



Road & Bridge Design Publications

Monthly Update – March 2024

Revisions for the month of **March** are listed and displayed below and will be included in projects submitted for the **July** letting.

E-mail road related questions to MDOT-Road-Design-Standards@michigan.gov.

Special Details

R-55-H: Filler Walls at Bridge Pier Columns: Revised the distance between the #4 horizontal rebars (located in the filler walls between the columns) from a 2'-0" spacing to a 1'-6" max spacing. Revised the filler wall end block details to match those on R-67-series and placed them on a separate sheet.

Road Design Manual

6.03.09A 1d: Asphalt Binders for Mainline Paving: Eliminated the Metro Region binder table in favor of using the non-Superior Region binders to eliminate thermal cracking.

Updates to the MDOT Cell Library, Sample Plans, and other automated tools may be required in tandem with some of this month's updates. Until such updates can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

Index to Special Details

3-25-2024

⑥

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	6-6-22
24	8	GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8	12-6-22
99	2	CHAIN LINK FENCE WITH WIRE ROPE	12-6-22
R-28-K	7	CURB RAMP AND DETECTABLE WARNING DETAILS	11-8-23
R-29-J	4	DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK	11-8-23
R-32-F	8	APPROACH CURB & GUTTER DOWNSPOUTS	9-20-22
R-32-SD	6	APPROACH CURB & GUTTER DOWNSPOUTS (FOR SAFETY SHAPES)	4-24-23
R-43-J	2	LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT	1-4-22
R-44-G	7	CONCRETE PAVEMENT REPAIR	9-18-23
R-45-K	2	PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH	1-4-22
R-50-H	6	LIGHT STANDARD FOUNDATION (CONCRETE BARRIER, DOUBLE FACE)	12-12-23
R-53-A	22	TEMPORARY CONCRETE BARRIER LIMITED DEFLECTION	8-14-15
*R-55-H	5	FILLER WALLS AT BRIDGE PIER COLUMNS	3-13-24
R-56-F	6	GUARDRAIL MEDIAN OBJECT PROTECTION	10-10-23
R-60-J	16	GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, & MGS-8D	1-29-24
R-62-H	4	GUARDRAIL APPROACH TERMINAL TYPE 2M	6-16-22
R-63-C	3	GUARDRAIL APPROACH TERMINAL TYPE 3M	10-2-23
R-66-E	4	GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS	9-14-23
R-67-G	16	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS	12-6-22
R-67-SD	6	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS (FOR SAFETY SHAPES)	4-4-23
R-72-D	6	GUARDRAIL LONG SPAN INSTALLATIONS	8-23-22
R-73-F	3	GUARDRAIL OVER BOX OR SLAB CULVERTS	8-1-19
R-80-F	8	GRANULAR BLANKETS, UNDERDRAINS, OUTLET ENDINGS, & BULKHEADS	6-28-21
R-88-E	4	STEEL END SECTION	3-7-23
R-100-I	4	SEEDING AND TREE PLANTING	12-8-23
R-110-B	3	PAVEMENT SAFETY EDGE	6-14-21
R-112-J	10	SHOULDER AND CENTER LINE CORRUGATIONS	8-2-23
R-126-I	5	PLACEMENT OF TEMPORARY CONCRETE & STEEL BARRIER	8-25-15
R-127-H	8	DELINEATOR INSTALLATIONS	8-11-23
R-130-A	6	LIGHT STANDARD DETAILS	1-4-24

*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the **July** letting.**

Notes: Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast-in-place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Bureau of Bridges & Structures, Structure Design Section, Special Structures Unit will provide special details for inclusion in construction plans for MDOT jobs. To assure prompt delivery, requests **must be made in advance**. Contact: MDOT-TriezenbergSquad@Michigan.gov

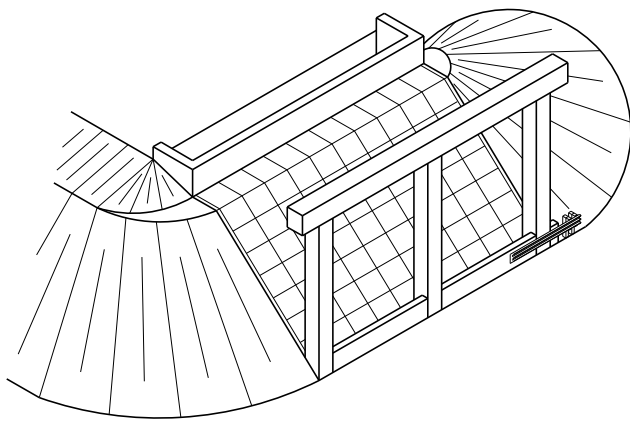
Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2020 Standard Specifications for Construction.

