

TYPICAL SECTIONS AND RELATED DETAILS

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION



2019 EDITION



TITLE	PAGE	TITLE	PAGE	TITLE	PAGE
INTRODUCTION AND GENERAL INFORMATION	i-iv	MEDIAN MODIFICATION AT BRIDGES AND MEDIAN OBSTACLES	47	GUARDRAIL INSTALLATION ON HEADWALLS AND PARAPETS	88
NEW CONSTRUCTION	1	AGGREGATE FILLED FABRIC UNDERDRAIN	48	GUARDRAIL INSTALLATION ON BRIDGE PARAPETS	89
ROAD WIDENING	2	CORRECTING DEEP DITCHES	49	GUARDRAIL INSTALLATION ON BOX CULVERTS AND BRIDGES	90-92
RESURFACING	3	NON-DITCH DETAILS	50-51	GUARDRAIL HEIGHT ADJUSTMENT	93
RESURFACING-ONE COURSE	4	WIDENING AND PAVED DITCH	52	MODIFIED CONCRETE END POST	94
MILLING & RESURFACING-W/ SCRATCH & WEARING	5-6	BITUMINOUS CURBING-TYPE II	53	DOUBLE FACE END TERMINAL	95
SUPERELEVATION RESURFACING	7	RESURFACING HEEL-IN DETAIL	54	GUARDRAIL PLACEMENT AT INTERSECTIONS	96-97
CURBED STREET SECTION-FIRST RESURFACING	8	HEEL-IN AT RAILROAD CROSSINGS AND BRIDGES	55	GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS	98-100
CURBED SECTION-SECOND AND SUBSEQUENT RESURFACING	9	SHOULDER RECONSTRUCTION	56	INSTALLATION OF HAZARD PANELS	101
NARROW ROAD PAVING-FULL WIDTH INCLUDING SHOULDERS	10	RESTORING SHOULDERS FOR GUARDRAIL & SLIVER FILLS	57	CANTILEVER MAILBOX SUPPORT	102
RESURFACING ROADWAY WITH PAVED SHOULDERS	11	RESETTING RCP & RESTORING SHOULDERS	58	BOLLARD DETAIL	103
SURFACE TREATMENT ON STONE BASE	12	EXTENDING PIPE & RESTORING SHOULDERS	59	PILING DETAILS	104-107
SURFACE TREATMENT OVER BITUMINOUS SURFACE	13	PIPE EXTENTION	60	LAGGING DETAIL	108
STONE STABILIZED ROADWAY	14	PIPE EXTENSION AT HEADWALL	61	PRECAST CONCRETE LAGGING	109
SHOULDER PAVING DETAIL WITH SAFETY EDGE	15	STANDARD INLET PROTECTION DETAIL	62	GABION RETAINING WALLS	110
MOONING CURVES	16	INLET ADJUSTMENT	63-64	CONCRETE BOX & GRATE DETAILS	111-112
POT-HOLE REPAIR DETAIL	17	ADJUSTING TYPE C INLETS	65-66	SUMMARY OF QUANTITIES	113
CONCRETE REPAIR DETAIL (METHOD A-E) & NOTES	18-23	TYPE U INLET	67-68	GUARDRAIL SUMMARY	114
CONCRETE PAVEMENT REPAIR (CONTINUOUS REINFORCED)	24	CONCRETE COLLAR DETAIL	69	BITUMINOUS PAVER	115
PARTIAL DEPTH REPAIRS	25-26	WATER VALVE ADJUSTMENT	70	CONCRETE MEDIAN BARRIER EXTENSION & NOTES	116-117
TYPICAL SECTION FOR BASE FAILURE	27-28	SANITARY SEWER MANHOLE COVER ADJUSTMENT	71	PLAN SHEET BORDERS	118-119
BASE FAILURE REPAIR DETAIL	29	PIPE MITER DETAIL	72	TITLE SHEET	120
EDGE FAILURE REPAIR DETAIL	30	ADJUSTING CONCRETE HEADWALLS	73-74		
DRIVEWAY AND SIDROAD TREATMENT	31	TYPE G INLET PLACEMENT	75-76		
TEMPORARY TRAFFIC CONTROL PLAN	32-33	REPAVING PIPE TRENCHES	77-78		
TEMPORARY TRAFFIC CONTROL DEVICE QUANTITY TABLE	34	REPAVING PIPE TRENCHES IN PAVED SHOULDER	79-80		
SAWED/MILLED RUMBLE STRIP FOR ASPHALT SHOULDERS	35	LOW-WATER CROSSING	81-82		
CENTERLINE RUMBLE STRIPS	36	MODIFICATION OF SHOULDER FOR FET	83		
MEDIANS, SHOULDERS AND DITCHES	37-38	GUARDRAIL CLASS GUARDRAIL HEIGHT	84		
SIDEWALK RAMPS	39-41	GUARDRAIL AT MEDIAN BRIDGES, GUARDRAIL FOR MEDIAN	85		
CURB RAMPS	42-46	MODIFIED CUT SLOPE TERMINAL	86-87		

TABLE OF CONTENTS

INTRODUCTION

The applicable pages of the 2017 edition "Typical Sections and Related Details" are to be used in preparing plans for both contract and state work. For use in resurfacing projects, copies of these convenient 8 1/2" x 11" sheets can be inserted into the contract document as applicable. For more complex projects where full-size plans are required, the applicable typical sections can be transferred onto a 22" x 34" linen or mylar. These sections and details are intended for use in probably 95% of the 3R type highway projects; however, changes and/or exceptions will occur and should be developed jointly with Engineering Division or District Design Engineer. Additional sections will appear in subsequent issues of this book.

GENERAL INFORMATION

A numbering sequence has been assigned to various items in the legends to retain consistency throughout and to avoid duplication. Blank spaces have been provided for certain items such as widths, thicknesses, rates of application, aggregate items and classes, etc.

DITCHES

It is the Design Policy of the Division to divert water from the pavement. The desirable ditch in-slope should be 4:1 or flatter with the ditch bottom 6" lower than the subgrade.

When the proper ditch requirements cannot be met the alternative to using a ditch section is a non-ditch section with proper drainage of the subbase. These typicals may be modified to accommodate a non-ditch section. If a non-ditch section is provided, the contract documents are to be accompanied by an explanation of the factors involved, such as traffic volume, right-of-way requirements, and cost differences.

EMBANKMENTS

Fill slopes are to be 2:1 or flatter for adequate soil stability. Where the height of the fill is 10' or less, it is desirable to flatten the slope to 4:1 or flatter if possible. When a 1 1/2:1 fill slope is required the embankment must be constructed of rock (select embankment or rock borrow excavation). Sliver fills require benching to provide stability and to allow compacting by equipment. Fill benching should be considered from the first feasibility study to the final plans as it can be a substantial cost item.

SHOULDER WIDTHS

Shoulder widths on certain typical sections, where indicated, are to be designated as maximum and minimum. In some cases, the dimensions are equal because of non-varying widths. The designer shall measure the shoulder widths and specify the maximum and minimum to ensure proper quantity calculations and to ensure that the full width is stabilized by the addition of stone. The existing and available shoulder widths are to be preserved. On projects where shoulder widths are predominately less than two feet, the shoulders should be paved and edge striping is to be placed at the previous pavement edge.

SHOULDERS AND DITCHES

In extreme erosion areas, ditches may require rock borrow excavation as shown on Page 49 "Correcting Deep Ditches". Correcting of ditch depth is in the interest of safety, but flowline of ditches should be maintained to provide a minimum 6" of freeboard for effective road drainage.

SHOULDER RECONSTRUCTION

Appropriate shoulder reconstruction details shall be included with the resurfacing typical section in the contract plans. Shoulders can become too steep by successive resurfacing, erosion, or ditch cleaning operations and should be restored to an appropriate slope. Repairs may require rock borrow excavation or gabions to prevent stream or right-of-way encroachment. Shoulders are to be restored with stone or pavement to a height equal to the finished roadway.

INTRODUCTION AND GENERAL INFORMATION

DRIVEWAY AND SIDEROAD TREATMENT

The intent of this detail is to assure, during resurfacing operations, proper treatment of driveways and side roads to maintain safe vehicle operation on the main road. On paved driveways and side roads, a minimum amount of asphalt is usually necessary to avoid an elevation difference (drop off) at the pavement edge. The intent is not to pave every unpaved approach.

It is the designer's responsibility to recognize existing and potential problem approaches. They are to be listed in the table provided and included in the contract documents. If more space is required, additional tables shall be provided. All problem approaches shall be documented with proper justification in the project file.

Underdrain or fabric drain is to be installed where approaches have caused pavement distress by trapping water.

BASE FAILURE REPAIR

Identify in the contract documents, all areas of base failure that are to be repaired.

ASPHALT SKID RESISTANT PAVEMENT

All asphalt wearing course must be a skid-resistant mix in accordance with DD-644. If a project has severe curvature, high wet accident data, or high frictional demand, skid-resistant pavement may be required and should be documented in the project file.

ADJUSTING MANHOLES, INLET GRATES, AND VALVE BOXES

Many objects, such as manholes, gas and water valves, etc.; must be adjusted for a smooth riding surface. When utility companies own such items the Designer will coordinate with the District Utilities Supervisor to determine all intended work and the required amount of adjustments. If certain utilities are not capable of the adjustments prior to the start of work it shall be included in the contract.

MATERIALS

Testing of material may be waived on minimum usage items. The designer should make this determination on a project by project basis and so note on the appropriate plan sheets or in a general note.

GUARDRAIL

The class of guardrail to be installed on a particular project shall be as specified by the current Design Directive, DD-662. When the top of the guardrail is less than 24" or greater than 31" above the finished grade, the guardrail shall be removed and reset to the correct height, as per standard details, in conjunction with adjacent work.

GUARDRAIL INSTALLATION ON HEADWALLS, PARAPETS, BOX CULVERTS, AND BRIDGES

Many bridge parapets have intermediate vertical faces that can catch vehicles and cause damage. It is the policy of the Division to remove or isolate these hazards. The intent is to avoid guardrail installations where a lack of connection to the structure allows vehicles to deflect the rail and hit the concrete. The purpose of these details is to provide safe methods of guardrail installation where existing headwalls and/or parapets presents a hazard to vehicles. However, there are certain physical limitations that may require such structures to remain. Before guardrail is added to a structure a comparison should be made to determine the feasibility of removing the obstruction and extending the culvert rather than installing guardrail. In many cases it is safer to many cases it is safer to install guardrail along the length of the parapet to minimize vehicle contact. These details, which are to be inserted into the contract document, include a table that

These details, which are to be inserted into the contract document, include a table that should be used to specify locations, lengths, class of guardrail and quantities of various appropriate end treatments, unless such information is shown in full-size plans for the projects. The details should be applicable in the majority of situations where existing headwalls and bridge parapets are to remain. Certain bridges will require special consideration and design. Modifications of these details may be made for a project only after approval by the Engineering Division.

INTRODUCTION AND GENERAL INFORMATION

GUARDRAIL PLACEMENT AT INTERSECTIONS

Details for guardrail placement at intersections are to be included in the plans to ensure well defined end points for guardrail end terminals. The designer is to add information such as the A, B, and C dimensions, the end treatment (TET, FET, CST, or buffer end), and the approximate milepost (or station) of the intersection in the space provided. Some intersections will require more than one detail sheet where guardrail is to be installed in more than one quadrant.

The following is a list of considerations in specifying guardrail:

1. TET, FET, and CST end treatments are most commonly used.
2. Errant vehicles normally leave the roadway at an angle of 8° or less.
3. The departure must also be considered for the traffic movement in the opposite direction on the other side of the highway, but the near side would normally be more critical.
4. It is desirable to extend the guardrail around the intersecting roadway radius to move end away from the mainline traffic.
5. The ending point of the guardrail must be established considering the departure, the significance of a roadside hazard adjacent to the roadway and the available right-of-way.
6. If the guardrail end is within the angle of departure, a FET, TET, or CST is required.
7. If the guardrail can be extended around the radius to outside the departure angle, the need for an end treatment for the intersecting must be considered. If the guardrail can be extended around the radius enough to develop strength for the guardrail adjacent to the mainline, a buffer end is adequate.
8. Guardrail constructed where there is an obstruction 4' or less from the back of the guardrail shall have posts on 3'-1/2" spacing for 12'-6" each side of the obstruction.
9. Additional data may be found in Design Directive 662.

MODIFIED CUT SLOPE TERMINAL

The detail should only be used on 3-R type projects where a cut slope terminal is desired but the cost of drainage modifications through the cut slope area is not economical. If the existing ditch is more than 18" below the required grade for a CST, the ditch line will need adjusted.

MODIFIED CONCRETE END POST

This detail is to be used on NHS 3-R type projects to upgrade existing bridge end posts to a shape which will accept the Thrie Beam Guardrail Bridge Transition and Connection as per Standard Detail GR11.

The designer should determine if non-NHS end posts should be upgraded based upon the specific location with emphasis on the probability of impact, traffic data, etc.

TEMPORARY TRAFFIC CONTROL PLAN

The temporary traffic control plan (applicable page 32 or 33) can be used on most resurfacing, widening, and stabilization projects. If the project contains work beyond the scope of the resurfacing temporary traffic control plan the designer shall develop a more appropriate, detailed temporary traffic control plan.

