From:	Butler, Steve
To:	Hackenbracht, Jeff; Saeed, Shirwan
Subject:	FW: Pages from PID 117607_FRA-161-15.80 Noise Walls_Stage 2_01-22-24_Markups.pdf
Date:	Thursday, March 21, 2024 11:27:24 AM
Attachments:	image001.png

Please see response in Magenta below.

Steven Butler PE
Associate - Principal
23 Triangle Park Drive | Cincinnati | OH | 45246 | USA
T: +1 513 942 3141 ext 51915
www.arcadis.com

Jeff,
Below are Mike Loeffler's (blue) and my (green) responses to your questions. Let me know if you'd like me to set up a meeting with Mike.
Thanks,
Katie

From: Hackenbracht, Jeff <jeff.hackenbracht@arcadis.com>
Sent: Monday, March 18, 2024 11:35 AM
To: Montoya, Katherine <Katherine.Montoya@dot.ohio.gov>
Cc: Saeed, Shirwan <shirwan.saeed@arcadis.com>; Butler, Steve <steven.butler@arcadis.com>; Kelley, Jenn <jennifer.kelley@arcadis.com>
Subject: FW: Pages from PID 117607_FRA-161-15.80 Noise Walls_Stage 2_01-22-24_Markups.pdf

Hi Katie,

Our structural staff has a few Stage 2 comments that we have provided responses for ODOT's consideration and/or requests for additional guidance. Please see below for the comments.

Your help in coordinating answers to our responses would be appreciated. If we need to have a follow up call, please advise.

Thanks,
jeff

From: Saeed, Shirwan <shirwan.saeed@arcadis.com>
Sent: Monday, March 18, 2024 11:27 AM
To: Hackenbracht, Jeff <jeff.hackenbracht@arcadis.com>; Butler, Steve <steven.butler@arcadis.com>
Cc: Jennifer Kelley <jennifer.kelley@ibigroup.com>
Subject: RE: Pages from PID 117607_FRA-161-15.80 Noise Walls_Stage 2_01-22-24_Markups.pdf

Good morning Jeff,

Few questions for ODOT:

1. Comment on P.199: General question - is there any reason the back-up bracket has to be an L4x3x5/16 and not just a 4x5/16 plate weld to the web. The use of the straight plate aids in less material, less maintenance issues, and warping issues during galvanizing.
   Arcadis Response: We believe that use of plates could lead to fatigue issues over time. Arcadis respectfully recommends utilizing the L shape.

This question stemmed from several details that were inconsistent in the plans. The plans submitted showed the angle attached two different way, one sheet showed the angle connected with a bolt. No information was given on bolt spacing, type of connection, or if the angle was to be galvanized prior too or after bolting. A second detailed, of the same post, showed the angles welded to the post web. The weld was shown only along the outstanding leg to the post web. The weld detailed had additional fabrication issues to be addressed. So, from the response they elected to go with bolting, which OSE has not seen any details.

If the consultant would like to use fatigue on the weld as a maintenance concern. Could they please state what the stress cyclic levels are on the weld holding the panels and should ODOT be concerned with the welded details at the column to base plated connection?

Arcadis Response: The original intent was to attach an angle to the steel posts by welding before galvanizing except at skewed posts where bolting connections allowed for adjustments as needed for better seating. The previous details were incomplete and did not fully show this. Based upon comments received and discussions, we believe that utilizing a welded connection to both sides of the angle would be the best connection method as the number of bolts required to meet the sealing requirements of AASHTO 6.13.2.6 would be excessive. It should be noted that the bottom buried panels in areas of sloped backfill will likely need to be thicker to accommodate the earth pressure. With these bottom panels likely being thicker, they would not slide between the flange and welded angle and would need to be bolted in at the bottom. A detail has been provided to show this.

2. Comment on P.200: Don't include post caps. From previous installations, they do not hold up well.
   Arcadis Response: Please confirm. It was our understanding that this was an aesthetic requirement for this project.
   Only the post covers and panel colors were part of the aesthetic requirement. Noel's experience shows the caps do not last so they can be left off on this project. Ensure the post covers extend to the top of post.
   Arcadis Response: Complied. The caps have been removed from the plans.

3. Comment on P.200: How do covers work at skewed post?
   Arcadis Response: A fabricator has been contacted to ask this question. Fiber Glass cover can be installed on skewed posts with the use of shims.

OSE has no issues with this detail. Please be sure the shims are to be part of the manufactured system and any adhesive to be used.

Arcadis Response: Complied. The shim specifications have been added.

ITEM SPECIAL - NOISE BARRIERS

GENERAL NOTES:

DESCRIPTION:

THIS WORK CONSISTS OF PREPARING ANY NECESSARY SHOP DRAWINGS, AND MANUFACTURING, TESTING, TRANSPORTING, STORING, AND INSTALLING NOISE BARRIERS; FURNISHING AND INSTALLING DRILLED SHAFTS; EXCAVATING AND BACKFILLING; AND RESTORING THE WORK AREA IN ACCORDANCE WITH THESE PROVISIONS AND IN CONFORMITY WITH THE DIMENSIONS, LINES AND GRADES SHOWN ON THE PROJECT PLANS. ALL APPLICABLE REQUIREMENTS OF THE STANDARD BRIDGE DRAWING NBS-1-09 SHALL BE MET UNLESS DIRECTED OTHERWISE BY THIS PLAN SET.

STANDARD DRAWINGS:

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWINGS:
NBS-1-09 REVISED 01-15-21

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO THE 9TH EDITION OF THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2020, AND THE ODOT BRIDGE DESIGN MANUAL, 2020

DESIGN LOADING:

WIND LOAD: APPLIED WIND LOAD ON POSTS AND PANELS IS 35 PSF.
ICE LOAD: APPLIED ICE LOAD IS 3 INCHES AT 57.3 PCF = 14.32 PSF

MATERIAL SPECIFICATIONS:

REINFORCING STEEL:
REINFORCING STEEL SHALL BE EPOXY-COATED AS PER CMS 709.00 OR GALVANIZED AS PER CMS 709.16.
THE REQUIREMENTS OF 509.09 SHALL APPLY TO BOTH EPOXY-COATED AND GALVANIZED REINFORCING STEEL.
REINFORCING STEEL SHALL CONFORM TO CMS 709.01, GRADE 60.

CONCRETE:
CONCRETE CLASS QC5 = 4,000 PSI (DRILLED SHAFTS)
CONCRETE FOR DRILLED SHAFTS SHALL CONFORM TO CMS 524.

STRUCTURAL STEEL:
ASTM A709, GRADE 50 AS PER CMS 711.01.

PANELS, POST COVERS AND CAPS:
NOISE BARRIER PANEL, POST COVER AND CAP MATERIALS SHALL BE GLASS FIBER REINFORCED PULTRUSION BY CARSONITE COMPOSITES OR AN APPROVED EQUAL. REFER TO SHEET P.200 FOR EXAMPLE SCHEMATIC PANEL, POST COVER AND CAP DETAILS.

FASTENERS:
ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 105
THREADED RODS SHALL BE DEFORMED, ONE-END THREADED, ASTM A615, GRADE 60
NUTS SHALL BE ASTM A563, GRADE DH
WASHERS SHALL BE ASTM F436

GALVANIZING:

GALVANIZE ALL STEEL POSTS, STRUCTURAL STEEL, BASE PLATES, ANCHOR BOLTS, THREADED RODS, NUTS, AND WASHERS AS PER CMS 711.02. ENSURE THAT THE ENTIRE LENGTH OF ANCHOR BOLTS AND THREADED RODS ARE GALVANIZED.