Index to Bridge Detail Sheets

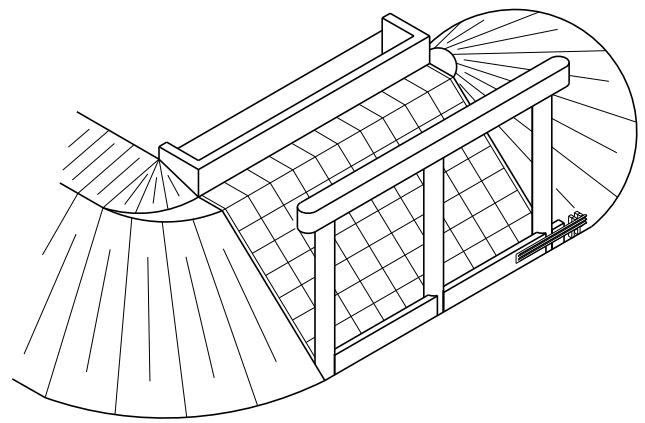
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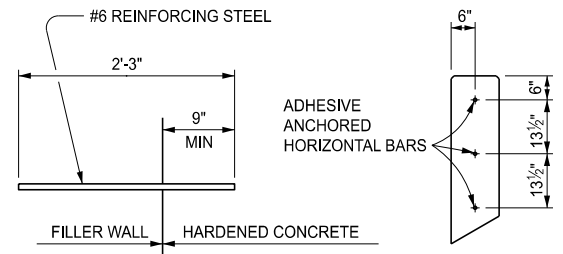
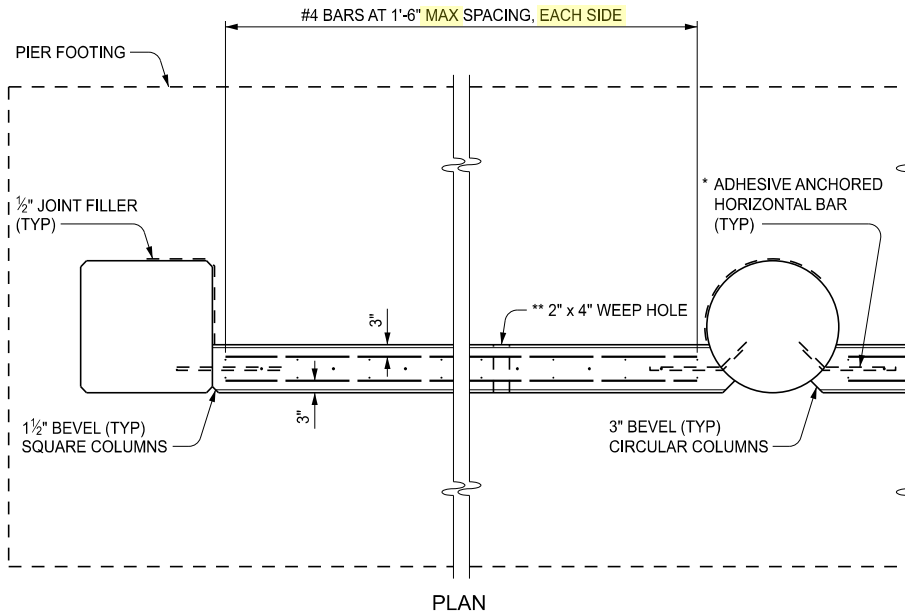
DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
B-25-L	8	BRIDGE RAILING, AESTHETIC PARAPET TUBE	11-15-23
B-27-B	7	BRIDGE RAILING, 3 TUBE WITH PICKETS	11-17-23
B-28-A	7	BRIDGE BARRIER RAILING, TYPE 7	1-22-24
B-29-A	8	BRIDGE BARRIER RAILING, TYPE 6	1-22-24
B-102-D	4	STANDARD SLOPE PAVING DETAILS	9-18-23
B-103-F	2	MOLDING, BEVEL, LIGHT STD. ANCHOR BOLT ASSEMBLY AND NAME PLATE DETAILS	12-8-23
EJ3AF	1 to 4	EXPANSION JOINT DETAILS (See Notes)	1-23-23
EJ4S	1 to 4	EXPANSION JOINT DETAILS (See Notes)	1-23-23
PC-1N	2	PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	11-28-22
PC-2I	2	70" PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	11-28-22
PC-4G	2	PRESTRESSED CONCRETE 1800 BEAM DETAILS (See Notes)	11-28-22
PC-5A	2	PRESTRESSED CONCRETE BULB-TEE BEAM DETAILS (See Notes)	11-28-22
<p>* Denotes New or Revised Special Detail to be included in projects for (beginning with) the July letting.</p> <p>Notes: Details EJ3AF & EJ4S are interactive, i.e., designers and detailers choose details based upon railing type and angle of crossing and fill in the project specific dimensions for the end plate. Place all details appropriate for the project (including the end plate), structure specific information, and the Expansion Joint Device quantity on the sheet. Add the sheet to the plans as a normal plan sheet. Call out and designate the location of the expansion joint device and the end plate on the Superstructure Sheet in the plan set.</p> <p>Details PC-1N, PC-2I, PC-4G, and PC-5A shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.</p>			