Additional signs or devices needed are to be listed on the table in the temporary traffic control plan and unit values for the additional signs are to be obtained from Section 636 of the Specifications.

The manual "Temporary Traffic Control For Streets And Highway's 2006 Edition" is to be used for additional methods of traffic control and promotion of safety through the work area.

INTRODUCTION AND GENERAL INFORMATION

INSTALLATION OF HAZARD PANELS

Hazard panels are to be installed within the clear zone of the project when it is not feasible to remove or isolate the hazards with guardrail. Hazard panels are to be installed at headwalls, box culverts and bridge parapets protected by guardrail whenever the bridge shoulder widths are 8 feet or less. The designer is to designate locations of the panels and delineators in the table on the

The designer is to designate locations of the panels and delineators in the table on the appropriate detail pages.

RECONSTRUCTING ROADWAY AND SHOULDERS USING ADDITIONAL AGGREGATE

The existing surface shall be scarified to a depth of 2 inches. When existing shoulders are sloped steeper than the nominal 3/4 in. per ft. (6%), the existing shoulder material shall be shaped to achieve that slope prior to addition of aggregate.

Subgrade soil or ditch soil shall not be mixed with the loosened material. The loosened material shall then be broken and reshaped to form a uniform grade and cross section.

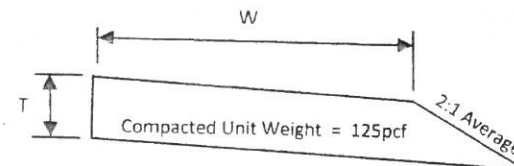
The additional material for roadway/shoulder reconstruction shall then be spread evenly over the surface so formed in an amount sufficient to provide a compacted thickness equal to the thickness shown on the Plans or as directed by use of a blade grader or other equipment as may be required.

CALCULATION OF SHOULDER STONE

The table below is to be used on projects for the calculation of shoulder stone. It must be remembered that aggregate is to be placed on the full width of existing shoulders up to a maximum of 10 feet on resurfacing projects and thickness is normally more than of asphalt resurfacing. Field measurements are required.

SHOULDER STONE IN TONS PER MILE-BOTH SIDES

T\W	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'
3"	206	370	536	701	866	1031	1196	1361	1526	1694
4"	294	513	733	954	1173	1393	1614	1833	2053	2274
6"	495	825	1155	1485	1815	2145	2475	2805	3135	3465
8"	735	1173	1614	2053	2493	2934	3373	3813	4254	4693
10"	1008	1558	2109	2658	3208	3759	4308	4858	5409	5958
12"	1320	1980	2640	3300	3960	4620	5280	5940	6600	7260

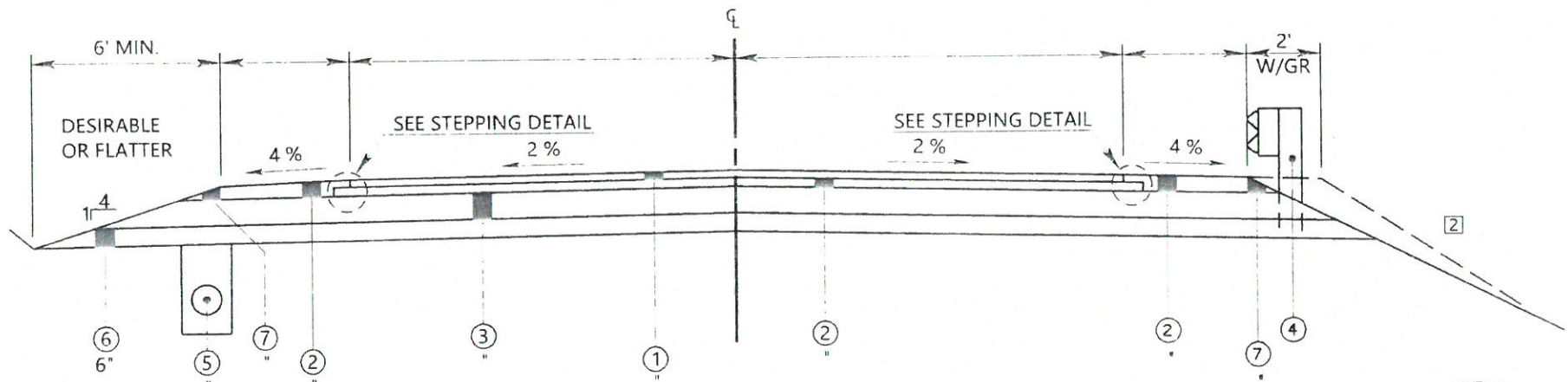


$$Q = 2 \times 5280 \times 125 \div 2000 \times (W+T)$$

$$Q = 660 (W+T)$$

Example: 1.17 miles (T=4, W=3) @ 733 = 858
1.75 miles (T=4, W=8) @ 1833 = 3171
0.62 miles (T=6, W=10) @ 3465 = 2148
Project Total 3.52 miles 6177 Tons

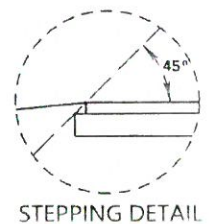
INTRODUCTION AND GENERAL INFORMATION



LEGEND

- ① ITEM 40 - * ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 40 - * ASPHALT, SLAG, TYPE
- ② ITEM 401001- * ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001- * ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 307001- * AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 606025- * INCH UNDERDRAIN PIPE OR
ITEM 606020-001, FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS.
- ⑥ ITEM 207002-000, SUBGRADE
- ⑦ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10

* SEQUENCE NUMBER



NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

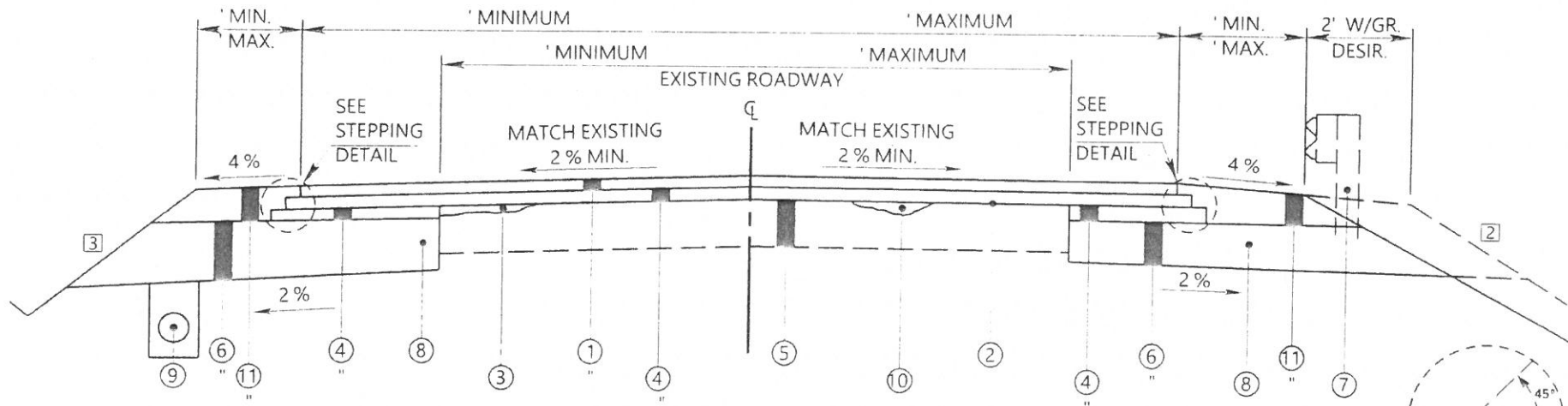
② EMBANKMENT SLOPE GUIDE

HT. OF EMB.	SLOPE	
0' TO 10'	4:1 DESIRABLE	2:1 MAX.
> 10'	2:1 DESIRABLE	1 1/2:1 MAX.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

NEW CONSTRUCTION

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401002- *ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 401002- *ASPHALT, SLAG, TYPE
- ② ITEM 408002- *ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- ③ ITEM 401003- *ASPHALT PATCHING AND LEVELING COURSE, STONE OR GRAVEL OR
ITEM 401003- *ASPHALT PATCHING AND LEVELING COURSE, SLAG
- ④ ITEM 401001- *ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001- *ASPHALT BASE COURSE, SLAG, TYPE
- ⑤ EXISTING PAVEMENT
- ⑥ ITEM 307001- *AGGREGATE BASE COURSE, CLASS
- ⑦ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑧ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑨ ITEM 606025- * INCH UNDERDRAIN PIPE OR
ITEM 606020-001 FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ⑩ POT-HOLE REPAIR - (SEE POT-HOLE REPAIR DETAIL)
- ⑪ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10

* SEQUENCE NUMBER

STEPPING DETAIL

Note : Amount of widening on each side may vary throughout the project because of physical restrictions. Dimensions for right and left will vary as shown in the plans or as directed by the engineer.

NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

EMBANKMENT SLOPE GUIDE

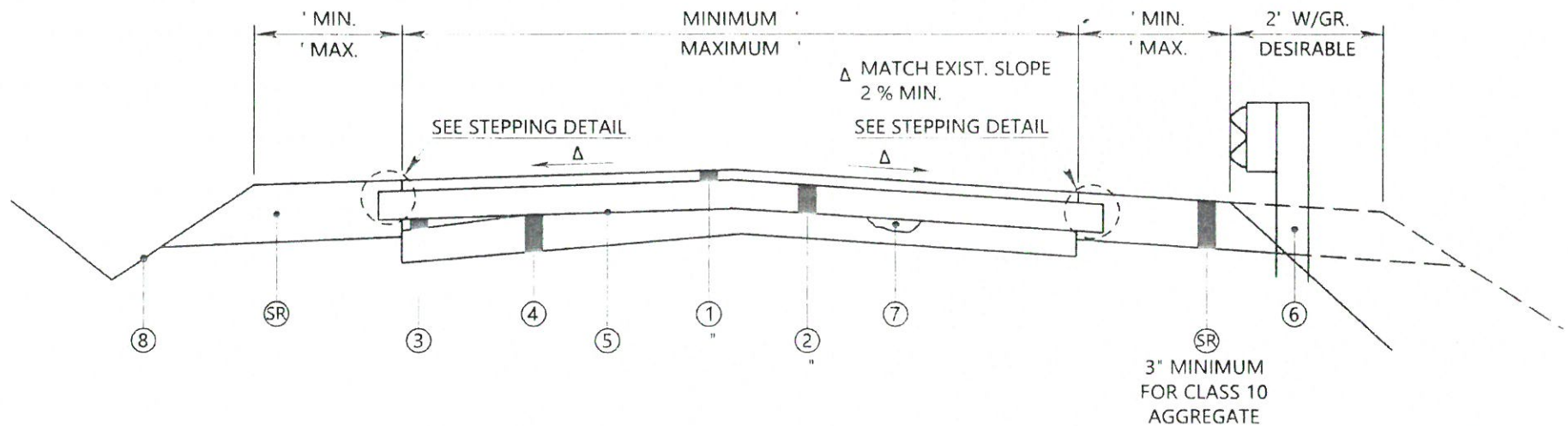
HT. OF EMB.	SLOPE
0' TO 5'	6:1
5' TO 10'	4:1
> 10'	2:1
1 1/2:1 MAX. W/ROCK FILL	

③ AS NOTED OR AS PER CROSS-SECTION

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

ROAD WIDENING

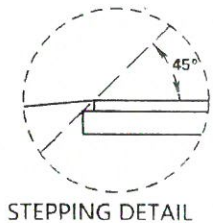
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 -*, ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 40 -*, ASPHALT, SLAG, TYPE
- ② ITEM 401001-*, ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001-*, ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL OR
ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, SLAG
- ④ EXISTING ROADWAY
- ⑤ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- SR SHOULDERS RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS PER L.F.
- ⑦ POT-HOLE REPAIR (SEE POT-HOLE DETAIL)
- ⑧ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

* SEQUENCE NUMBER



STEPPING DETAIL

SHOULDER WIDTHS:

Reconstruct shoulders to the full width of existing shoulders up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

NOTES:

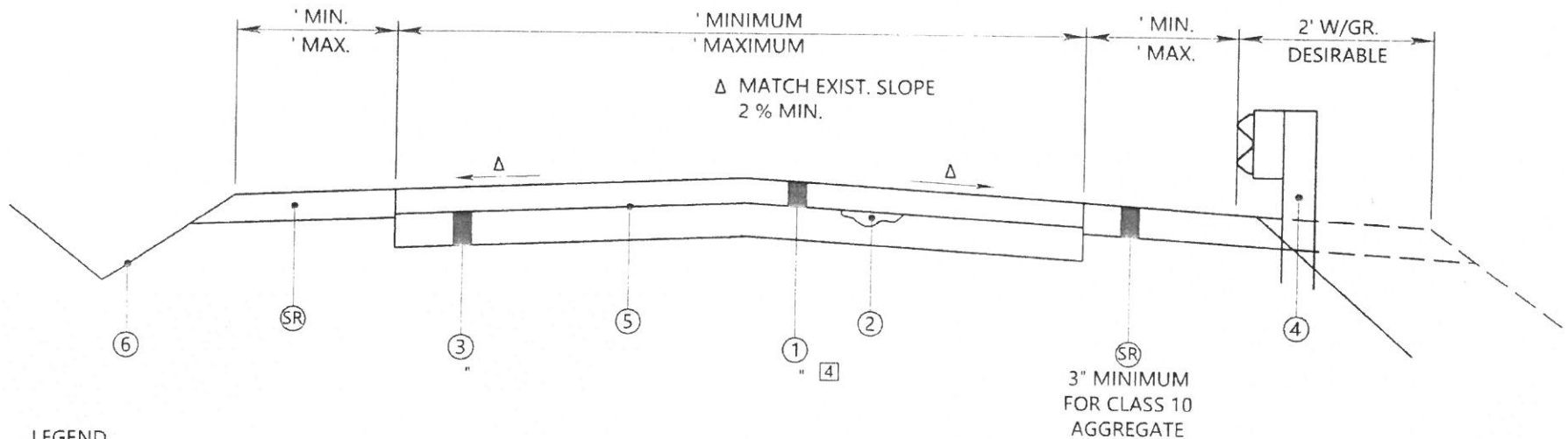
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

RESURFACING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401 -*, ASPHALT COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401 -*, ASPHALT COURSE, SLAG, TYPE
- ② POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ③ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- ⑥ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

* SEQUENCE NUMBER

- ④ The intent of this dimension is to provide a quantity of asphalt for leveling the existing road and simultaneously provide a smooth riding surface.