BEARING PADS:

ALL BOTTOM NOISE BARRIER PANELS REQUIRE A NEOPRENE PREFORMED BEARING PAD BETWEEN THE BOTTOM OF THE NOISE PANEL AND THE BEARING SURFACE. THE BEARING PADS SHALL BE A MINIMUM 1/8" THICK AND COVER A MINIMUM OF 25 SQUARE INCHES. THE BEARING PADS SHALL CONFORM TO ODOT CMS SECTION 711.21, PREFORMED BEARING PADS.

DRILLED SHAFTS:

THE NOISE BARRIER POSTS SHALL BE SUPPORTED BY 30" DIAMETER DRILLED SHAFT FOUNDATION.

AVOIDANCE OF UNEXPECTED OBSTRUCTIONS:

IF THE AVOIDANCE OF UNEXPECTED UTILITIES OR OTHER OBSTRUCTIONS REQUIRES THE USE OF CLOSER POST SPACINGS THAN WHAT WAS SHOWN ON THE PROJECT PLANS FURNISH AND INSTALL ADDITIONAL FOUNDATIONS, POSTS, AND PANELS AS DIRECTED BY THE ENGINEER. THE ADDITIONAL FOUNDATIONS, POSTS, AND PANELS SHALL CONFORM TO THESE STANDARD DRAWINGS AND PROVISIONS. THE TOP AND BOTTOM ELEVATIONS OF THE ADDITIONAL POSTS AND PANELS, AND PANEL JOINT LOCATION.

SHOP DRAWINGS:

PROVIDE SHOP DRAWINGS FOR ALL NOISE WALL COMPONENTS THAT REQUIRE SHOP FABRICATION. INCLUDE THE FABRICATION SCHEDULE FOR ALL NOISE BARRIER WALL COMPONENTS IN THE PROJECT PROGRESS SCHEDULE AS REQUIRED BY C&MS 108.02.

NOISE BARRIER PANELS AND POSTS:

THE NOISE BARRIER PANELS, POST COVER AND CAPS SHALL BE GLASS FIBER REINFORCED, AND FABRICATED AND INSTALLED PER MANUFACTURER'S WRITTEN INSTRUCTIONS. THE SURFACE TEXTURE AND FINISH COLOR SHALL BE AS SHOWN IN THE PLANS. THE MANUFACTURER SHALL DESIGN AND PROVIDE SUPPLEMENTARY REINFORCEMENT FOR THE BOTTOM PANELS INSTALLED BELOW FINISHED GRADE SEALED AND SIGNED BY AN OHIO REGISTERED PROFESSIONAL ENGINEER.

CONSTRUCTION METHODS:

CONSTRUCTION METHODS SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD BRIDGE DRAWING NBS-1-09.

METHOD OF MEASUREMENT:

THE DEPARTMENT WILL MEASURE THE NOISE BARRIER BY THE NUMBER OF SQUARE FEET.

THE DEPARTMENT WILL DETERMINE THE AREA OF INDIVIDUAL NOISE BARRIER SEGMENTS FROM PROJECT PLAN DIMENSIONS USING A HEIGHT FROM THE BOTTOM OF THE BOTTOM PANEL TO THE TOP OF THE CAP ON THE TOP PANEL, AND SPAN LENGTHS MEASURED FROM CENTER TO CENTER POSTS.

BASIS OF PAYMENT:

PAYMENT FOR NOISE BARRIERS IS FULL COMPENSATION FOR FURNISHING AND INSTALLING FOUNDATIONS, POSTS INCLUDING APPARATUS SUCH AS BACKUP BRACKETS, SUPPORT BRACKETS AND BENT PLATES, PANELS, POST COVERTS AND CAPS, STEEL BASE PLATES AND CONNECTIONS, ARCHITECTURAL SURFACE TREATMENTS, SAMPLE POST(S) AND PANEL(S), BEARING PADS, EXCAVATION, DRAINAGE AND BACKFILL, AND OTHER ITEMS THAT DO NOT HAVE SEPARATE PAY ITEMS BUT ARE NECESSARY TO COMPLETE THE NOISE BARRIER.

THE DEPARTMENT WILL PAY FOR THE ADDITIONAL LENGTH OF DRILLED SHAFTS CONSTRUCTED AT THE DIRECTION OF THE ENGINEER IN UNEXPECTED AREAS OF POOR SOIL AS EXTRA WORK IN ACCORDANCE WITH C&MS 109.05.

THE DEPARTMENT WILL PAY FOR THE ADDITIONAL FOUNDATIONS, POSTS, AND PANELS FURNISHED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO AVOID UNEXPECTED UTILITIES OR OTHER OBSTRUCTIONS AS EXTRA WORK IN ACCORDANCE WITH C&MS 109.05.

WHERE THE DRILLED SHAFT LENGTH WAS DECREASED FROM THE PROJECT PLAN DIMENSION DUE TO INTERFERENCE WITH UNEXPECTED BEDROCK, THE DEPARTMENT WILL NON-PERFORM THE SHAFT LENGTH BELOW THE BEDROCK ELEVATION AND PAY FOR THE ROCK SOCKET AND INCIDENTALS AS EXTRA WORK ACCORDING TO C&MS 109.05.

THE DEPARTMENT WILL NOT PAY FOR REPAIRED OR REPLACED COMPONENTS DAMAGED BY IMPROPER HANDLING, TRANSPORTING, STORING, OR ERECTING.

THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES AT THE CONTRACT PRICES AS FOLLOWS:

ITEM 606 - SPECIAL - NOISE BARRIER (REFLECTIVE)

consider changing to "post covers and post caps"

Arcadis Response: No longer applicable as post caps will no longer be used.

Not sure what this means or loads to be used?

Arcadis Response: Some of the bottom panels are subjected to earth pressure as they are placed below grade within a slope. It is the intent for the manufacturer to design the bottom panels to account for this earth pressure. The grade information can be obtained from wall cross sections. It is the intent for the loads to be determined by the manufacturer's engineer. This note has been updated for clarity.

OSE is recommending the use of expandable foam to fill the gap between the base plate and top of 30" drilled shaft to increases the corrosion resistance of the proposed detail. We recommend the designer add call outs and notes for expendable foam similar to Supplemental Specification 842 or SS 864

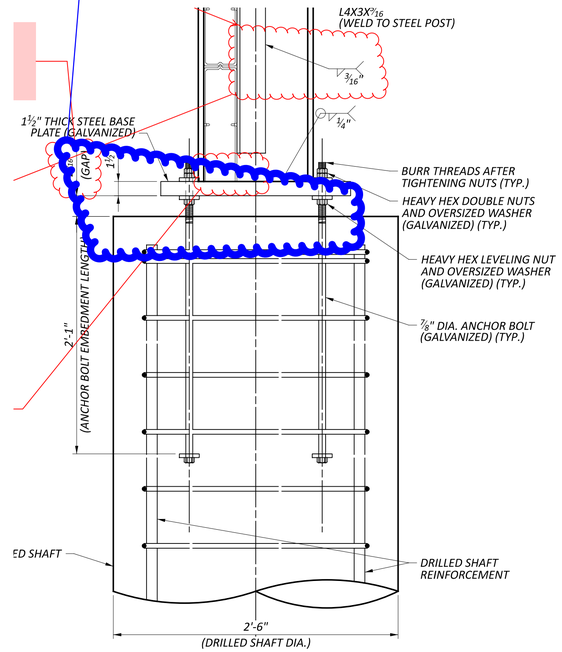
Arcadis Response: Complied.