SKETCH OF FILLER WALLS
AT SQUARE PIER COLUMNS



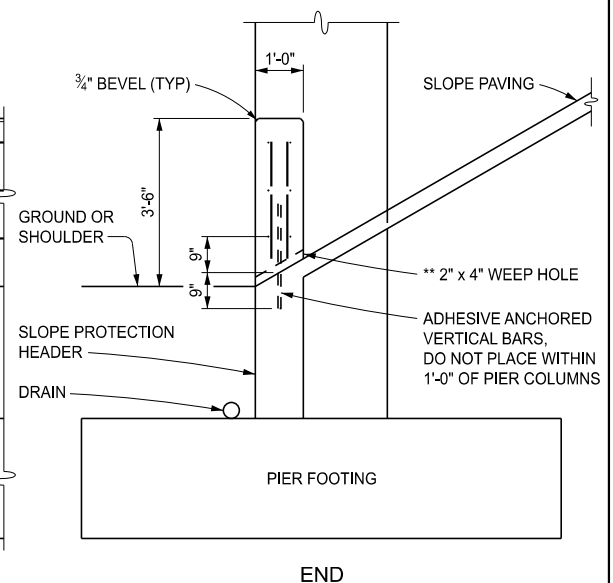
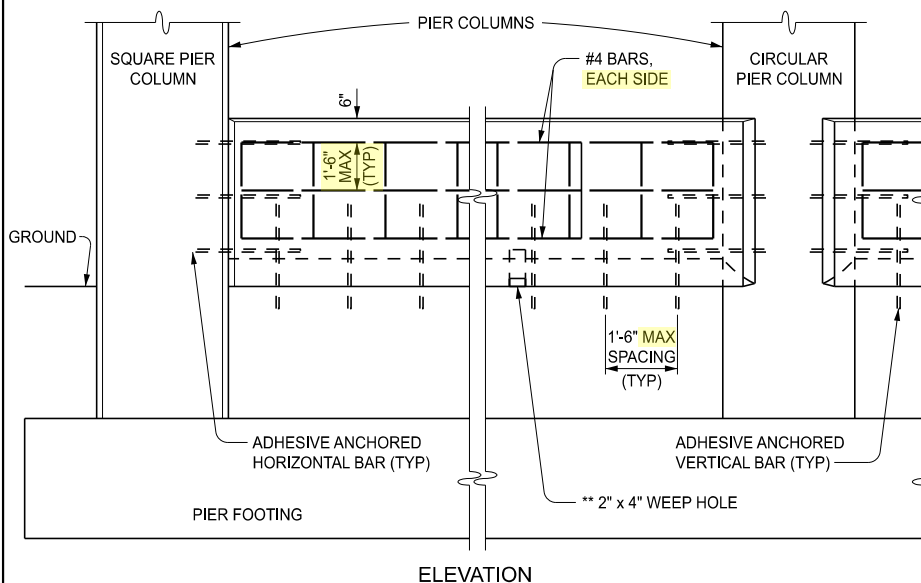
SKETCH OF FILLER WALLS
AT CIRCULAR PIER COLUMNS



ADHESIVE ANCHORED
HORIZONTAL OR VERTICAL BAR
INSTALLATION DETAIL
(UNLESS OTHERWISE DETAILED)

* REINFORCING STEEL SHALL BE TESTED ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION PRIOR TO BENDING. THE REINFORCING STEEL SHALL THEN BE FIELD BENT RADIALLY TO CIRCULAR PIERS AND PARALLEL TO THE FILLER WALL. FIELD BENDING SHALL BE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ANY DAMAGE TO THE EPOXY COATING DURING TESTING OR BENDING SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