SHOULDER WIDTHS:

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

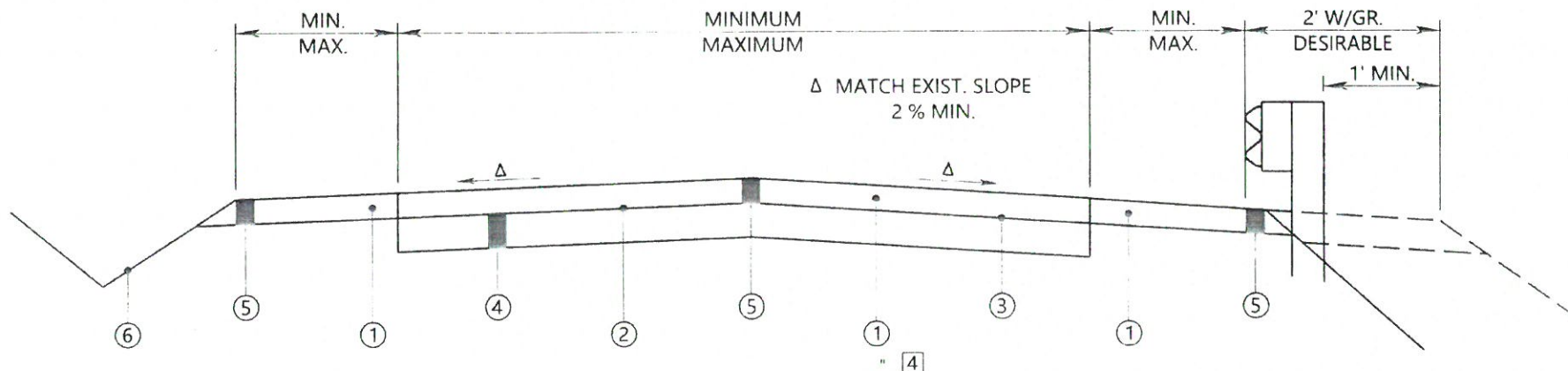
NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS RESURFACING - ONE COURSE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 -*, ASPHALT, STONE OR GRAVEL, TYPE
- ITEM 40 -*, ASPHALT, SLAG
- ② ITEM 401007-*, ASPHALT, SCRATCH
- ITEM 401007-*, ASPHALT, SLAG
- ③ ITEM 408002-*, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- ④ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑤ ITEM 415005-001, STANDARD MILLING
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

* EXISTING ROADWAY

- ④ The intent of this dimension is to provide a quantity of asphalt for leveling the existing road and simultaneously provide a smooth riding surface.

SHOULDER WIDTHS:

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

NOTES:

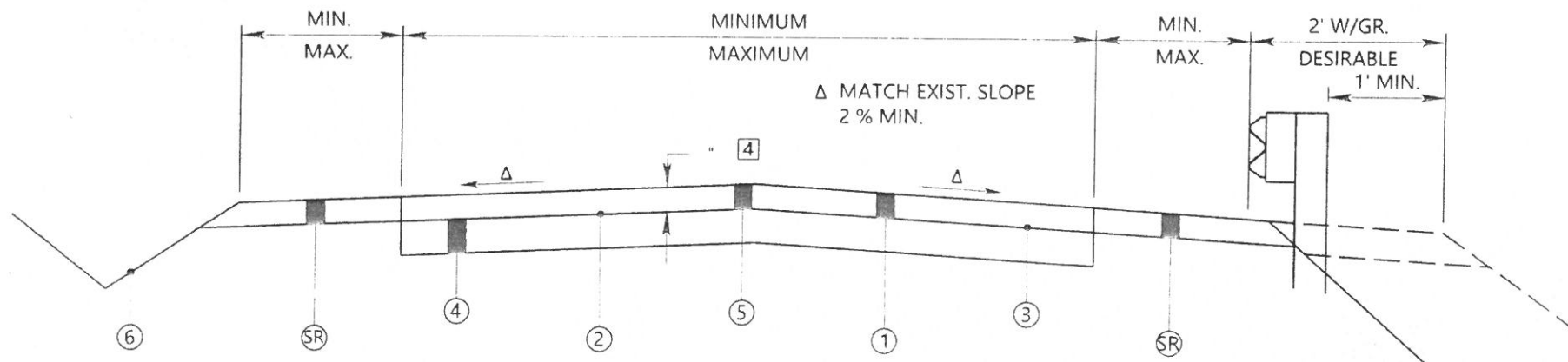
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MILLING & RESURFACING-W/ SCRATCH & WEARING-PAVED SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 - * ASPHALT, STONE OR GRAVEL, TYPE
- ITEM 40 - * ASPHALT, SLAG
- ② ITEM 401007- * ASPHALT, SCRATCH
- ITEM 401007- * ASPHALT, SLAG
- ③ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- ④ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑤ ITEM 415005-001, STANDARD MILLING
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

* SEQUENCE NUMBER

- ④ The intent of this dimension is to provide a quantity of asphalt for leveling the existing road and simultaneously provide a smooth riding surface.

SHOULDER WIDTHS:

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

NOTES:

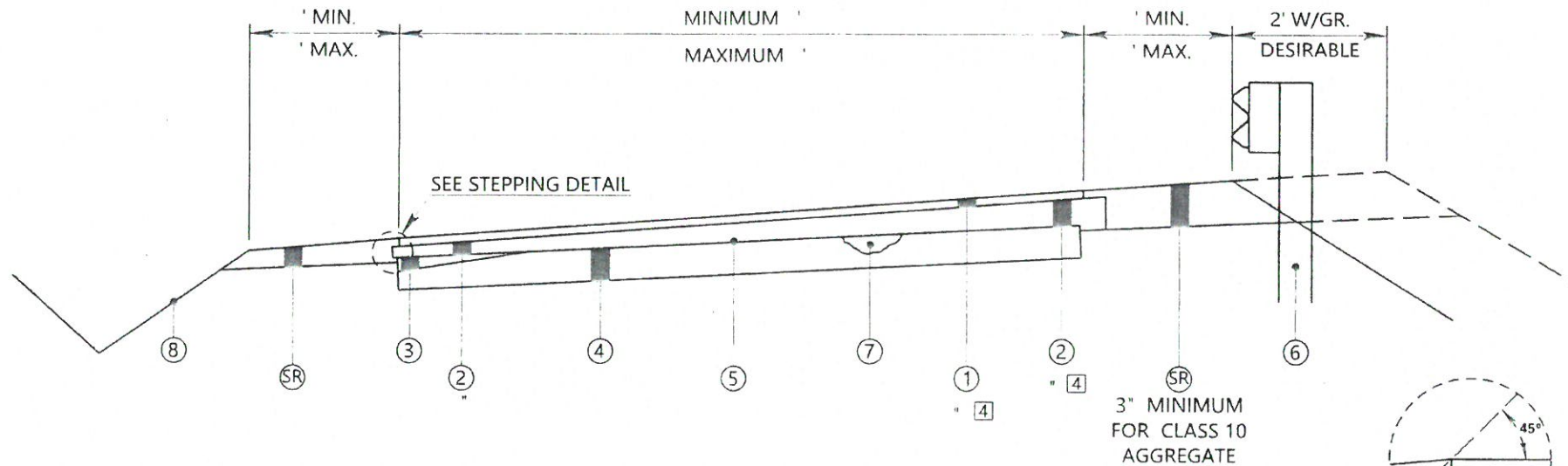
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MILLING & RESURFACING - W/ SCRATCH & WEARING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 -*, ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 40 -*, ASPHALT, SLAG, TYPE
- ② ITEM 401001-*, ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001-*, ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL, OR
ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, SLAG, TYPE
- ④ EXISTING ROADWAY
- ⑤ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑦ POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ⑧ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDER AND DITCHES DETAIL)

* SEQUENCE NUMBER

STEPPING DETAIL

- ④ The intent of this dimension is to provide a quantity of asphalt for leveling the existing road and simultaneously provide a smooth riding surface.

SHOULDER WIDTHS:

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

NOTES:

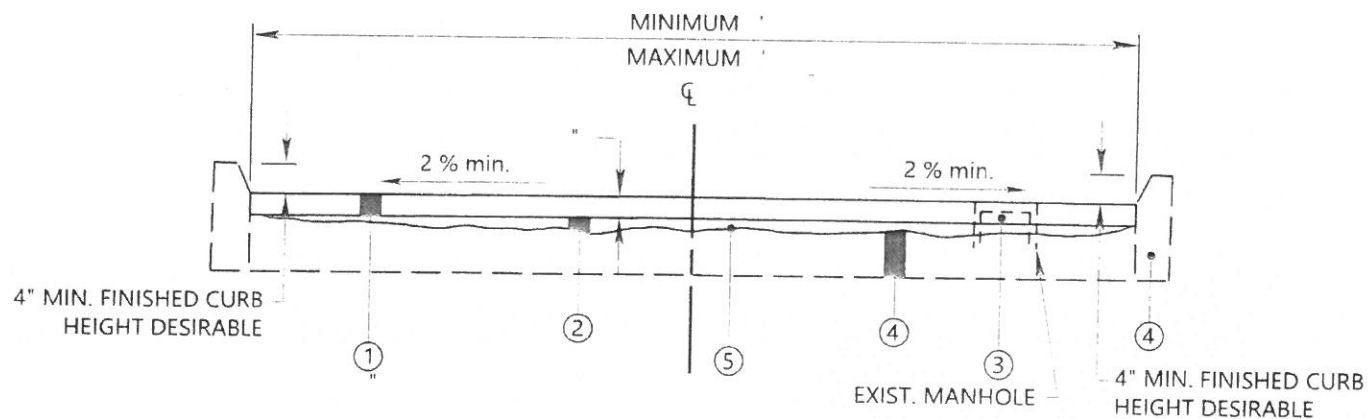
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SUPERELEVATION RESURFACING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 - * ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 40 - * ASPHALT, SLAG, TYPE
- ② ITEM 401003- * ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL, OR
ITEM 401003- * ASPHALT PATCH AND LEVEL COURSE, SLAG
- ③ ITEM 605015-, *ADJUST MANHOLE TYPE
- ④ EXISTING PAVEMENT AND CURBS
- ⑤ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL. PER S.Y.