Please clarify if a bearing pad is required between each 1'-0" panel or only at the base plate or support angle.

Arcadis Response: Bearing pads are only required for the bottom panel supported on the baseplate and support angles. The note has been reworded for clarity.

ADD STATEMENT SIMILAR TO NBS-1-09 "CONSTRUCT DRILLED SHAFTS ACCORDING TO C&MS 524"

Arcadis Response: Complied.



STEEL BASE PLATE ELEVATION

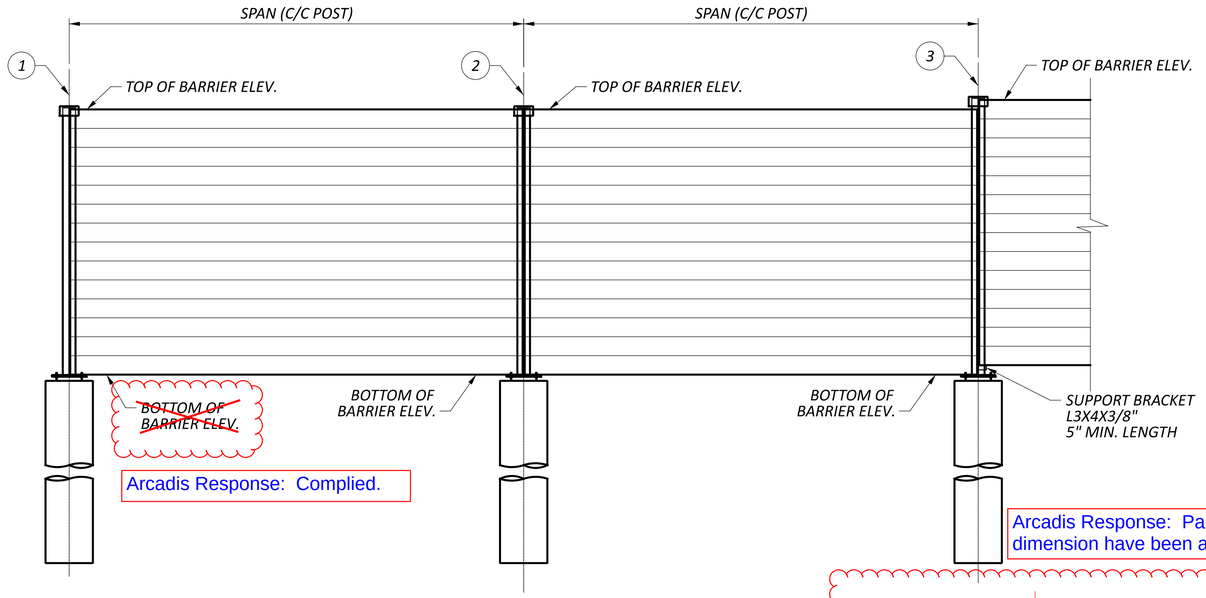
NOISE WALL GENERAL NOTES
WALLS 3, 6, 8, 9, 11, 12, & 15

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 818-4900
www.arcadis.com

DESIGNER AIS
REVIEWER SS 01-12-24
PROJECT ID 117607
SHEET P.197 TOTAL P.276

FRA-15.80 NOISE WALLS

MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 2024-01-19 TIME: 3:22:58 PM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WN001.dgn



PARTIAL ELEVATION

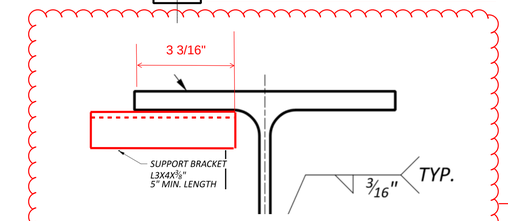
Arcadis Response: Complied.

LEGEND:

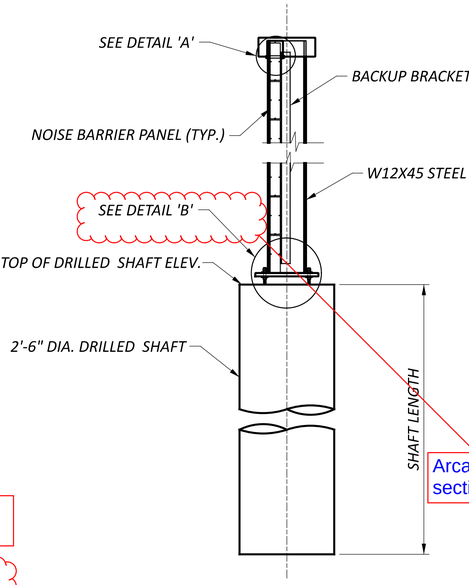
(X) - DRILLED SHAFT NUMBER

NOTES:

1. FOR NOISE WALL PLANS AND PROFILE, SEE SHEETS P.16 TO P.45 .
2. FOR NOISE WALL ELEVATION TABLES, SEE SHEETS P.193 TO P.195.



Arcadis Response: Panel and dimension have been added.

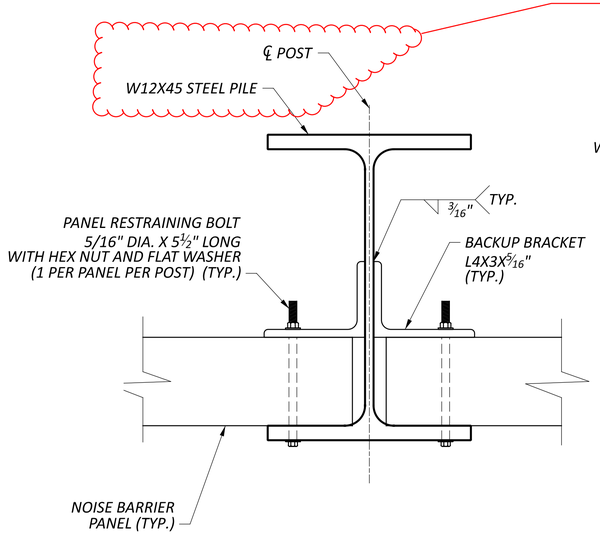


TYPICAL SECTION

Arcadis Response: A second section has been added.

NOT the same detail

Detail sheet 2 of 3 calls the W12x45 "posts" recommend using the same nomenclature to prevent confusion

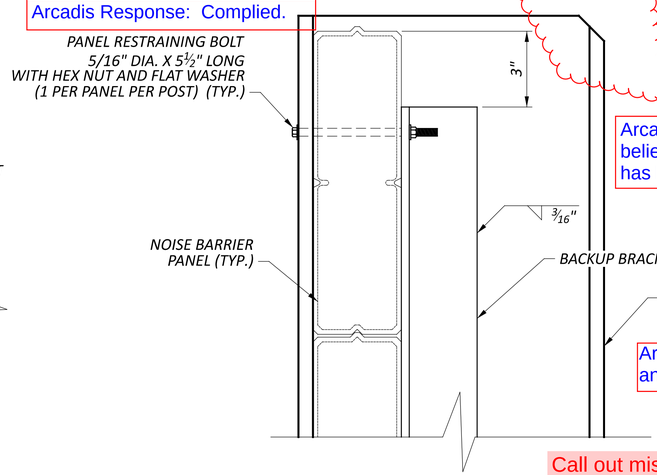


PARTIAL PLAN

Add statement "Post covers not shown"

Arcadis Response: Complied.