** PLACE ONE 2" x 4" WEEP HOLE IN EACH FILLER WALL SECTION. (MAY BE RANDOMLY LOCATED)



FILLER WALLS USING SLOPE PROTECTION HEADER AS FOOTING

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

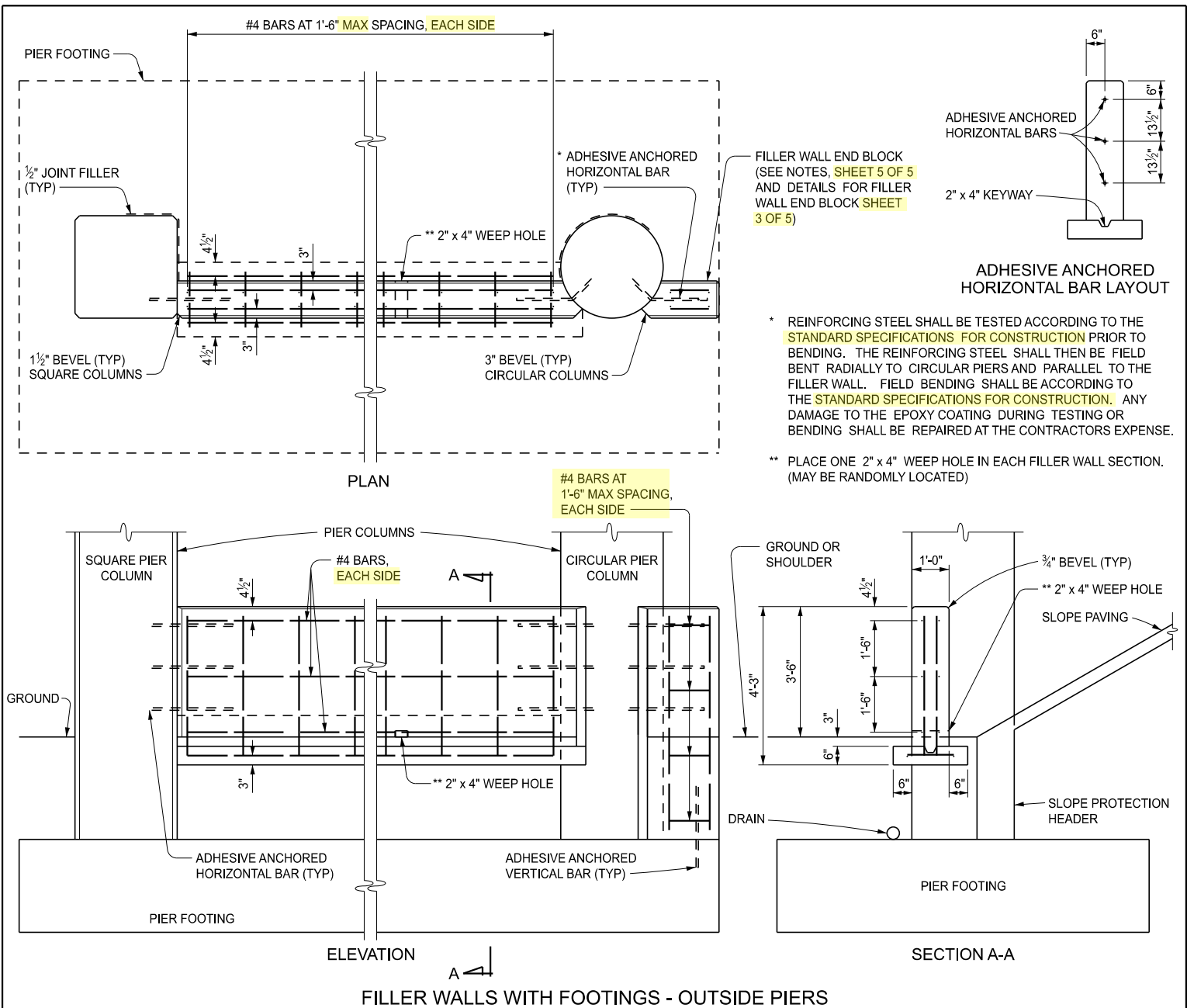
STANDARD PLAN FOR
FILLER WALLS AT
BRIDGE PIER COLUMNS

(SPECIAL DETAIL)
FHWA APPROVAL

03/13/2024
PLAN DATE

R-55-H

SHEET
1 OF 5



* REINFORCING STEEL SHALL BE TESTED ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION PRIOR TO BENDING. THE REINFORCING STEEL SHALL THEN BE FIELD BENT RADIAL TO CIRCULAR PIERS AND PARALLEL TO THE FILLER WALL. FIELD BENDING SHALL BE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ANY DAMAGE TO THE EPOXY COATING DURING TESTING OR BENDING SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