* SEQUENCE NUMBER

NOTES:

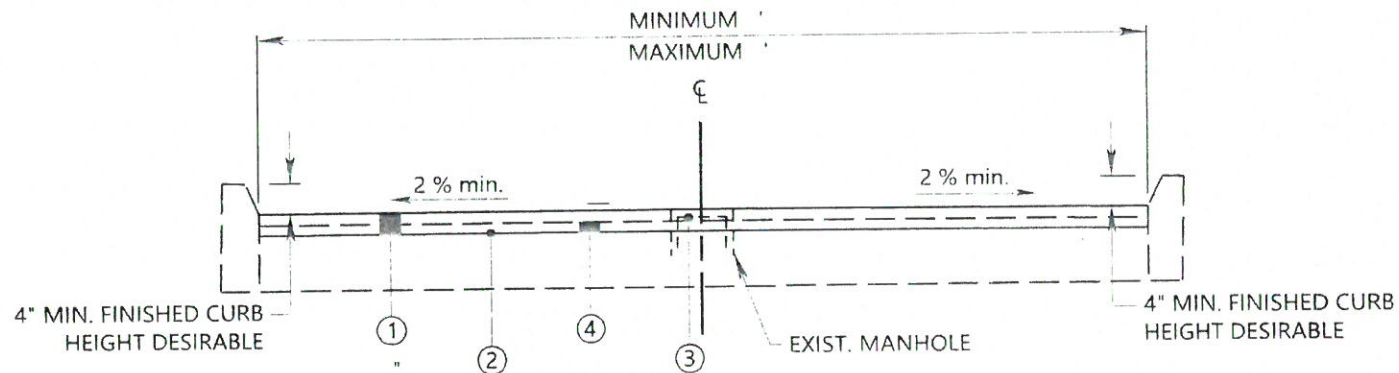
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CURBED STREET SECTION-FIRST RESURFACING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 40 - * ASPHALT, STONE OR GRAVEL, TYPE OR
ITEM 40 - * ASPHALT, SLAG, TYPE
- ② ITEM 408002-*, ASPHALT MATERIAL, GAL. PER S.Y.
- ③ ITEM 605015-001, ADJUST MANHOLE TYPE
- ④ ITEM 415005-001, STANDARD MILLING

* SEQUENCE NUMBER

NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

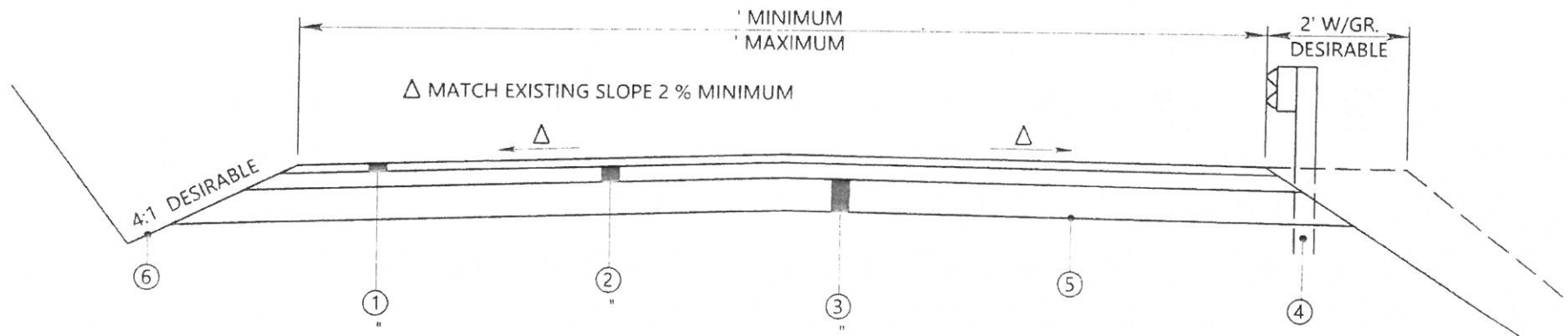
NOTES :

- ④ REMOVAL OF EXISTING ASPHALT PAVEMENT IS INTENDED TO ACHIEVE A 4" FINISHED CURB HEIGHT. REMOVAL IS TO BE OF VARIABLE THICKNESS TO ACHIEVE A SMOOTH - RIDING SURFACE.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CURBED SECTION-SECOND & SUBSEQUENT RESURFACING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401002-*, ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401002-*, ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001 *, ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001 *, ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 307001-001 , AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 228001 *, SUBGRADE PREPARATION
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE DETAIL Page 38)

* SEQUENCE NUMBER

NOTE:

WHERE DITCH IS NOT OF SUFFICIENT DEPTH TO INSURE POSITIVE DRAINAGE FROM BASE COURSE, CURB SECTION AND OR UNDERDRAIN IS TO BE USED AS SHOWN IN NON-DITCH DETAILS. (Page 50 AND Page 51)

NOTES:

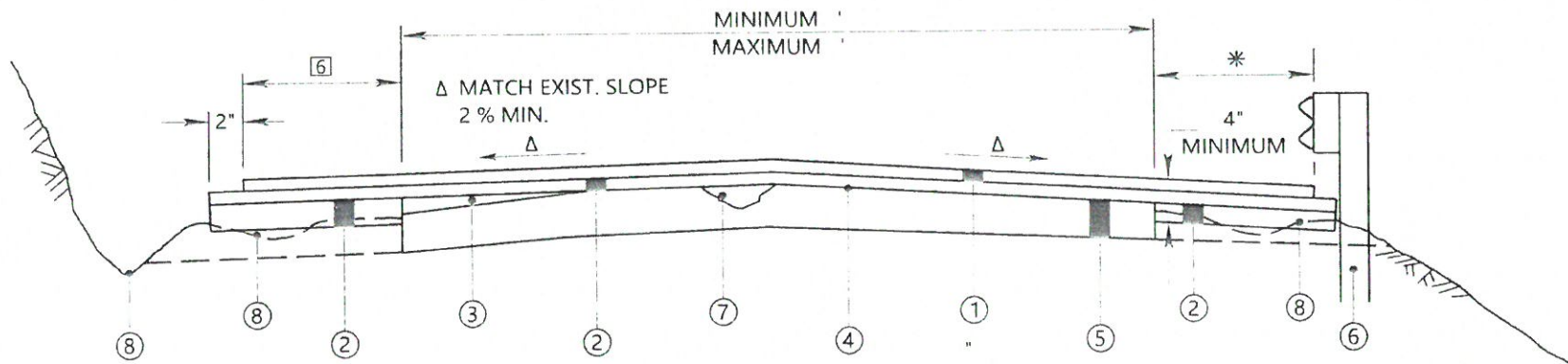
The pavement design for this project shall be in accordance with ____ Traffic Design.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

NARROW ROAD PAVING-FULL WIDTH INCLUDING SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401002-*, ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401002-*, ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-*, ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001-*, ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL OR
ITEM 401003-*, ASPHALT PATCH AND LEVEL COURSE, SLAG, TYPE
- ④ ITEM 408002-001, ASPHALT MATERIAL, GAL. PER S.Y.
- ⑤ EXISTING PAVEMENT
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS PER L.F.
- ⑦ POT-HOLE REPAIR - (SEE DETAIL Page 17)
- ⑧ ITEM 229001-000, SHOULDERS AND DITCHES (SEE DETAIL Page 38)

- ⑥ WIDTH OF EXISTING SHOULDERS GENERALLY
LESS THAN 2 FEET RESULTING IN COMPACTION
DIFFICULTIES IF STONE IS SPECIFIED.

NOTES:

The pavement design for this project shall
be in accordance with ____ Traffic Design.

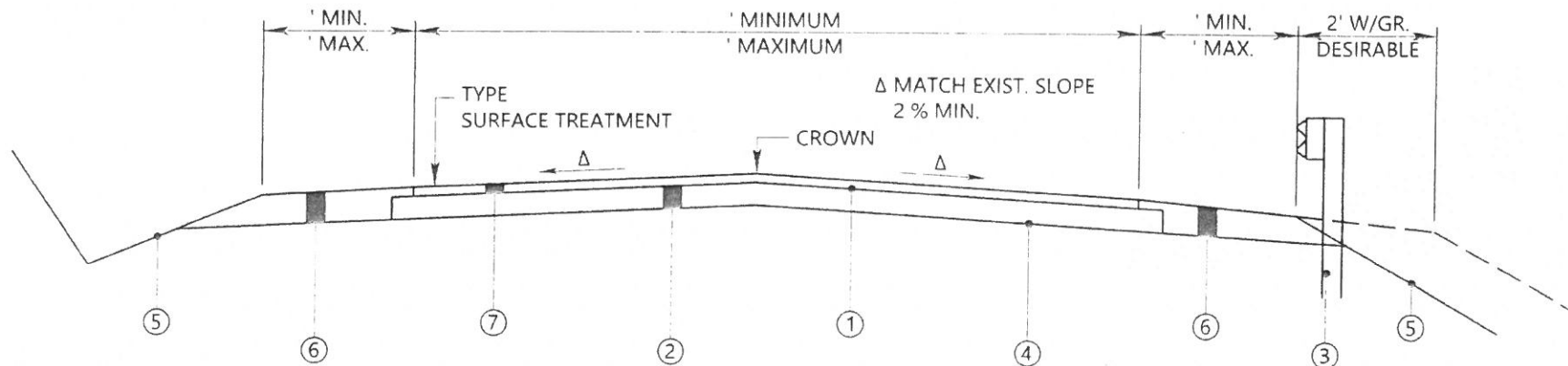
The design ESAL value on this project shall
be ____.

* SEQUENCE NUMBER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

RESURFACING ROADWAY WITH PAVED SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



- ① ITEM 408002-001, ASPHALT MATERIAL, GAL. PER S.Y.
- ② ITEM 307001-*, AGGREGATE BASE COURSE, CLASS
- ③ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ④ ITEM 228001-*, SUBGRADE PREPARATION
- ⑤ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- *** ⑥ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑦ ITEM 405001-*, SURFACE TREATMENT AGGREGATE, STONE OR GRAVEL, TYPE OR
ITEM 405001-*, SURFACE TREATMENT AGGREGATE, SLAG, TYPE
ITEM 405003-*, ASPHALT MATERIAL

* SEQUENCE NUMBER

NOTES:

CROWN TANGENT SECTIONS WHEN PAVEMENT IS WIDE ENOUGH FOR 2-LANE TRAFFIC (16' MINIMUM).

ONE-LANE PAVEMENT TO BE SLOPED AT 2% TOWARD FILL SIDE WHERE PRACTICAL. CURVES TO BE REVERSE-SLOPED OR SUPER-ELEVATED AS NECESSARY.

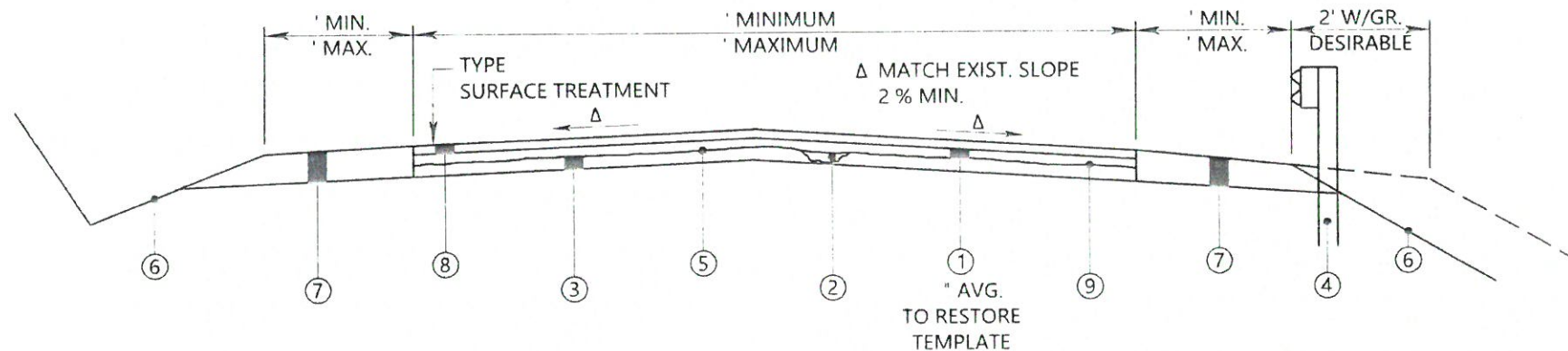
- ⑤ WHERE SHOULDERS ARE GENERALLY LESS THAN 2' WIDE, SHOULDER WIDTH WILL BE SHOWN AS 0 ABOVE INDICATING THAT SUCH SHOULDERS ARE TO BE PAVED WITH SAME MATERIAL AS TRAVELLED LANES.

The design ESAL value on this project shall be ____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SURFACE TREATMENT ON STONE BASE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



- ① ITEM 40 -*, ASPHALT , STONE AND GRAVEL, CLASS OR
ITEM 40 -*, ASPHALT , SLAG, CLASS
- ② POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ③ EXISTING ROADWAY
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 408002-001, ASPHALT MATERIAL
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- *** ⑦ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑧ ITEM 405001-* SURFACE TREATMENT AGGREGATE, STONE OR GRAVEL OR SINGLE, DOUBLE, TRIPLE
ITEM 405003-* ASPHALT MATERIAL
- ⑨ ITEM 405002-* PATCHING AND LEVELING AGGREGATE, STONE OR GRAVEL OR
ITEM 405002-* PATCHING AND LEVELING AGGREGATE, SLAG

NOTES:

- ⑤ WHERE SHOULDERS ARE GENERALLY LESS THAN 2' WIDE, SHOULDER WIDTH WILL BE SHOWN AS 0 ABOVE INDICATING THAT SUCH SHOULDERS ARE TO BE PAVED WITH SAME MATERIAL AS TRAVELLED LANES.