Arcadis Response: Complied.



Arcadis Response: Upon further review, we do not believe that this clip is needed here and the detail has been modified accordingly.

Clip dimensions?

Arcadis Response: Bearing pad and callout has been added.

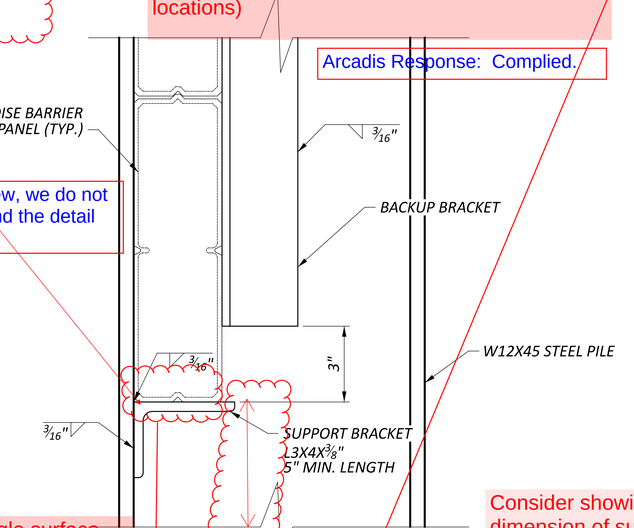
DETAIL 'A'

Post Cap not shown

Arcadis Response: A statement that the "post covers not shown" has been added.

Recommend adding additional detail and show minimum weld length (note start and stop locations)

Arcadis Response: Complied.



DETAIL 'B'

Call out missing for bearing pad - note angle surface isn't 25 sq in.

BEARING PADS:

ALL BOTTOM NOISE BARRIER PANELS REQUIRE A NEOPRENE PREFORMED BEARING PAD BETWEEN THE BOTTOM OF THE NOISE PANEL AND THE BEARING SURFACE. THE BEARING PADS SHALL BE A MINIMUM 1/8" THICK AND COVER A MINIMUM OF 25 SQUARE INCHES. THE BEARING PADS SHALL CONFORM TO ODOT CMS SECTION 711.21, PREFORMED BEARING PADS.

Consider showing dimension of support bracket as the post needs to be fabricated prior to galvanizing.

Arcadis Response: Additional detailing has been added to allow for the manufacturer to determine all dimensions.

NOISE WALL DETAILS – 1 OF 3
WALLS 3, 6, 8, 9, 11, 12, & 15

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 818-4900
www.arcadis.com

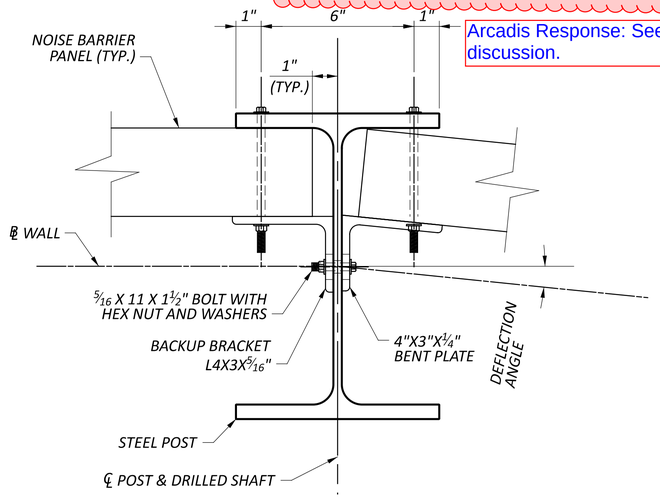
DESIGNER AIS
REVIEWER SS 01-12-24
PROJECT ID 117607
SHEET P.198 TOTAL P.276

FRA-15.80 NOISE WALLS

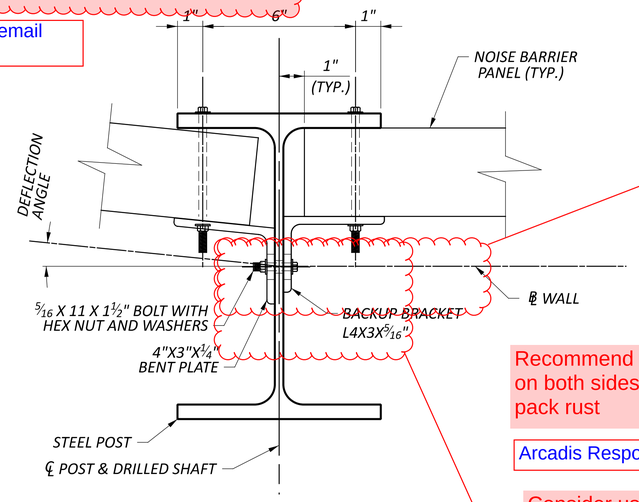
MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 2024-01-19 TIME: 9:44:19 AM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WD002.dgn

General question - is there any reason the back-up bracket has to be an L4x3x5/16 and not just a 4x5/16 plate weld to the the web. The use of the straight plate aids in less material, less maintenance issues, and warping issues during galvanizing

Arcadis Response: See email discussion.



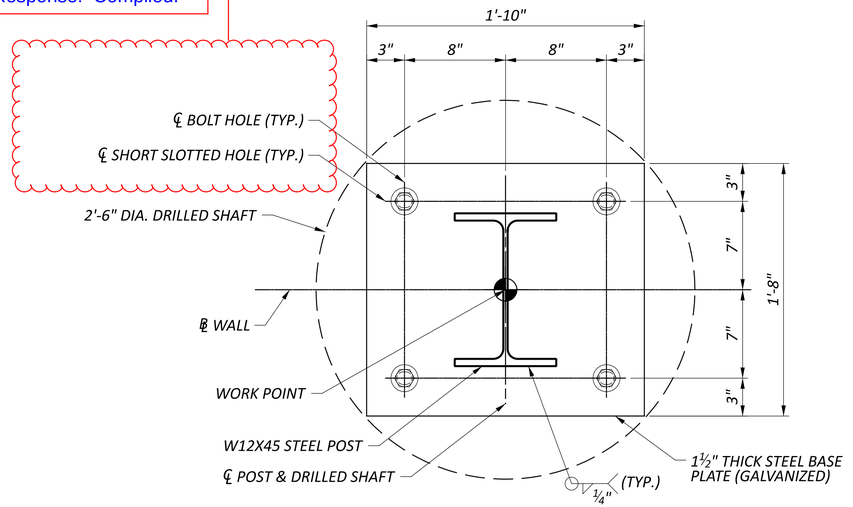
SKEWED POST DETAILS - 1



SKEWED POST DETAILS - 2

Recommend only one call out - show direction of slotted hole and dimensions

Arcadis Response: Complied.



STEEL BASE PLATE PLANS

Recommend using a weld on both sides to prevent pack rust

Arcadis Response: Complied.

Consider using 1/4" increments (note this will change wall elevation tables)

Arcadis Response: Complied.

There is some confusion with attachment of the backup angle to the steel post. Verify backup bracket connection method.

Arcadis Response: This has been modified to the welded connection.

Call out missing for bearing pad

BEARING PADS:

ALL BOTTOM NOISE BARRIER PANELS REQUIRE A NEOPRENE PREFORMED BEARING PAD BETWEEN THE BOTTOM OF THE NOISE PANEL AND THE BEARING SURFACE. THE BEARING PADS SHALL BE A MINIMUM 1/8" THICK AND COVER A MINIMUM OF 25 SQUARE INCHES. THE BEARING PADS SHALL CONFORM TO ODOT CMS SECTION 711.21, PREFORMED BEARING PADS.