** PLACE ONE 2" x 4" WEEP HOLE IN EACH FILLER WALL SECTION. (MAY BE RANDOMLY LOCATED)

FILLER WALLS WITH FOOTINGS - OUTSIDE PIERS



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

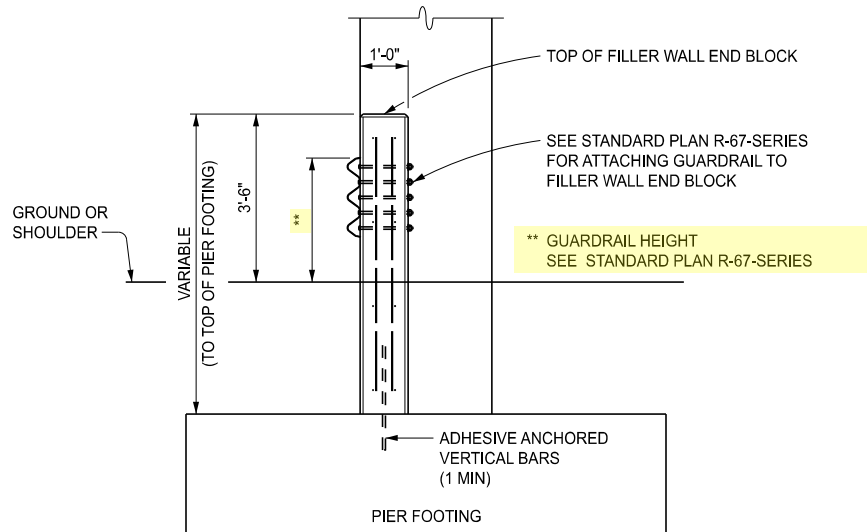
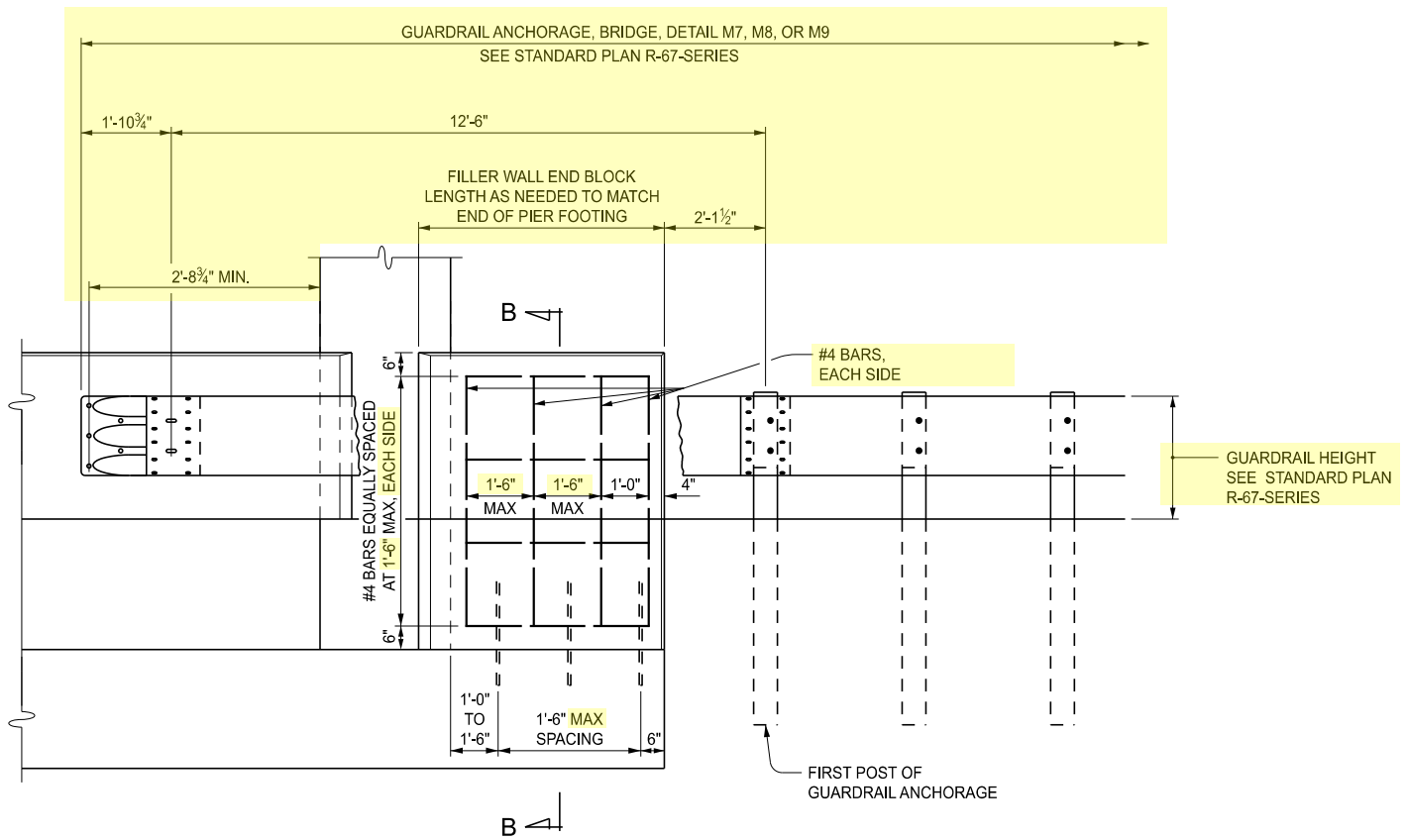
STANDARD PLAN FOR
FILLER WALLS AT
BRIDGE PIER COLUMNS

(SPECIAL DETAIL)
FHWA APPROVAL

03/13/2024
PLAN DATE

R-55-H

SHEET
2 OF 5



DETAILS FOR FILLER WALL END BLOCK
(SEE STANDARD PLAN R-67-SERIES FOR GUARDRAIL ATTACHMENT DETAILS)