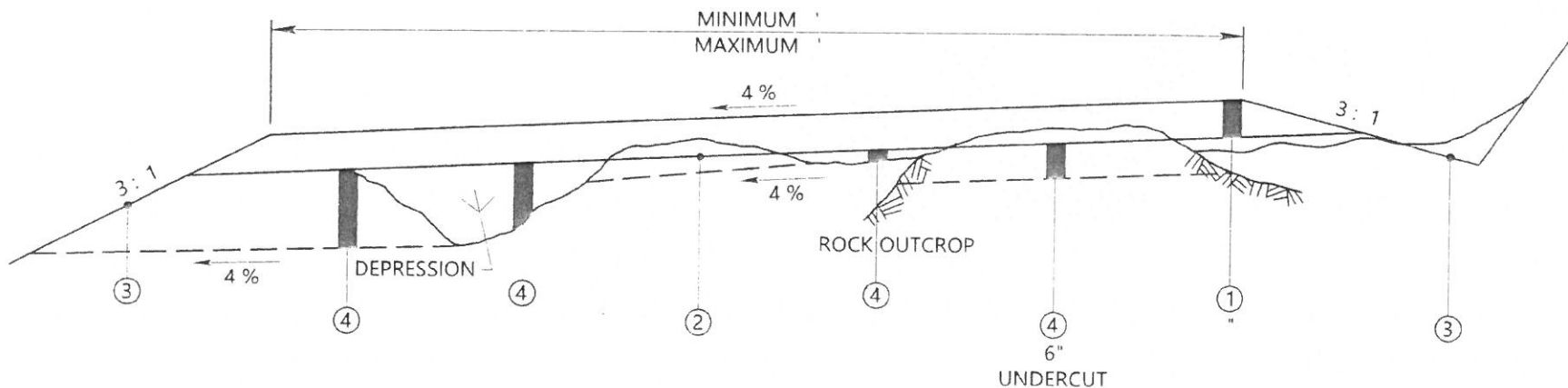
The design ESAL value on this project shall be ____.

* SEQUENCE NUMBER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SURFACE TREATMENT OVER BITUMINOUS SURFACE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 307001- * AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS OR
ITEM 307001- * AGGREGATE BASE COURSE, SLAG, CLASS
- ② ITEM 228001-000, SUBGRADE PREPARATION
- ③ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- ④ ITEM 307001- * AGGREGATE BASE COURSE, CLASS DEPRESSIONS

* SEQUENCE NUMBER

NOTE : SUBGRADE PREPARATION SHALL INCLUDE

A. DEPRESSION REPAIR-NECESSARY GRADING TO POSITIVELY DRAIN AREA TO BE FILLED WITH STONE.

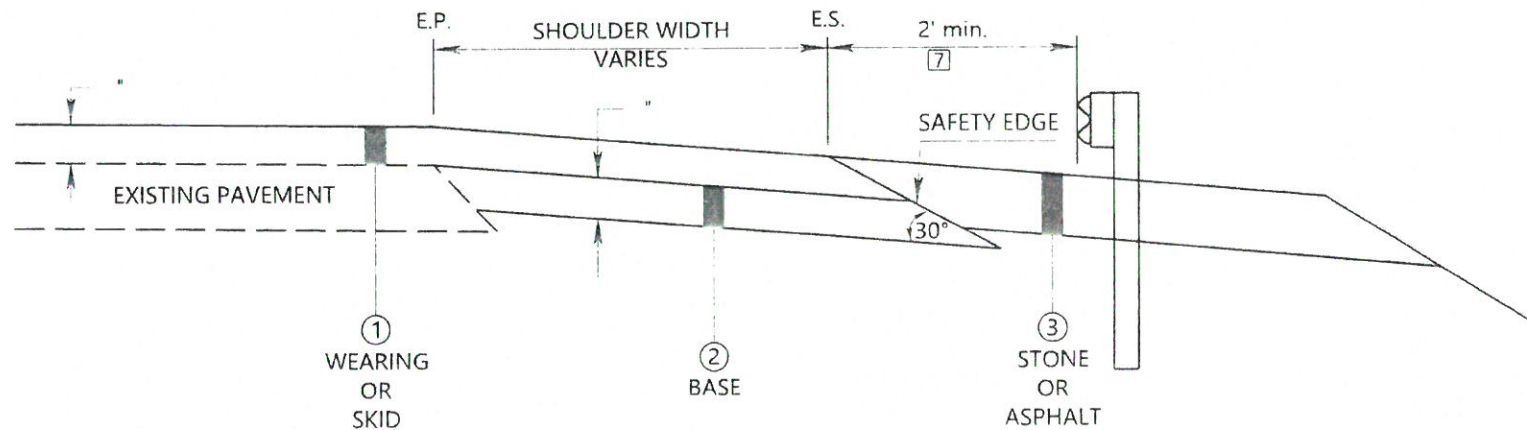
B. ROCK OUTCROP UNDERCUT-NECESSARY RIPPING AND/OR BLASTING.

NOTE:
The design ESAL value on this project shall be _____.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

STONE STABILIZED ROADWAY

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



NOTES:

- 7 2' minimum on interstates and expressways.
On rural roads where shoulders are to be paved use 6"

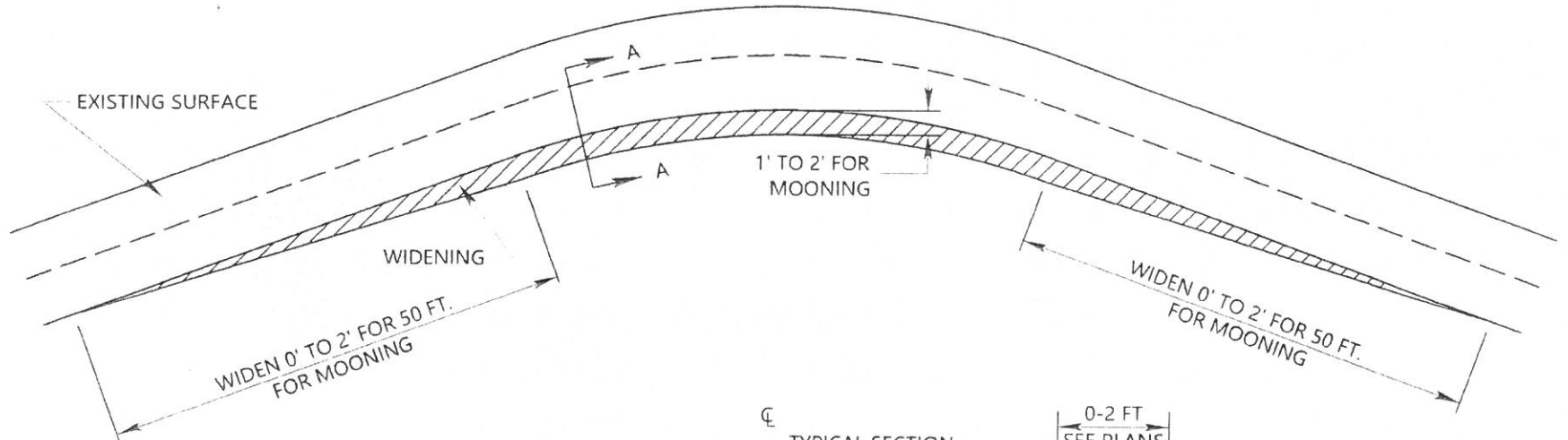
A Special Provision is required when using this detail.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

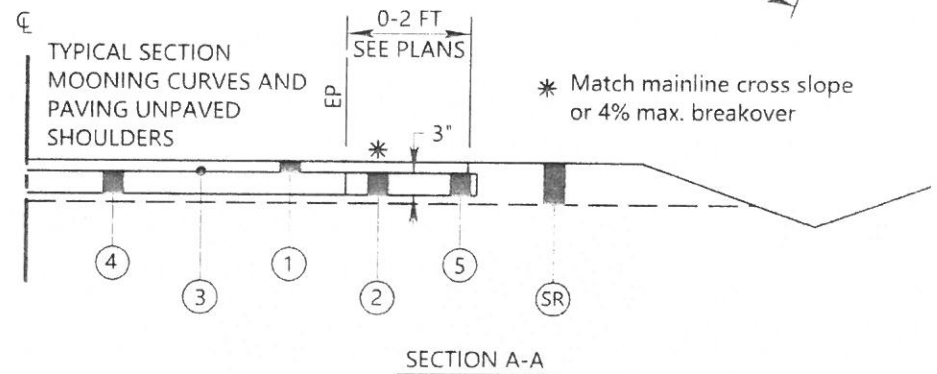
SHOULDER PAVING DETAIL WITH SAFETY EDGE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

TYPICAL
WIDENING / MOONING
OF A CURVE



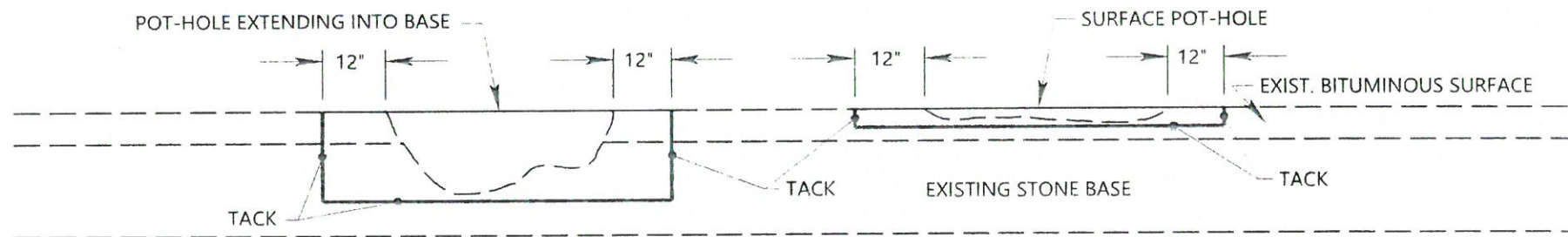
- ① MATCH TOP LIFT
- ② ITEM 401001-001, MARSHALL ASPHALT BASE COURSE, ST OR GR, TYPE 2 OR
ITEM 401001-002, MARSHALL ASPHALT BASE COURSE, SLAG, TYPE 2
- ③ ITEM 408002-001, ASPHALT MATERIAL, 0.03 GAL PER SY
- ④ EXISTING ROADWAY
- ⑤ UNCLASSIFIED EXCAVATION
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MOONING CURVES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



(ELEVATION VIEW)

THE SIDES AND BOTTOMS MUST BE CLEANED AFTER THE HOLE IS SHAPED TO FROM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL OR AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC WITH THE EDGES NEAT AND AS NEARLY VERTICAL AS POSSIBLE.

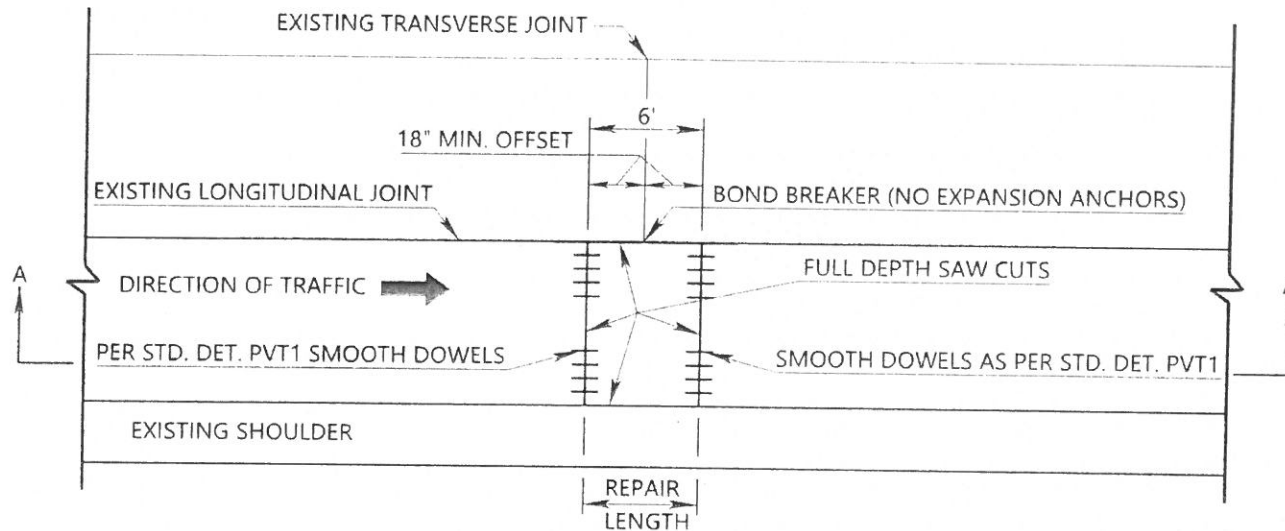
THE EXISTING BASE WILL BE REPLACED WITH ASPHALT.

THE REMAINING SURFACE POT-HOLE WILL BE FILLED WITH ASPHALT BASE COURSE TYPE MEETING REQUIREMENTS OF SECTION 401 OF THE SPECS. ENOUGH MATERIAL MUST BE USED TO BRING THE SURFACE OF REPAIR ABOUT $\frac{1}{4}$ " ABOVE THE LEVEL OF THE ORIGINAL PAVEMENT TO ALLOW FOR FURTHER COMPACTION BY TRAFFIC AND/OR RESURFACING.