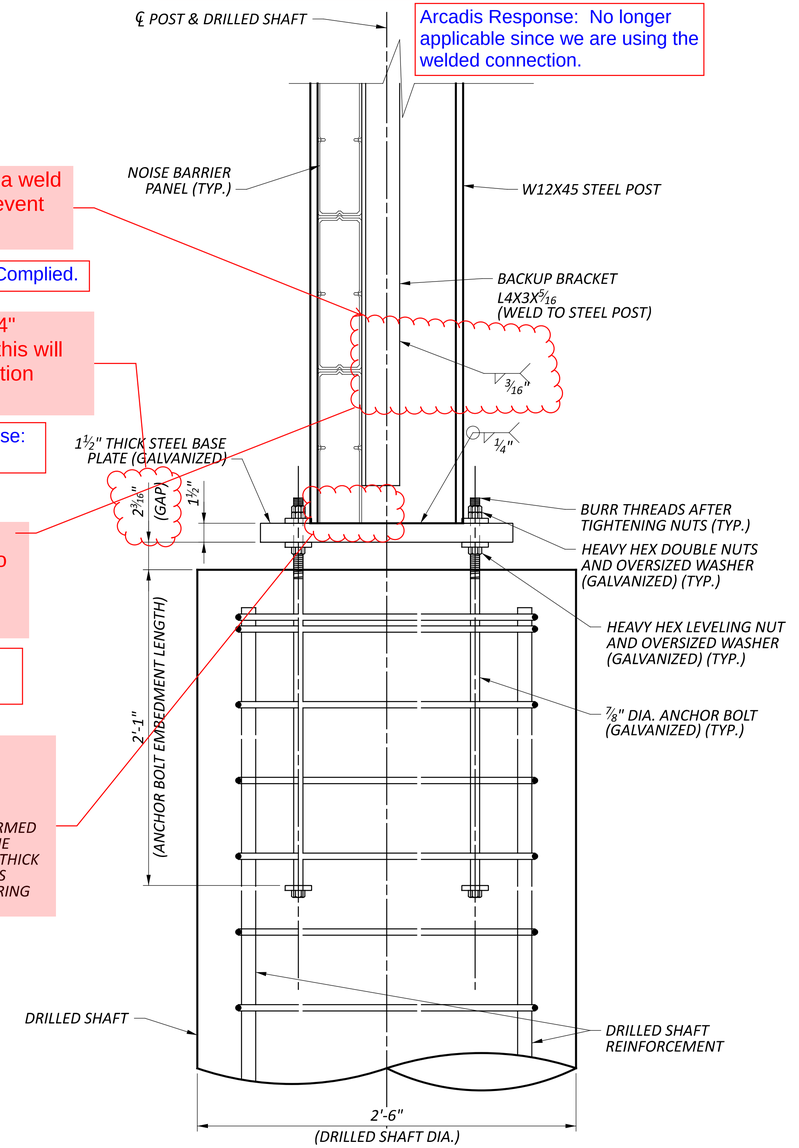
Arcadis Response: Complied.

NOTES:

1. *FOR WALL DEFLECTION ANGLES, SEE TABLES ON SHEETS P.193 TO P.195.*
2. *FOR ADDITIONAL BASE PLATE AND DRILLED SHAFT NOTES AND DETAILS, REFER TO STD. DWG. NBS-1-09.*

Verify max spacing uses AASTHO 6.13.2.6.2 for sealing against penetration of moisture

Arcadis Response: No longer applicable since we are using the welded connection.



STEEL BASE PLATE ELEVATION

NOISE WALL DETAILS – 2 OF 3
WALLS 3, 6, 8, 9, 11, 12, & 15

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 818-4900
www.arcadis.com

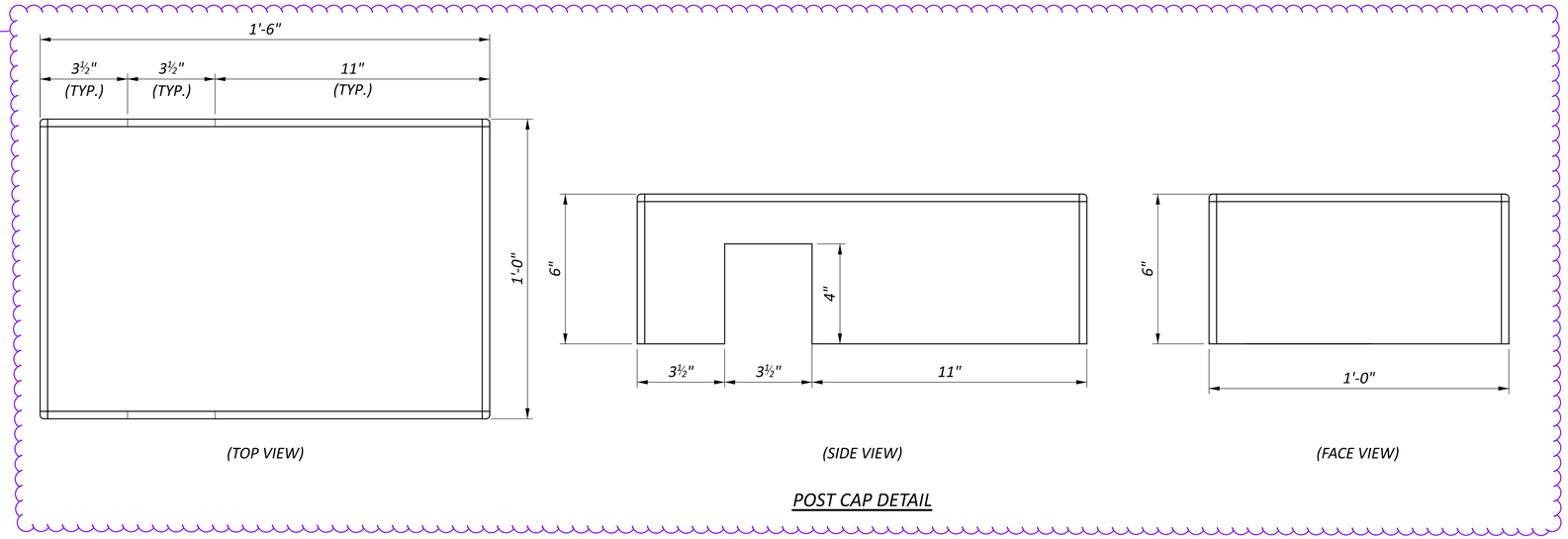
DESIGNER AIS
REVIEWER SS 01-12-24
PROJECT ID 117607
SHEET P.199 TOTAL P.276

FRA-15.80 NOISE WALLS

MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 2024-01-19 TIME: 3:23:11 PM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WD003.dgn

Don't include post caps. From previous installations, they do not hold up well.