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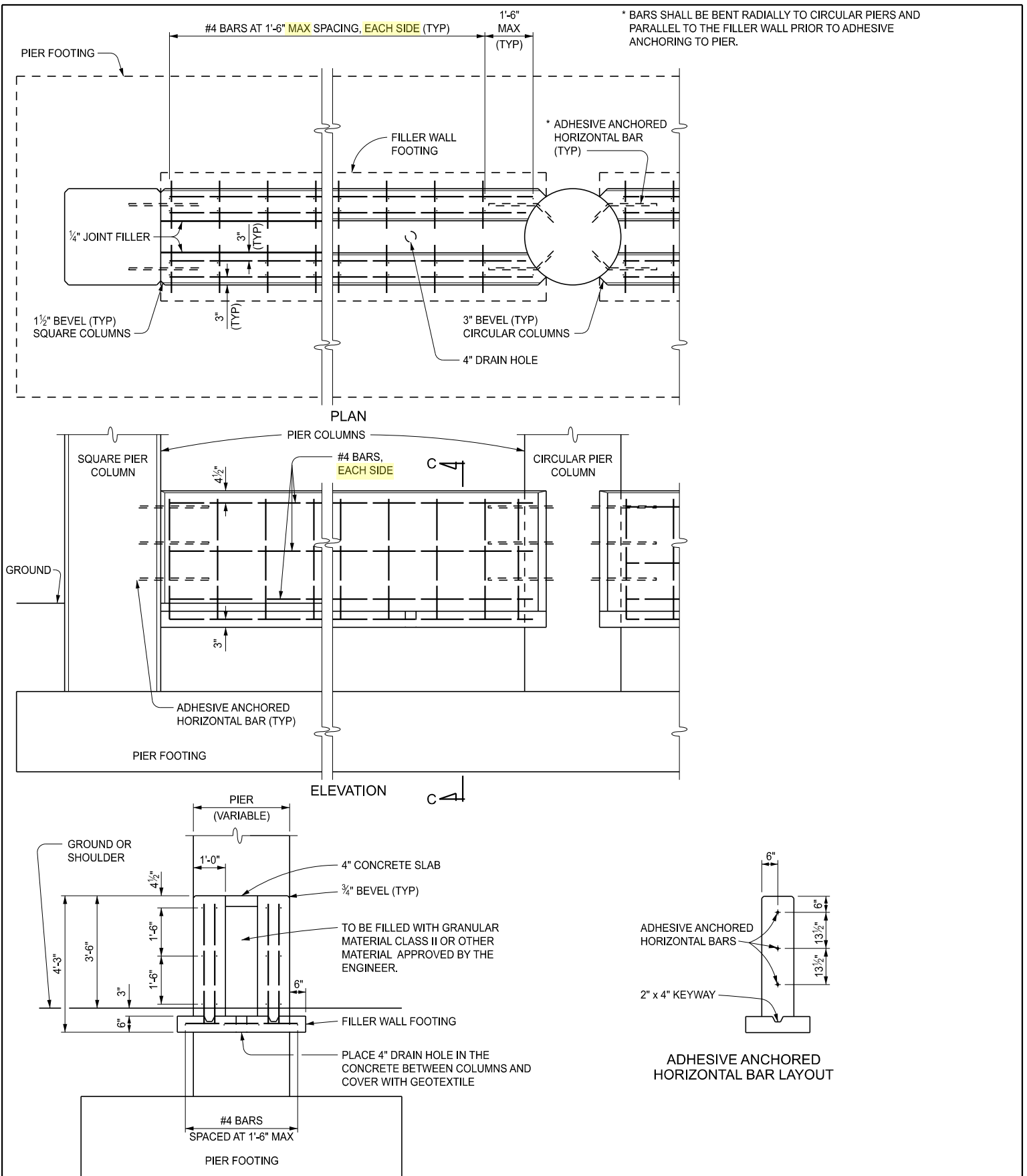
STANDARD PLAN FOR
FILLER WALLS AT
BRIDGE PIER COLUMNS