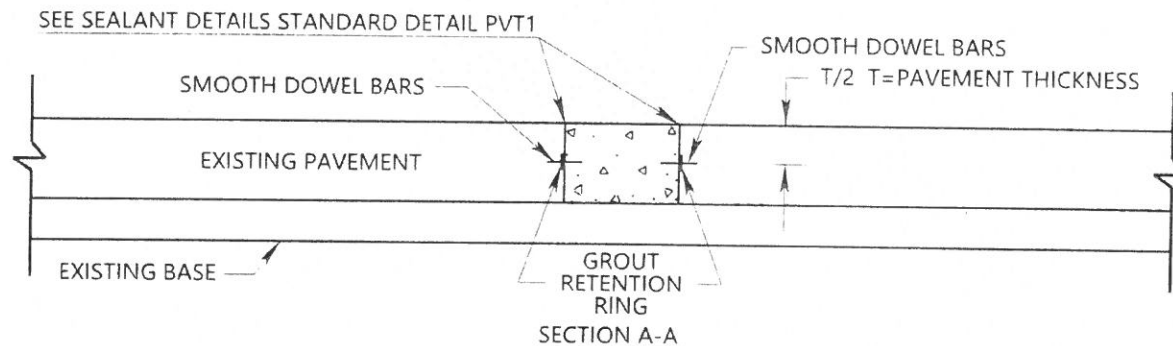
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

POT-HOLE REPAIR DETAIL

Public Roads Div	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



PLAN



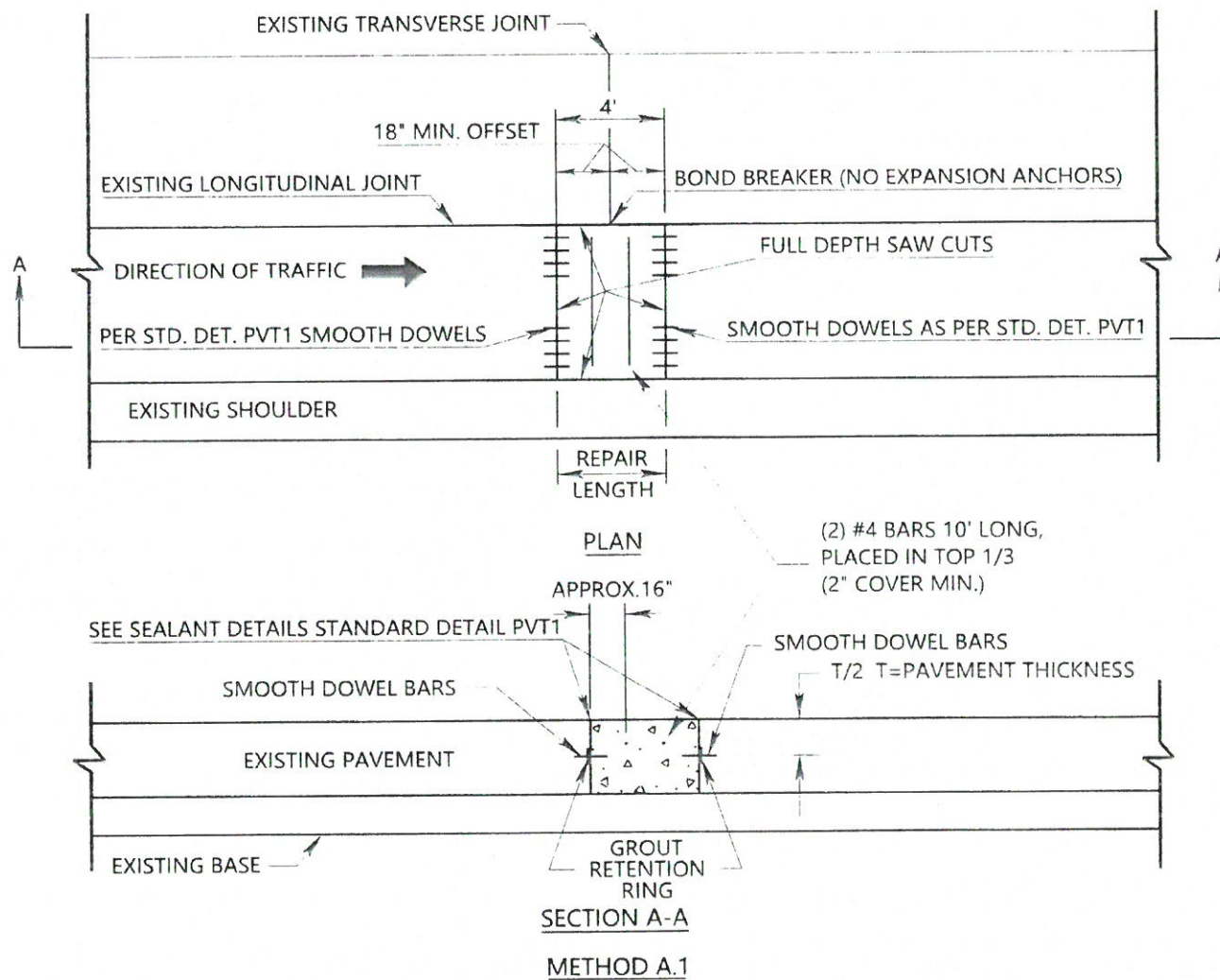
METHOD A

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR.
THE TOTAL REPAIR LENGTH SHALL BE 6 FOOT.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD A) 1 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

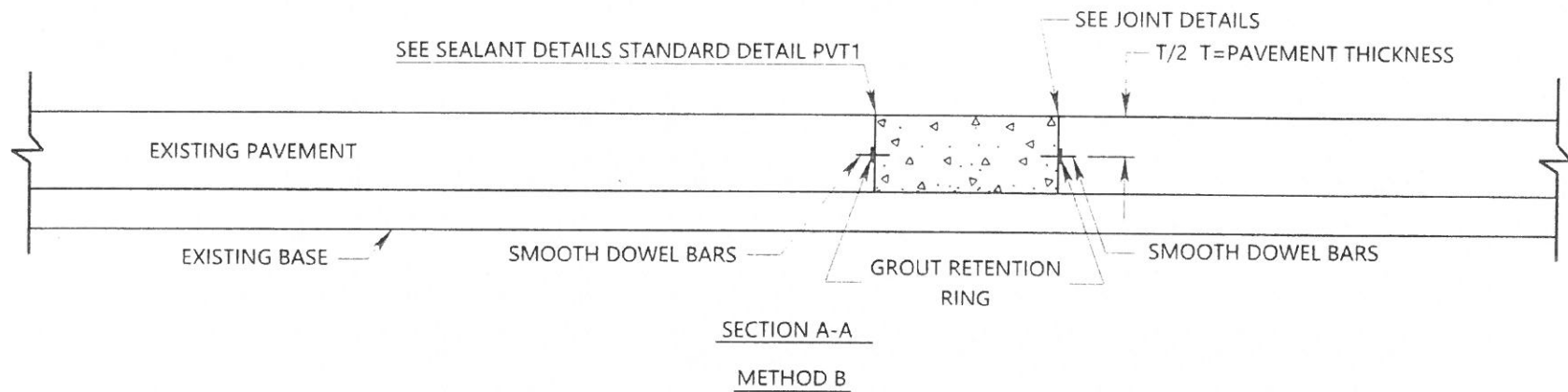
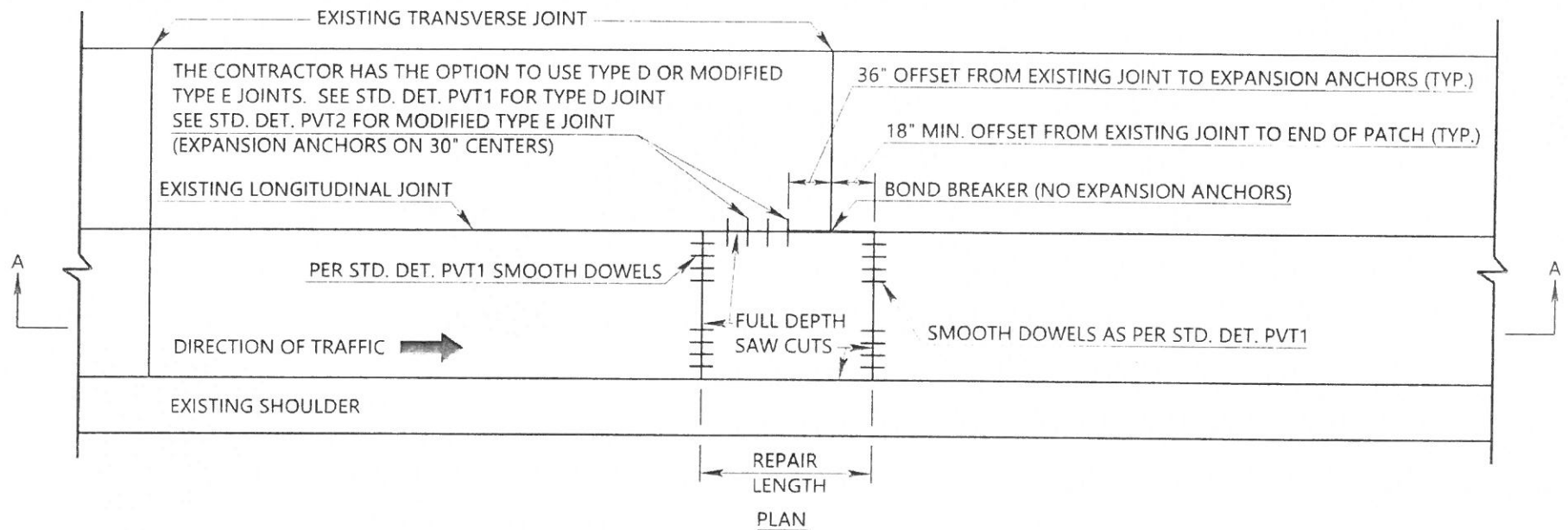


REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR. THE TOTAL REPAIR LENGTH SHALL BE 4 FOOT.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD A.1) 1a OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

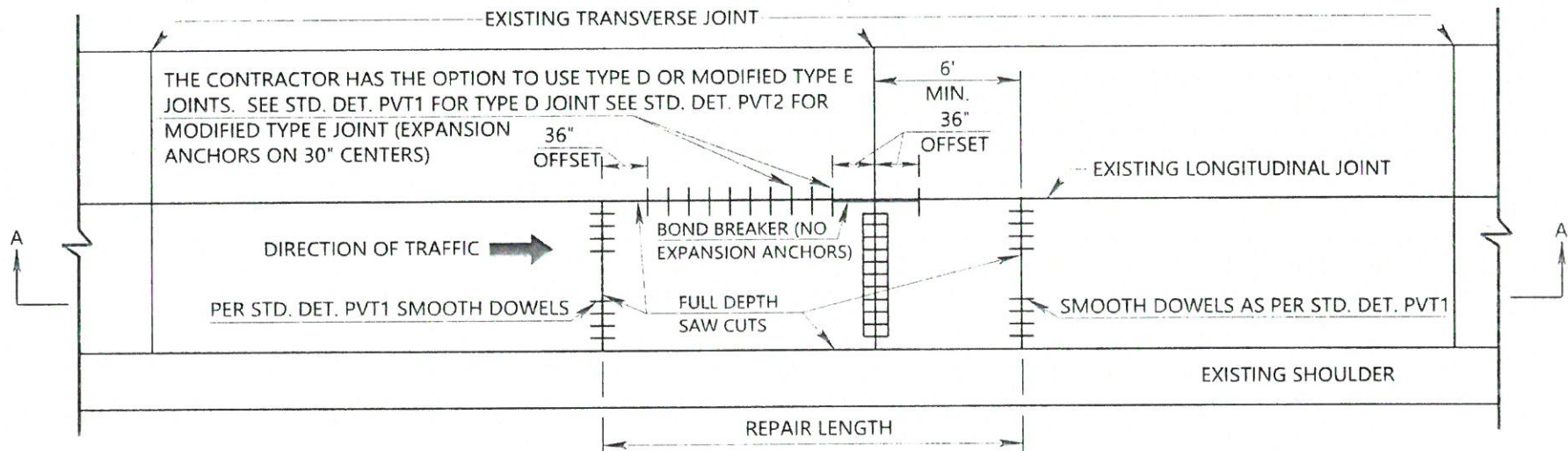


REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT WHEN THE REPAIR EXCEEDS 36" ON ONLY ONE SIDE OF THE JOINT. (NOTE THAT THE 18" OFFSET IS TO ALLOW FOR THE REMOVAL AND REPLACEMENT OF DOWELS.) REPAIRS ARE GREATER THAN 6' BUT LESS THAN 15' IN LENGTH AND REQUIRE LONGITUDINAL TYPE D OR MODIFIED TYPE E JOINTS.