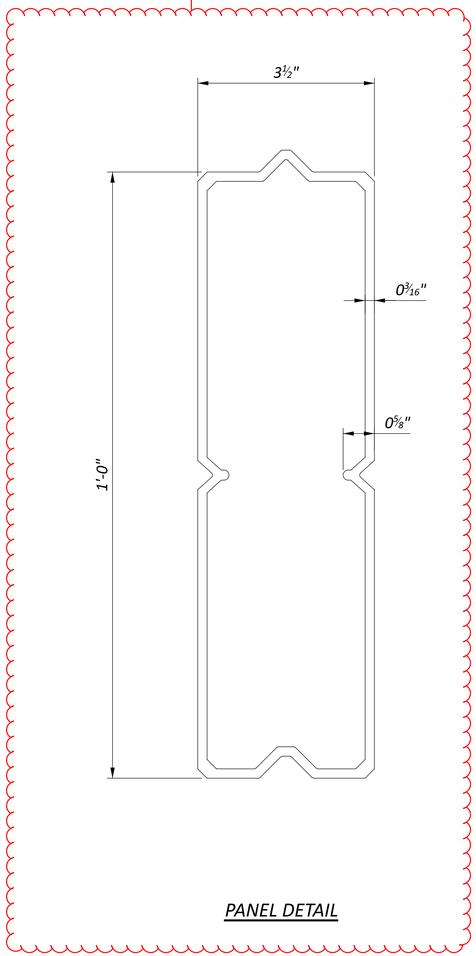
Arcadis Response: See email discussion.



POST CAP DETAIL

Add note about bolt holes - predrilled, fielded drilled, or optional

Arcadis Response: Complied. The holes in the structural steel shall be shop drilled before galvanizing, and the holes in the panels shall be field drilled to aid tight fit.



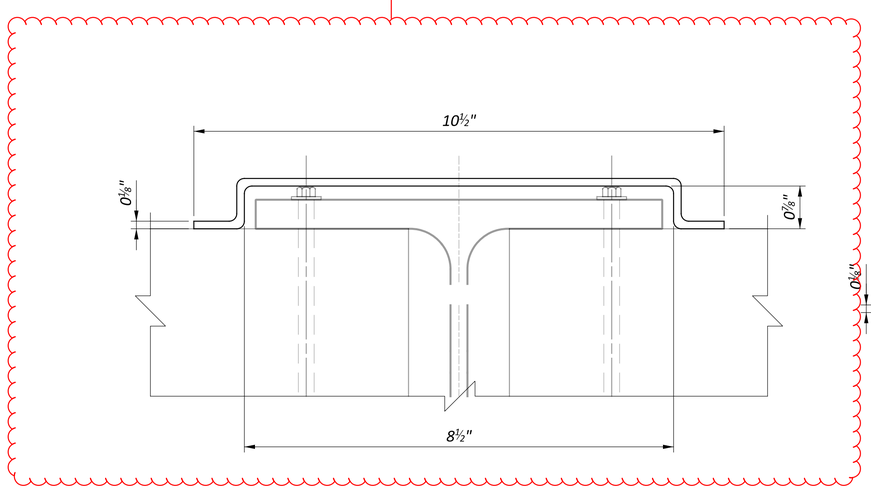
PANEL DETAIL

NOTES:

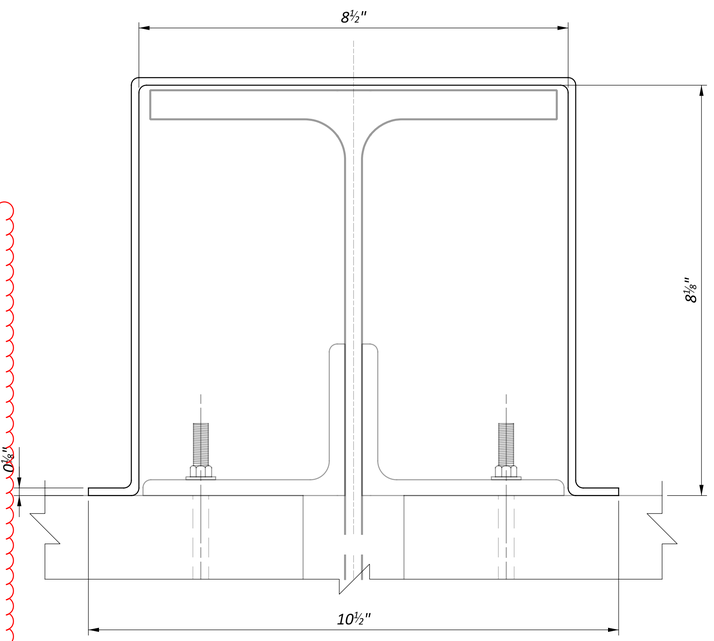
1. INSTALL POST COVER AND CAPS PER MANUFACTURER'S RECOMMENDATIONS.
2. PANELS, POST COVER AND CAPS SHALL BE GLASS FIBER REINFORCED FROM CARSONITE COMPOSITES AS SHOWN OR AN APPROVED EQUAL.

How do covers work at skewed post?

Arcadis Response: See email discussion.



FRONT FACE POST COVER DETAIL



REAR FACE POST COVER DETAIL

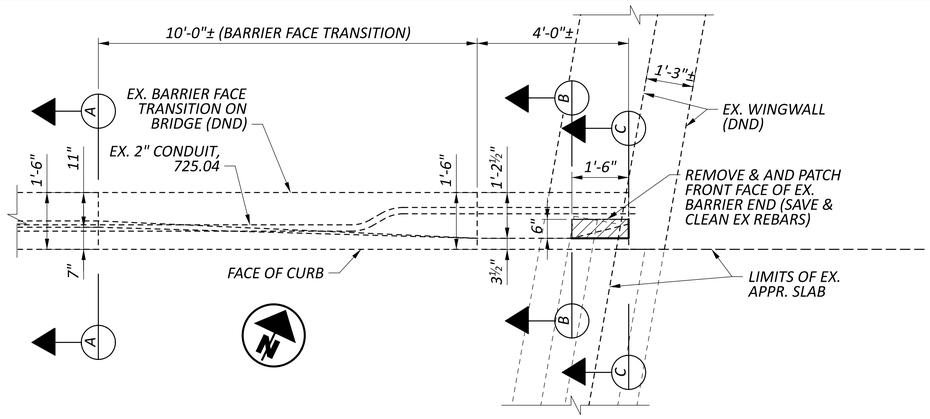
FRA-15.80 NOISE WALLS

MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 2024-01-19 TIME: 9:44:40 AM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WD004.dgn

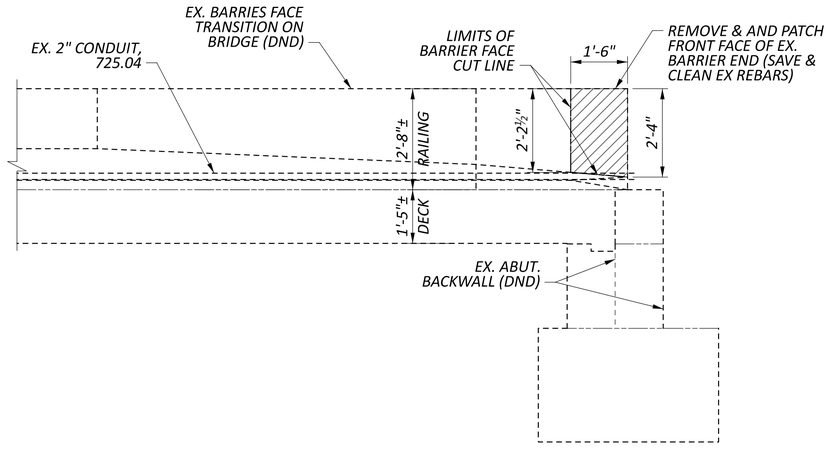
NOISE WALL DETAILS – 3 OF 3
WALLS 3, 6, 8, 9, 11, 12, & 15

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 825-4900
www.arcadis.com

DESIGNER AIS
REVIEWER SS 01-12-24
PROJECT ID 117607
SHEET P.200 TOTAL P.276

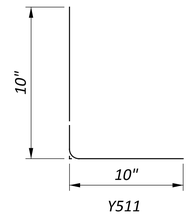


PLAN



ELEVATION

STEEL LIST (For Estimating Purposes Only)					
Mark	Bar	Shape	No.	Length	Weight (lb)
X510	#5	Straight	4	1'-10"	8
Y510	#5	Straight	2	2'-8"	6
Y511	#5	Bent	2	1'-7"	3
				Total =	17



BENDING DIAGRAM

Arcadis Response: Complied.