(SPECIAL DETAIL)
FHWA APPROVAL

03/13/2024
PLAN DATE

R-55-H

SHEET
3 OF 5



FILLER WALLS WITH FOOTINGS - MEDIAN PIERS



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BRADLEY C. WIEFERICH, PE

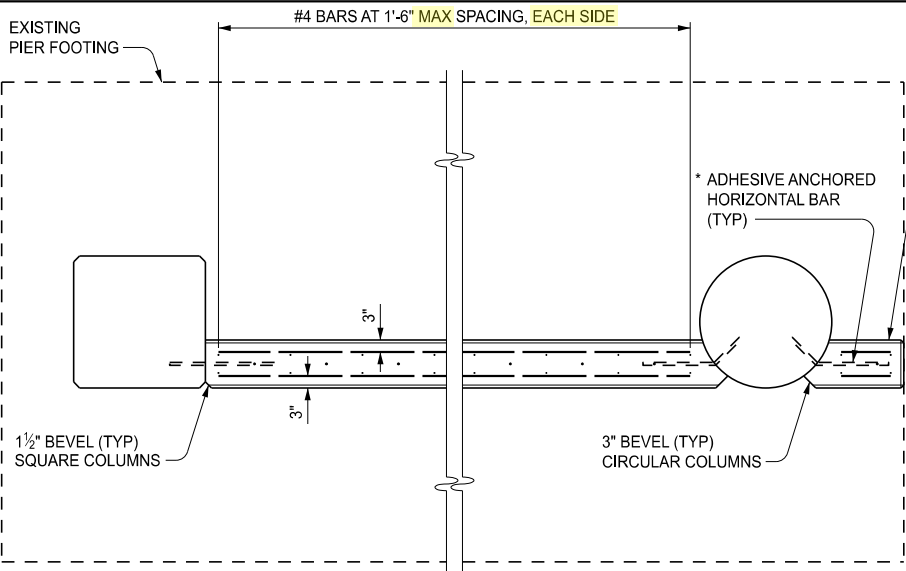
STANDARD PLAN FOR
FILLER WALLS AT
BRIDGE PIER COLUMNS

(SPECIAL DETAIL)
FHWA APPROVAL

03/13/2024
PLAN DATE

R-55-H

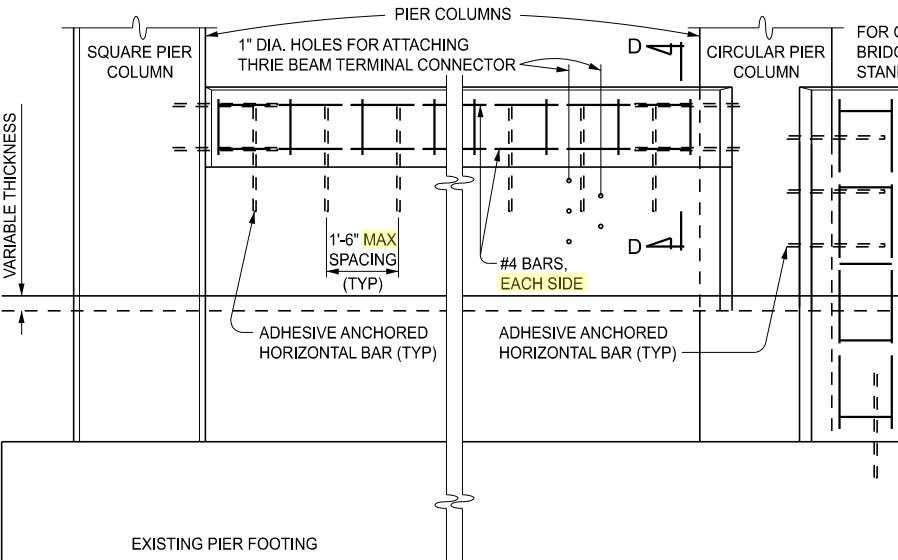
SHEET
4 OF 5



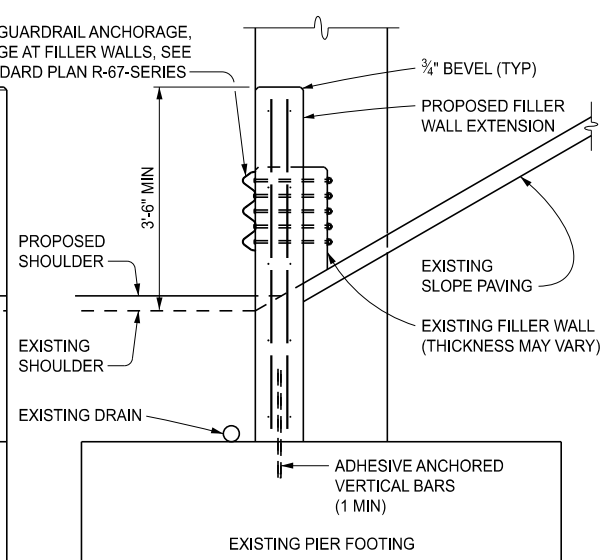
FILLER WALL END BLOCK
(SEE NOTES, BELOW, AND DETAILS FOR
FILLER WALL END BLOCK **SHEET 3 OF 5**)

* REINFORCING STEEL SHALL BE TESTED ACCORDING TO THE
STANDARD SPECIFICATIONS FOR CONSTRUCTION PRIOR TO
BENDING. THE REINFORCING STEEL SHALL THEN BE FIELD
BENT RADIALLY TO CIRCULAR PIERS AND PARALLEL TO THE
FILLER WALL. FIELD BENDING SHALL BE ACCORDING TO
THE **STANDARD SPECIFICATIONS FOR CONSTRUCTION**. ANY
DAMAGE TO THE EPOXY COATING DURING TESTING OR
BENDING SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

PLAN



ELEVATION



END

**FILLER WALL EXTENSION
FOR ADDITIONAL HEIGHT**

NOTES:

THE AREA BETWEEN THE FILLER WALLS AT THE MEDIAN PIERS MAY BE FILLED
WITH CONCRETE AT THE CONTRACTOR'S OPTION, WITH NO INCREASE IN COST
TO THE DEPARTMENT.

CARE SHALL BE TAKEN TO ENSURE THAT FILLER WALLS DO NOT ENTRAP WATER.
DRAINAGE MUST BE PROVIDED BY USE OF WEEP HOLES AND DRAIN HOLES AND/OR
RESHAPING SLOPES.

TOP OF FILLER WALL SHALL BE PARALLEL WITH THE PAVEMENT GRADE.

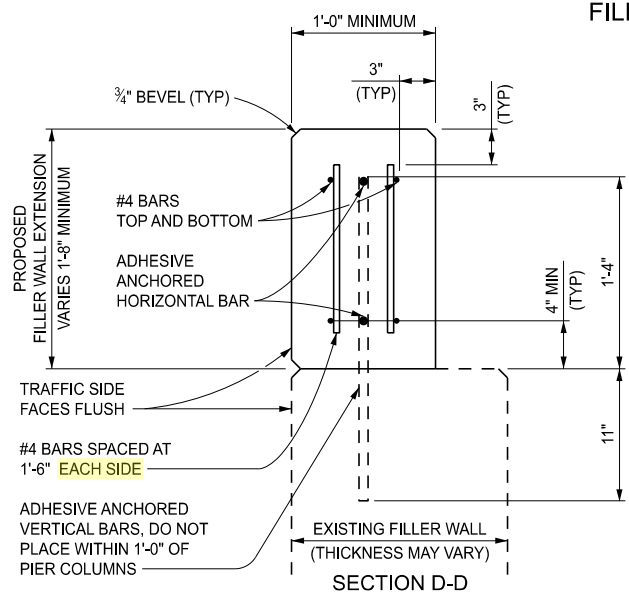
MATERIALS AND LABOR REQUIRED TO CONSTRUCT FILLER WALL END BLOCKS
SHALL BE PAID FOR AS FILLER WALL CONCRETE AND ADHESIVE ANCHORING OF
HORIZONTAL/VERTICAL BARS, AND SHALL BE ACCORDING TO THE **STANDARD
SPECIFICATIONS FOR CONSTRUCTION**.