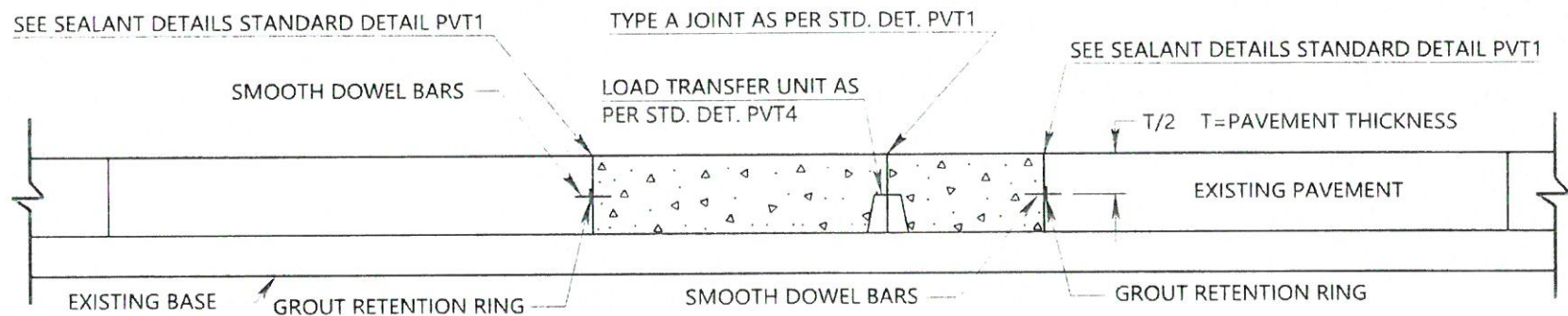
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD B) 2 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



PLAN



SECTION A-A

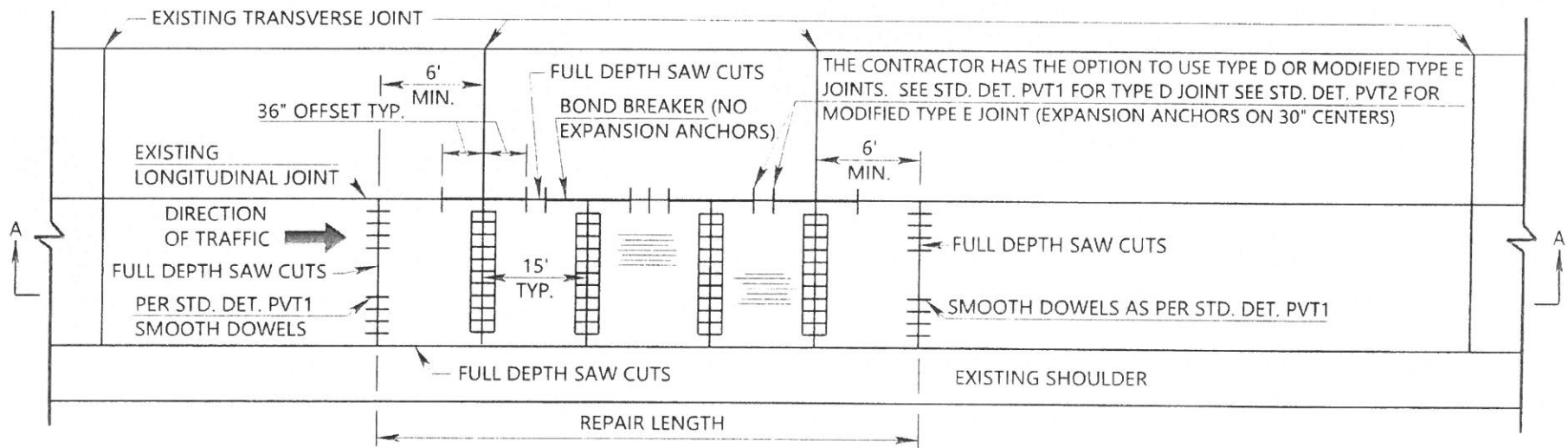
METHOD C

REPAIRS EXCEEDING 36" ON BOTH SIDES OF AN EXISTING TRANSVERSE JOINT, REPAIR SLABS AND REMAINS OF EXISTING SLABS SHALL NOT BE LESS THAN 15' IN LENGTH.

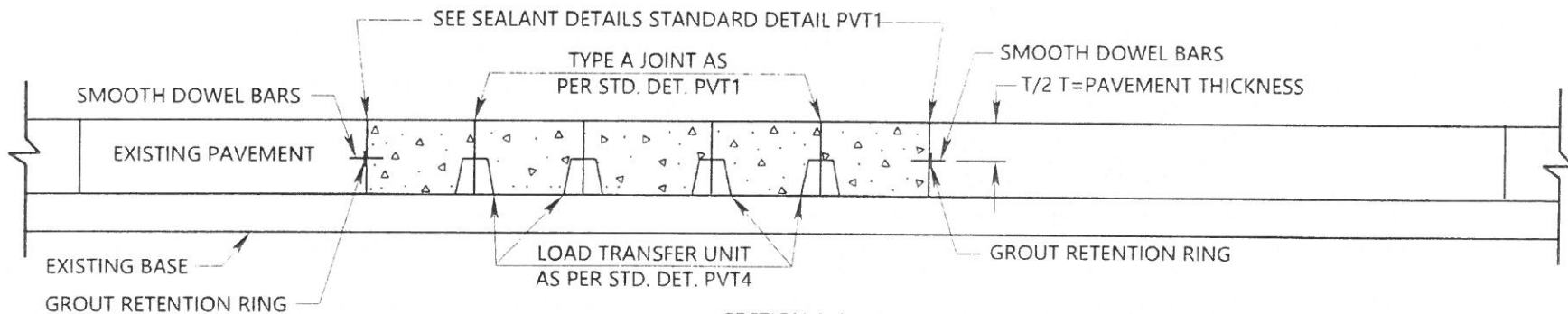
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD C) 3 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



PLAN



SECTION A-A

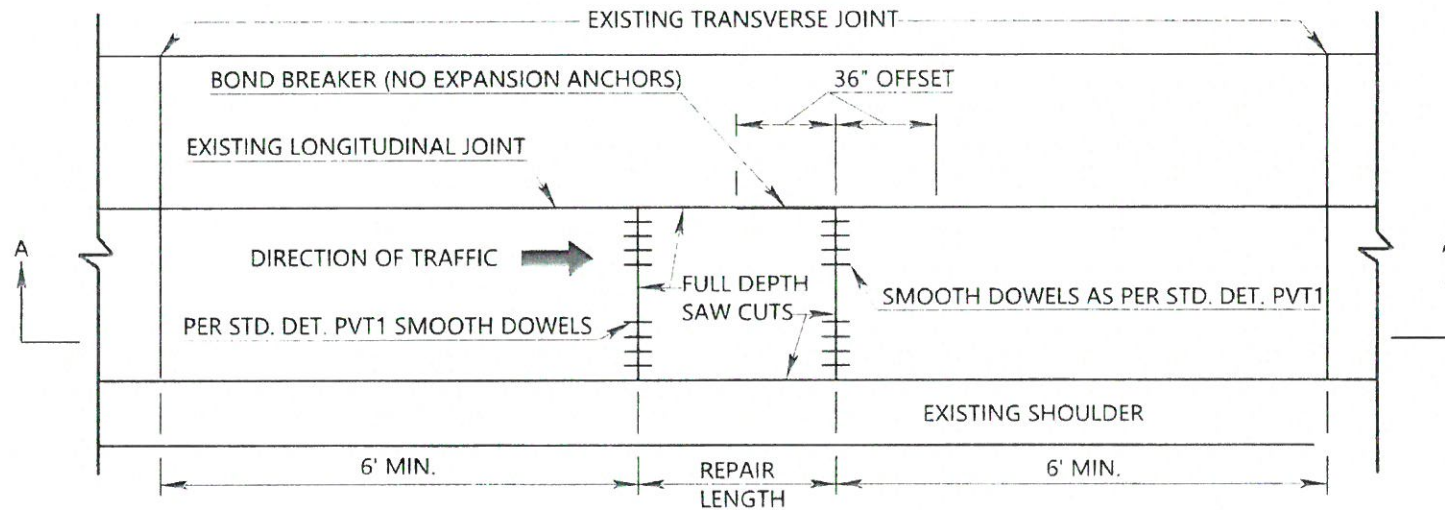
METHOD D

REPAIRS PERFORMED TO COMPLETELY REPLACE SLABS BETWEEN TWO JOINTS. EXISTING DOWELS AND ASSEMBLIES SHALL BE COMPLETELY REMOVED WHEN A REPAIR IS PERFORMED AT A TRANSVERSE JOINT.

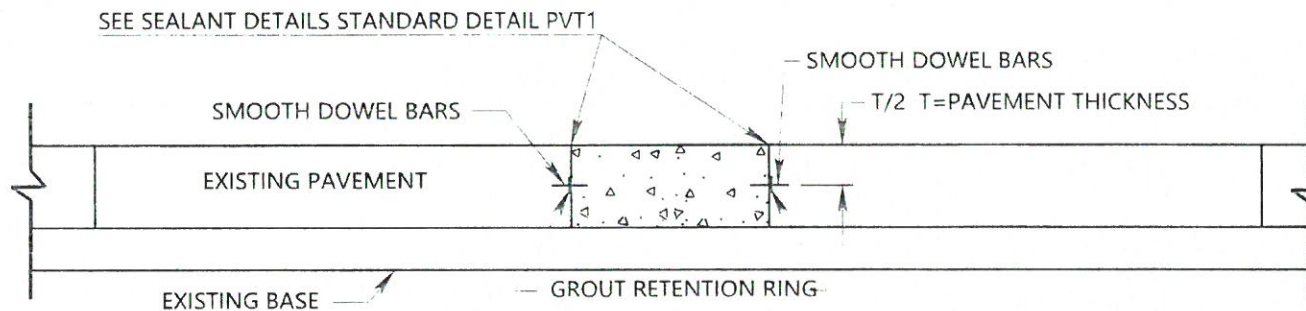
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD D) 4 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



PLAN



SECTION A-A

METHOD E

REPAIRS PERFORMED AT MID SLAB SHALL BE A MINIMUM OF 6' FROM AN EXISTING TRANSVERSE JOINT. DETAIL METHODS A, B, C AND D SHALL APPLY.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD E) 5 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

GENERAL NOTES

REPAIRS SHALL BE MADE USING CONCRETE MEETING THE REQUIREMENTS OF SECTION 501 OF THE SPECIFICATIONS, SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH SUBSECTION 228 OF THE SPECIFICATIONS AND MAY REQUIRE ADDITIONAL MATERIAL TO FACILITATE PLACEMENT OF LOAD TRANSFER UNITS. COST TO BE INCLUDED IN VARIOUS ITEMS IN THE CONTRACT. HOLES FOR THE DOWELS AND LOAD TRANSFER UNITS SHALL BE DRILLED SIMULTANEOUSLY TO THE REQUIRED DEPTH USING FRAME MOUNTED DRILLS WHICH WILL MAINTAIN THE DRILLS IN A LONGITUDINALLY PARALLEL POSITION. HOLE DIAMETER SHALL BE $\frac{1}{4}$ " LARGER FOR CEMENT GROUTS AND $\frac{1}{16}$ " FOR EPOXIES THAN THE BAR DIAMETER. AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOIL AND TESTING DIVISION SHALL BE USED TO SECURE THE DOWEL/TIE BARS IN PLACE. JOINTS SHALL BE MADE IN ACCORDANCE WITH SECTION 501 OF THE SPECIFICATIONS AND DETAILS ATTACHED IN PLANS. ALL DOWELS SHALL BE EPOXY COATED. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED FOR REMOVING AND REPLACING EXISTING PORTLAND CEMENT CONCRETE PAVEMENT IN ACCORDANCE WITH THE ABOVE DETAILS. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 506001-001 CONCRETE PAVEMENT REPAIR. THE CONTRACTOR IS REQUIRED TO SCHEDULE WORK ON ALL CONCRETE PAVEMENT REPAIRS IN SUCH A MANNER THAT WILL NOT PERMIT OPEN HOLES TO REMAIN OPEN OVERNIGHT OR ON WEEKENDS.

OVERSAWING INTO ADJACENT SLABS WHEN ONLY ONE LANE OR PORTION OF A LANE IS TO BE REMOVED SHALL BE KEPT TO THE MINIMUM NECESSARY TO ENSURE THAT FULL DEPTH CUTS IN THE CORNERS HAVE BEEN ACHIEVED. ALL OVERSAWING SHALL BE THOROUGHLY CLEANED AND REPAIRED WITH AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOILS AND TESTING DIVISION.

MINIMUM $1\frac{1}{4}$ " DIAMETER PLAIN EPOXY COATED DOWEL BARS, AS PER STANDARD DETAIL SHEET PVT4, WILL BE USED AT BOTH ENDS OF THE REPAIR. STARTING 6-12 INCHES FROM EITHER EDGE AND THEN ON 12" CENTERS.

TYPE D OR MODIFIED TYPE E JOINTS AS PER STANDARD DETAIL SHEETS PVT4 AND PVT2 MAY BE USED FOR THE LONGITUDINAL CONSTRUCTION JOINT. BARS SHALL BE SPACED ON 30" CENTERS WITH THE EXCEPTION THAT BARS WILL NOT BE PLACED WITHIN 36" OF A WORKING CONSTRUCTION JOINT OR AN ADJACENT TRANSVERSE CONTRACTION JOINT, OR AN ADJACENT WORKING CRACK THAT WILL NOT BE REPAIRED. A BOND BREAKER WILL BE PLACED IN THIS AREA IN LIEU OF THE EXPANSION ANCHORS.

FOR PAVEMENT REPAIR LENGTHS GREATER THAN 15', LOAD TRANSFER UNITS AS PER STANDARD DETAIL SHEET PVT4 SHALL BE INSTALLED:

1. TO MATCH ADJACENT CONTRACTION JOINTS OR RANDOM TRANSVERSE CRACKS IF ONLY ONE LANE IS REPLACED, OR
2. ON 15' CENTERS IF MORE THAN ONE LANE OF PAVEMENT REPAIR IS BEING REPLACED.