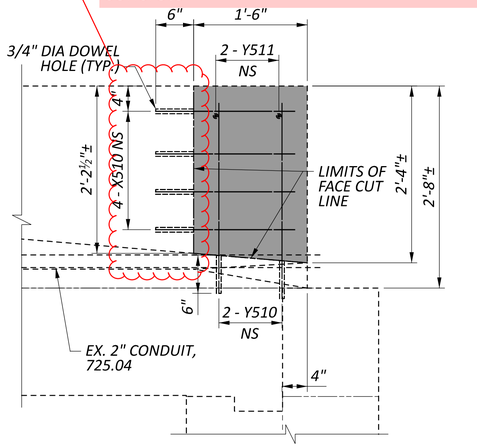
NOTES:

1. REMOVE EX. CONCRETE BARRIER FRONT FACE ON ABUTMENT WINGWALL AS SHOWN. THE COST SHALL BE INCLUDED WITH THE UNIT PRICE FOR ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN FOR PAYMENT.
2. ALL EX. DIMENSIONS ARE ±.
3. INSTALL DOWEL BARS IN ACCORDANCE WITH CMS 510 USING NON-SHRINK NONMETALLIC GROUT.
4. FOR ADDITIONAL CONCRETE RAILING NOTES AND DETAILS, SEE STD. DWG. BR-1-13.
5. PAYMENT FOR PATCHING CONCRETE BARRIER END SECTION SHALL BE MADE AT THE UNIT PRICE FOR ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN AND SHALL INCLUDE ALL MATERIALS, LABOR, DOWEL HOLES AND REINFORCING STEEL REQUIRED TO PATCH THE BARRIER END SECTION AS SHOWN.

Call out appropriate date from archived drawings and add to standard drawing to notes sheet

Arcadis Response: Complied.

Recommend keeping the X510 NS bars, but not doweling the X510 NS bars into the existing concrete. As the original design (TL classification) is not compromised with the additional concrete



ELEVATION
(PATCHING BARRIER END SECTION)

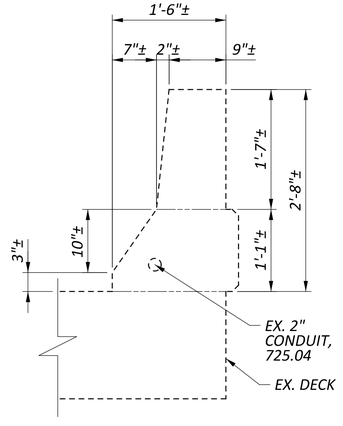
LEGEND:

EX. CONCRETE BARRIER REMOVAL

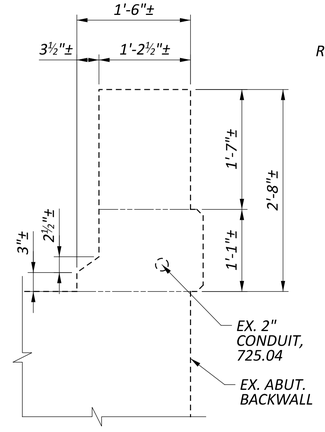
PATCHING OF CONCRETE

ABBREVIATIONS:

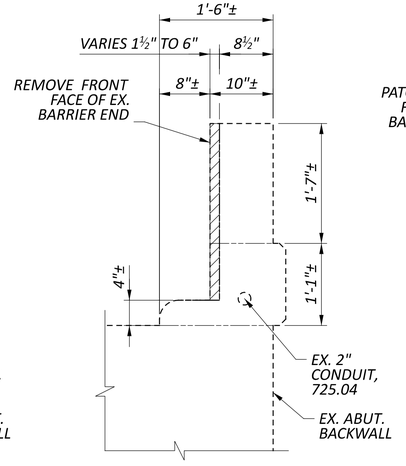
CONST. = CONSTRUCTION
DND = DO NOT DISTURB
ES = EACH SIDE
EX. = EXISTING
FS = FAR SIDE
NS = NEAR SIDE
PEJF = PREFORMED EXPANSION JOINT FILLER
PROP. = PROPOSED
TYP. = TYPICAL



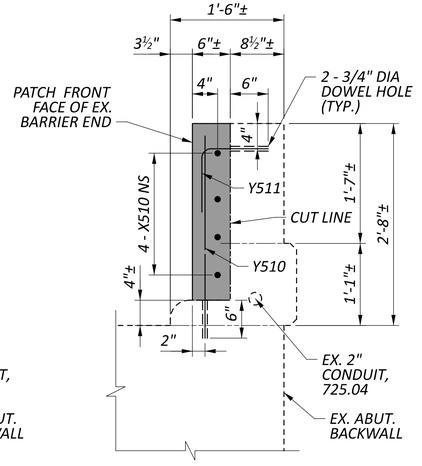
SECTION A-A
(EX. BARRIER)



SECTION B-B
(EX. BARRIER END SECTION)



SECTION C-C
(EX. BARRIER END SECTION REMOVAL)



SECTION C-C
(PATCHING BARRIER END SECTION)

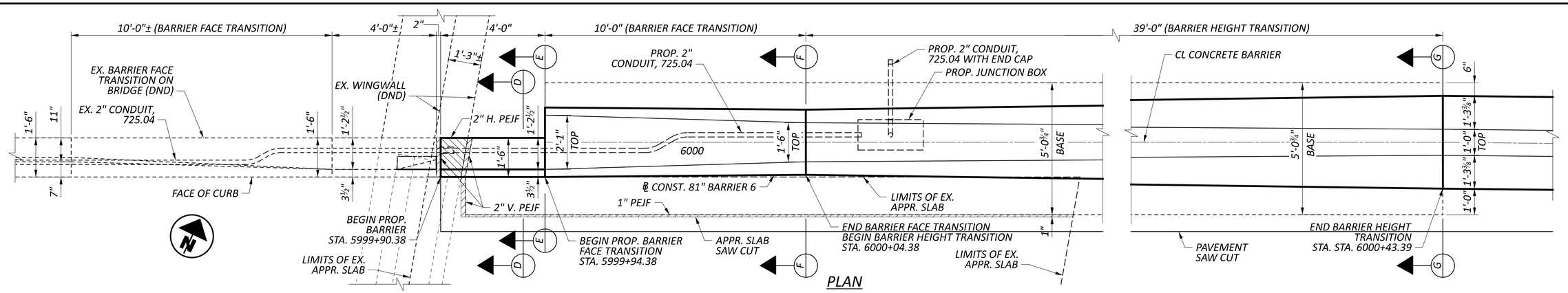
CONCRETE 81" BARRIER 6 END SECTION, AS PER PLAN