SEE STANDARD PLAN R-67-SERIES WHEN ATTACHING GUARDRAIL TO FILLER WALLS.

ALTERNATE METHODS MAY BE USED TO ANCHOR THE BARS IF APPROVED BY THE
ENGINEER.

ALL STEEL REINFORCEMENT BARS AND ADHESIVE ANCHORED HORIZONTAL/VERTICAL
BARS SHALL BE EPOXY COATED AND PAID FOR SEPARATELY.

ADHESIVE ANCHORS SHALL BE INSTALLED AS PER MANUFACTURERS RECOMMENDATION
EXCEPT AS MODIFIED ON THIS STANDARD.



SECTION D-D

MICHIGAN DESIGN MANUAL ROAD DESIGN

6.03.09 (revised 3-25-2024)

Hot Mix Asphalt (HMA) Mixture Selection Guidelines

This guide is to aid in the selection of Hot Mix Asphalt (HMA) mixtures, asphalt binders and Aggregate Wear Index values. It is the ultimate responsibility of the Region Soils/Materials Engineer to provide appropriate hot mix asphalt and thickness recommendations. Any questions regarding these guidelines should be addressed to either the HMA Unit or the Pavement Design Engineer in the Construction Field Services Division.

A. Rehabilitation, Reconstruction (R&R) and New Construction Projects

1. Mainline Paving

a) Mixture Selection

All mainline paving shall be composed of Superpave mixtures.

Computed Design BESALs (HMA Equivalent Single Axle Load) will be used to identify the appropriate Superpave mixture type.

6.03.09A1a (continued)

Superpave Mix Type	Design BESAL (millions)
EL	Less than 0.3
EML	Between 0.3 and 3.0
EMH	Between 3.0 and 30.0
EH	Between 30.0 and 100.0
SMA	Between 10.0 and 100.0

SMA is to only be used as a top course mixture.

Design BESALs are calculated using the following information:

- Commercial Traffic
- Traffic Growth Rate
- Lane Distribution of Commercial Traffic
- BESAL Axle Load Equivalency for Flexible Pavement
- Total accumulated BESALs for 20 year design

The method for calculating ESALs for flexible pavements (BESALs) is explained in the **AASHTO Guide for Design of Pavement Structures**, 1993. Design BESALs should be requested from the Project Planning Section of the Project Planning Division. The Pavement Design Engineer of the Pavement Management Section of the Construction Field Services Division can provide an approximate BESAL value (for estimating purposes only). Show the 20 year design BESALs on the design plans.

b) Superpave Mixture Number Designation and Thickness Guidelines

After mixture selection has been determined, based on design BESALs, the mixture number for use in the various pavement courses can be determined. The mixture number will be 2, 3, 4 or 5 depending on the nominal maximum size aggregate. Following are the mixture numbers, minimum/maximum application rates and course type application:

MICHIGAN DESIGN MANUAL ROAD DESIGN

6.03.09A1d (continued)

Hot Mix Asphalt (HMA) Mixture Selection Guidelines

Metro, North, Grand, Bay, Southwest and University Region

Mixture Type	HMA Mainline and Ramps		High Stress HMA	
EMH [^] , EH, SMA	PG 70-28P PG 64-22*	Top & Leveling Course Base Course	PG 76-28P PG 64-22*	Top & Leveling Course Base Course
EML, EMH ^{^^}	PG 64-28 PG 58-22**	Top & Leveling Course Base Course	PG 70-28P PG 58-22**	Top & Leveling Course Base Course
EL	PG 58-28 PG 58-22**	Top & Leveling Course Base Course	PG 64-28 PG 58-22**	Top & Leveling Course Base Course

Superior Region

Mixture Type	HMA Mainline and Ramps		High Stress HMA	
EL, EML, EMH ^{^^}	PG 58-34 PG 58-28	Top & Leveling Course Base Course	PG 64-34P PG 58-28	Top & Leveling Course Base Course

[^] Greater than 10 Million ESALs

^{^^} Less than 10 Million ESALs

* Use PG 64-28 for North Region

** Use PG 58-28 for North Region

NOTES:

1. For shoulders paved greater than or equal to 8 feet or in a separate operation, use PG 58-28 for top and leveling course and PG 58-22 for base course for all Regions
2. For Temporary Roads, commercial and private Approaches, Wedging, and Hand Patching, use PG 64-22 for all Regions except Superior and North, use PG 58-28.