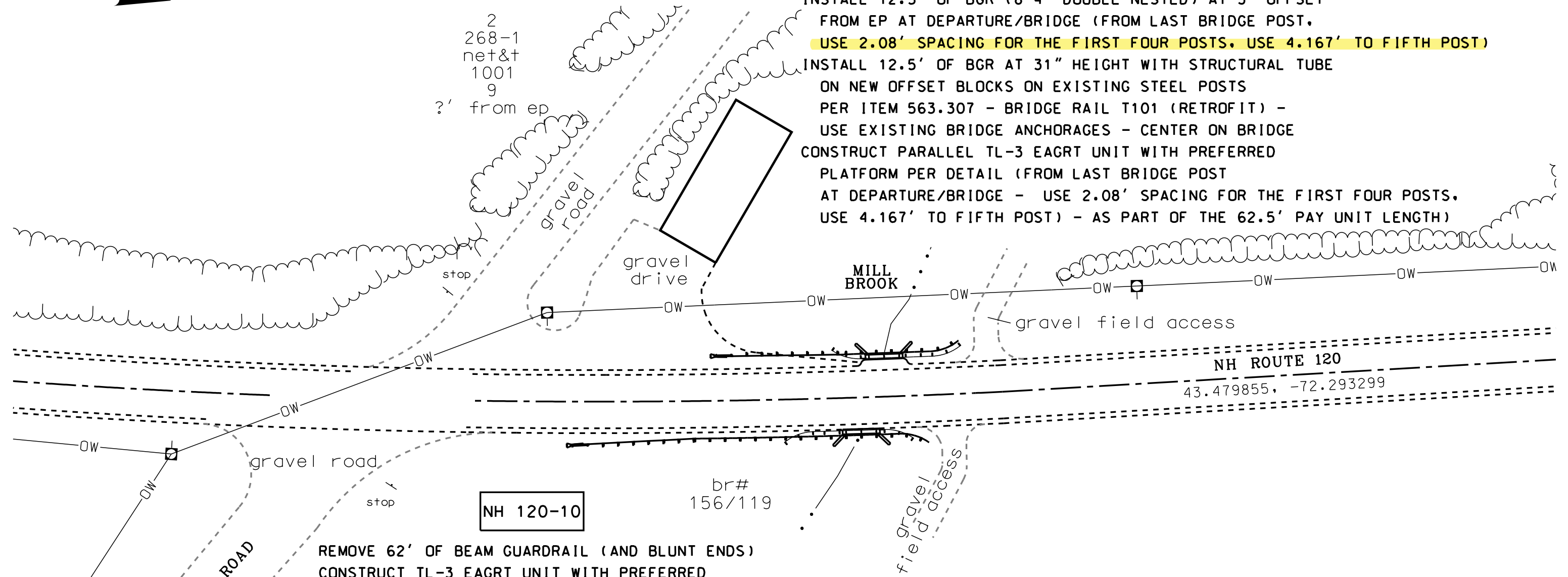
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REMOVE 62.5' OF BEAM GUARDRAIL (AND BLUNT ENDS)
 INSTALL 12.5' BGR (WITH R=20') ON THE APPROACH, AT 28" IF POSSIBLE
 6' AHEAD FROM EXISTING FIRST POST
 INSTALL 12.5' OF BGR (8'4" DOUBLE NESTED) AT 3' OFFSET
 FROM EP AT DEPARTURE/BRIDGE (FROM LAST BRIDGE POST,
USE 2.08' SPACING FOR THE FIRST FOUR POSTS, USE 4.167' TO FIFTH POST)
 INSTALL 12.5' OF BGR AT 31" HEIGHT WITH STRUCTURAL TUBE
 ON NEW OFFSET BLOCKS ON EXISTING STEEL POSTS
 PER ITEM 563.307 - BRIDGE RAIL T101 (RETROFIT) -
 USE EXISTING BRIDGE ANCHORAGES - CENTER ON BRIDGE
 CONSTRUCT PARALLEL TL-3 EAGRT UNIT WITH PREFERRED
 PLATFORM PER DETAIL (FROM LAST BRIDGE POST
 AT DEPARTURE/BRIDGE - USE 2.08' SPACING FOR THE FIRST FOUR POSTS,
 USE 4.167' TO FIFTH POST) - AS PART OF THE 62.5' PAY UNIT LENGTH)



REMOVE 62' OF BEAM GUARDRAIL (AND BLUNT ENDS)
 CONSTRUCT TL-3 EAGRT UNIT WITH PREFERRED
 PLATFORM PER DETAIL 81.5' BACK FROM EXISTING FIRST POST
 INSTALL 25' OF BGR AT 2' OFFSET FROM EP AT APPROACH
 INSTALL 25' T101 BRIDGE APPROACH UNIT (ITEM 606.1285)
 INSTALL 12.5' OF BGR AT 31" HEIGHT WITH STRUCTURAL TUBE
 ON NEW OFFSET BLOCKS ON EXISTING STEEL POSTS
 PER ITEM 563.307 - BRIDGE RAIL T101 (RETROFIT) -
 USE EXISTING BRIDGE ANCHORAGES - CENTER ON BRIDGE
 INSTALL 12.5' OF BGR (8'4" DOUBLE NESTED) AT 3.5' OFFSET FROM EP AT DEPARTURE/BRIDGE
(FROM LAST BRIDGE POST, USE 2.08' SPACING FOR THE FIRST FOUR POSTS)
USE 4.167' TO FIFTH POST
 INSTALL 12.5' BGR (WITH R=20') ON THE DEPARTURE, AT 28" IF POSSIBLE

NH 120-10

br#
156/119

CLARK CAMP ROAD

POSTED SPEED: 55 MPH ADT: 2,600 NOT TO SCALE

TOWN OF
CORNISH

STATE OF NEW HAMPSHIRE				
STATEWIDE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
GENERAL PLANS				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
GEN16	43131genplans	43131	47B	65