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 818-4900
www.arcadis.com

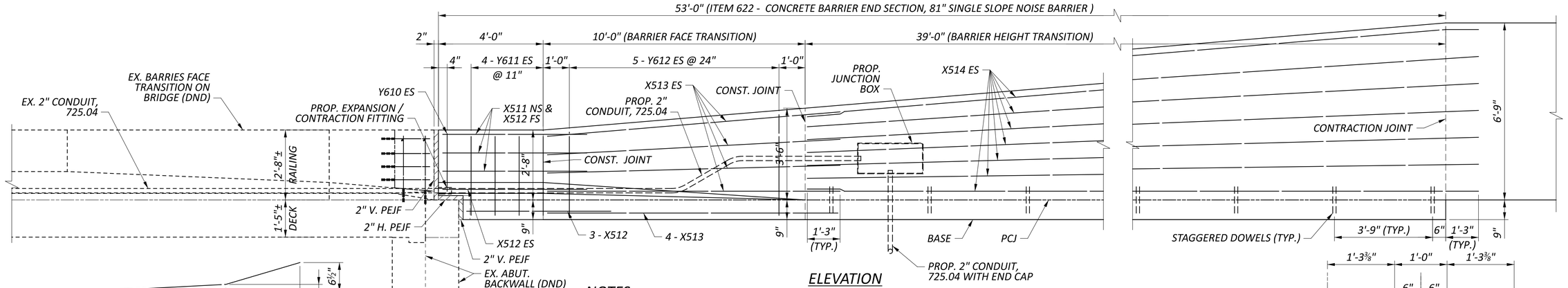
DESIGNER	
SS	
REVIEWER	
JDH	01-22-24
PROJECT ID	
117607	
SHEET	TOTAL
P.201	P.276

FRA-161-15.80 NOISE WALLS

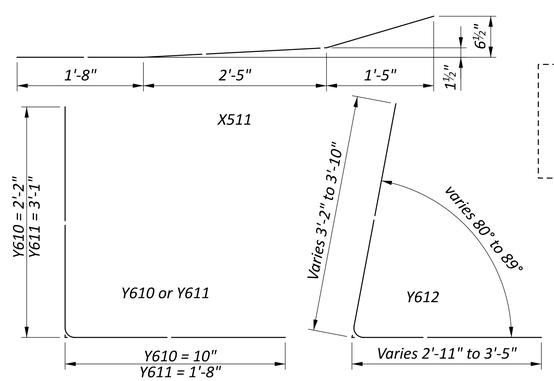
MODEL: SHEET - 1 PAPERSIZE: 34x22 (in.) DATE: 2024-01-22 TIME: 3:40:38 PM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WD001.dgn



PLAN



ELEVATION

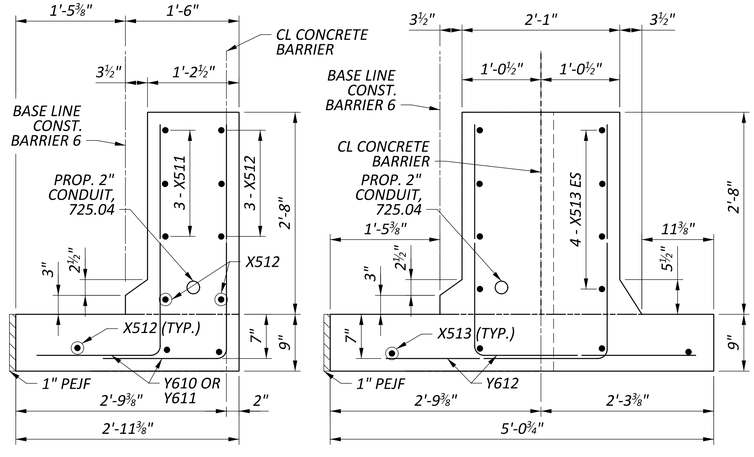


BENDING DIAGRAMS

STEEL LIST (For Estimating Purposes Only)					
Mark	Bar	Shape	No.	Length	Weight (lb)
X511	#5	Bent	3	5'-6"	17
X512	#5	Straight	8	5'-6"	46
X513	#5	Straight	12	11'-1"	139
X514	#5	Straight	14	40'-3"	588
Y610	#6	Bent	2	2'-10"	9
Y611	#6	Bent	8	4'-7"	55
Y612	#6	Bent	2 SERIES OF 5	Varies 5'-11" to 7'-1"	98
				Total =	955

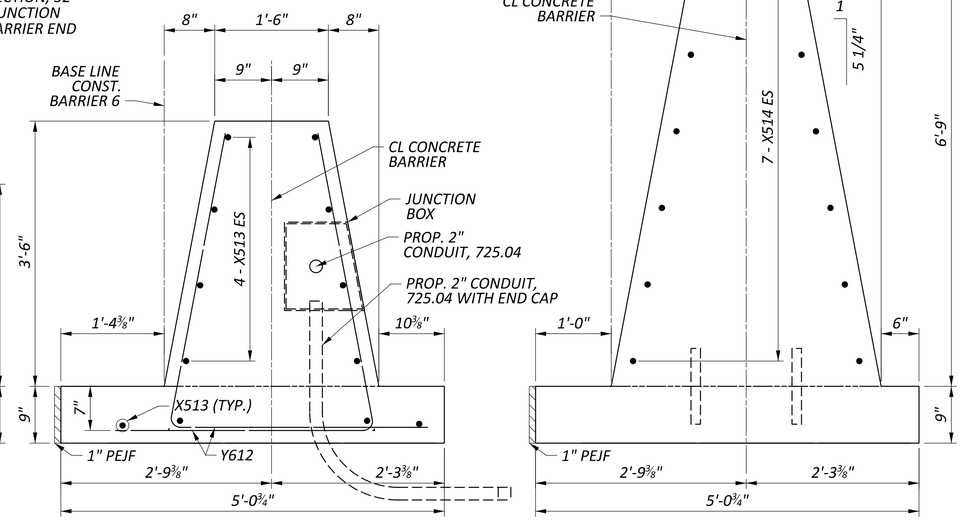
NOTES:

1. FOR ADDITIONAL NOTES AND DETAILS, SEE STD. DWG. RM-4.3.
2. FOR ADDITIONAL JUNCTION BOX AND CONDUIT NOTES AND DETAILS, SEE STD. DWG. HL-30.31.
3. ALL EX. DIMENSIONS ARE ±.
4. PAYMENT FOR THE CONCRETE BARRIER END SECTION SHALL BE MADE AT THE UNIT PRICE FOR ITEM 622 - CONCRETE BARRIER, 81" SSB, END SECTION, 32" TO 81" AND SHALL INCLUDE ALL MATERIALS, LABOR, CONDUIT, JUNCTION BOX, AND REINFORCING STEEL REQUIRED TO CONSTRUCT THE BARRIER END SECTION AS SHOWN.



SECTION D-D

SECTION E-E



SECTION F-F

SECTION G-G

CONCRETE 81" BARRIER 6 END SECTION, AS PER PLAN

FRA-161-15.80 NOISE WALLS

MODEL: SHEET - 2 PAPERSIZE: 34x22 (in.) DATE: 2024-01-22 TIME: 3:40:39 PM USER: jennifer.kelley
pw:\\arcadis-us-pw.bentley.com:arcadis-us-01\Documents\01 Active Projects\143720\400_CAD\400-Engineering\Roadway\Sheets\117607_WD001.dgn

DESIGN AGENCY
ARCADIS
8101 NORTH HIGH ST SUITE 100
COLUMBUS, OHIO 43235
(614) 985-4600
www.arcadis.com

DESIGNER SS

REVIEWER AMP 01-22-24

PROJECT ID 117607

SHEET P.202 | TOTAL P.276