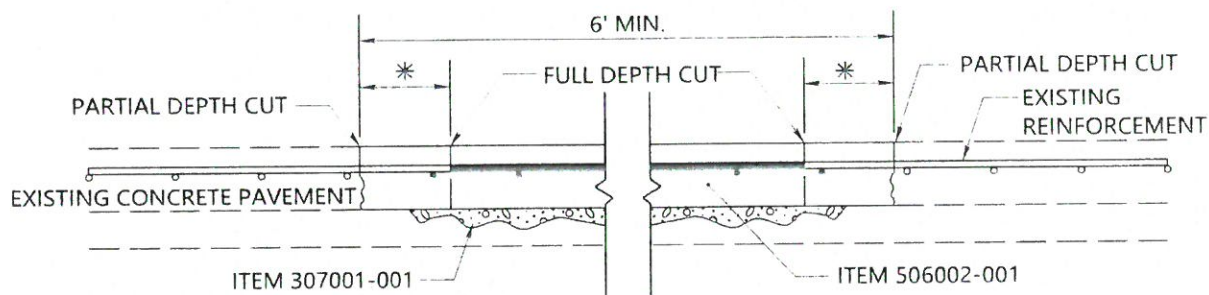
CONTRACTION JOINTS IN THE ADJACENT LANE SCHEDULED TO REMAIN SHALL BE SEALED ON THEIR LOGITUDINAL FACE PRIOR TO PLACEMENT OF CONCRETE IN THE REPAIR AREA IN ORDER TO PREVENT NEW CONCRETE FROM ENTERING.

HOT POUR JOINT SEALANT MEETING ASTM SPECIFICATION D3405 MAY BE SUBSTITUTED FOR THE LOW-MODULUS SILICONE SEALANT SPECIFIED ON STANDARD DETAIL SHEET PVT1.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

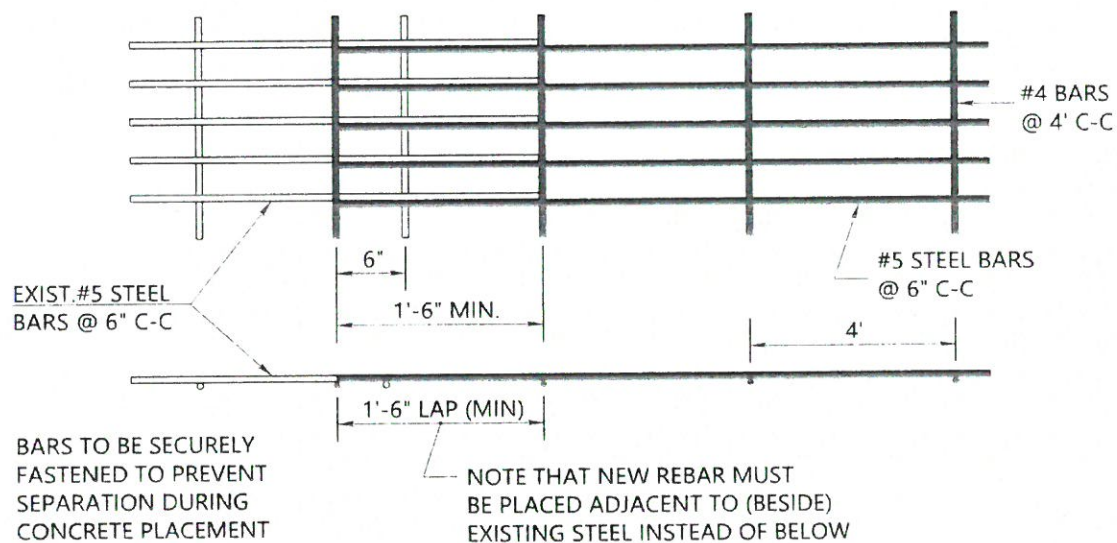
CONCRETE REPAIR DETAIL (NOTES) 6 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



* SEE LAP DETAIL

CONCRETE PAVEMENT REPAIR (CONTINUOUS REINFORCED)



LAP DETAIL

NOTES

EXISTING CONTINUOUS REINFORCED CONCRETE PAVEMENT IS TO BE REMOVED BY FULL DEPTH CUTTING OF THE CONCRETE AND REINFORCEMENT EXCEPT FOR THE LAP SECTION. THE LAP SECTION CONCRETE IS TO BE SAWED PARTIAL DEPTH (TO JUST ABOVE THE REINFORCING STEEL AND THE REMAINDER IS TO BE BROKEN OUT WITH HAND TOOLS). JACKHAMMER SIZE IS LIMITED TO 15 POUNDS TO AVOID SPALLING IN THE ADJACENT CONCRETE. EXTREME CARE MUST BE TAKEN TO AVOID DAMAGE TO THE REINFORCING IN THIS SECTION. REINFORCING BARS SHOULD NOT BE BENT TO FACILITATE CLEANOUT. THE REINFORCEMENT IS THEN TO BE PLACED WITH 1'-6" OVERLAP IN THE REINFORCEMENT AND SECURED AS SHOWN IN THE LAP DETAIL. CHAIRS, WITH SAND PLATES, ARE REQUIRED IN ORDER TO SUPPORT THE REBAR MAT FOR THE PREVENTION OF SAGGING DURING CONCRETE PLACEMENT.

ALL MATERIAL REMOVED IN THE CONCRETE PAVEMENT REPAIRS WILL BE REMOVED FROM THE PROJECT AND DISPOSED OF BY THE CONTRACTOR. THE COST OF THE REMOVAL AND DISPOSAL OF THE OLD CONCRETE SHALL BE INCLUDED IN THE UNIT BID PRICE OF ITEM 506002-___ "HIGH EARLY STRENGTH CONCRETE PAVEMENT REPAIR (S.Y.)"

THE CONTRACTOR IS LIMITED TO SAWING ONLY THE AMOUNT IN WHICH HE CAN REPLACE IN ONE SHIFT.

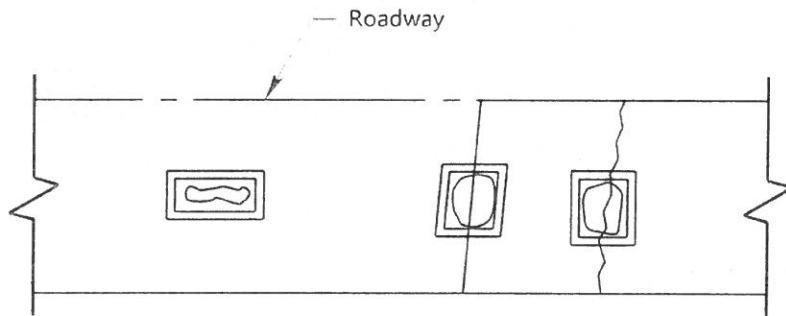
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE PAVEMENT REPAIR (CONTINUOUS REINFORCED)

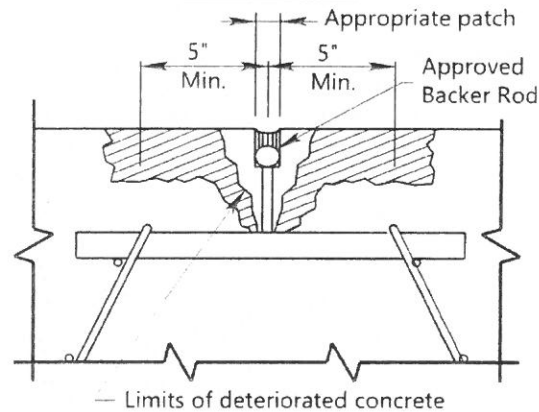
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

DESCRIPTION: REMOVE CONCRETE, FURNISH AND PLACE CONCRETE, SAW, AND SEAL JOINTS/CRACKS.

PLAN VIEW



PROFILE VIEW



AREA TO BE REMOVED
18" Min. dimension
(width & length)

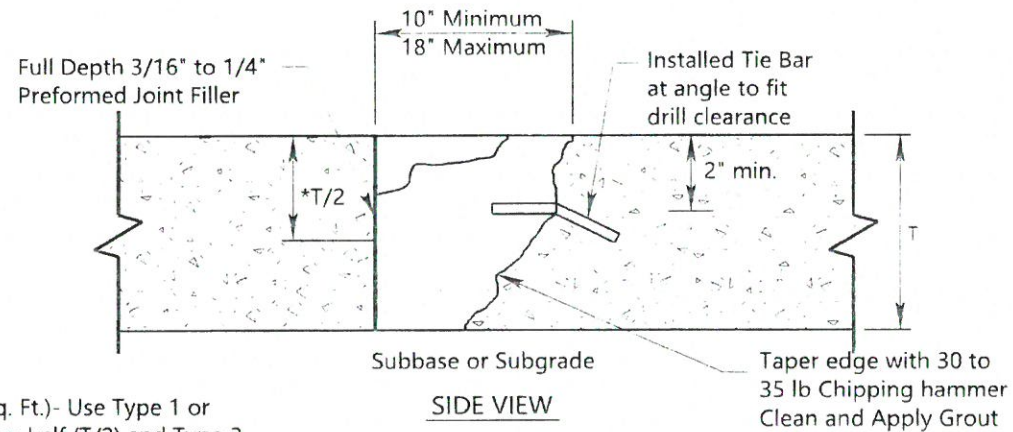
CONSTRUCTION NOTES:

1. DO NOT PLACE CONCRETE FOR PARTIAL DEPTH REPAIRS AT AIR TEMPERATURES BELOW 40°F.
2. DO NOT USE "JACKHAMMERS" FOR PARTIAL DEPTH REPAIRS. REMOVAL HAMMERS ARE LIMITED TO A MAXIMUM RATED WEIGHT OF 35 LBS.
3. REMOVE THE CONCRETE SURFACE IN THE DESIGNATED REPAIR AREAS TO A MINIMUM DEPTH OF 2 INCHES AND ALL DETERIORATED CONCRETE REMOVE TO A MAXIMUM DEPTH OF ONE-HALF PAVEMENT THICKNESS.
4. REMOVE THE CONCRETE SURFACE IN THE DESIGNATED REPAIR AREA BY EITHER MILLING OR BY DELINEATING THE REPAIR AREA BY SAW CUTS. THE CONTRACTOR SHALL NOT DAMAGE THE DOWEL BARS DURING THE REMOVAL PROCESS. ANY DAMAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE CONTRACTOR SHALL PROVIDE A COMPRESSION RELIEF SAW CUT OR INSTALL COMPRESSION RELIEF MATERIAL AT THE TIME OF PLACEMENT OF THE CONCRETE TO RE-ESTABLISH JOINTS AND CRACKS AT THEIR ORIGINAL LOCATIONS. COMPRESSION RELIEF MATERIAL EQUAL TO EXISTING CRACK WIDTH, $\frac{1}{4}$ " MINIMUM, 1" MAXIMUM. MATERIAL TO BE INSTALLED AT THE TIME OF CONCRETE PLACEMENT TO THE FULL DEPTH OF THE REPAIR. EDGING OF THE RESTORED CRACK IS REQUIRED.
6. THE CONTRACTOR WILL PROVIDE AND PLACE A EPOXY BONDING MATERIAL TO THE PREPARED CONCRETE REPAIR SURFACE.
7. THE CONTRACTOR SHALL FURNISH, PLACE, FINISH AND CURE CONCRETE IN ACCORDANCE WITH SECTION 501 OR CLASS B IN ACCORDANCE WITH SECTION 601. AND AS MODIFIED BY SECTION 506 AS REPLACEMENT CONCRETE FOR ALL PARTIAL DEPTH REPAIRS. AASHTO NUMBER 8 SHALL BE ALLOWED AS THE COURSE AGGREGATE FOR CONCRETE MIXES USED FOR PARTIAL DEPTH REPAIRS.
8. THE CONTRACTOR SHALL SAW AND SEAL EXISTING JOINTS AND CRACKS INVOLVING PARTIAL DEPTH REPAIRS.

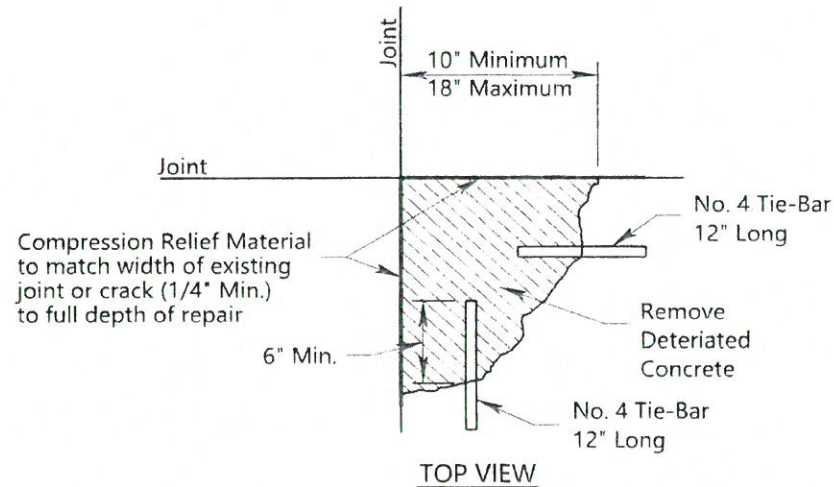
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PARTIAL DEPTH REPAIR

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



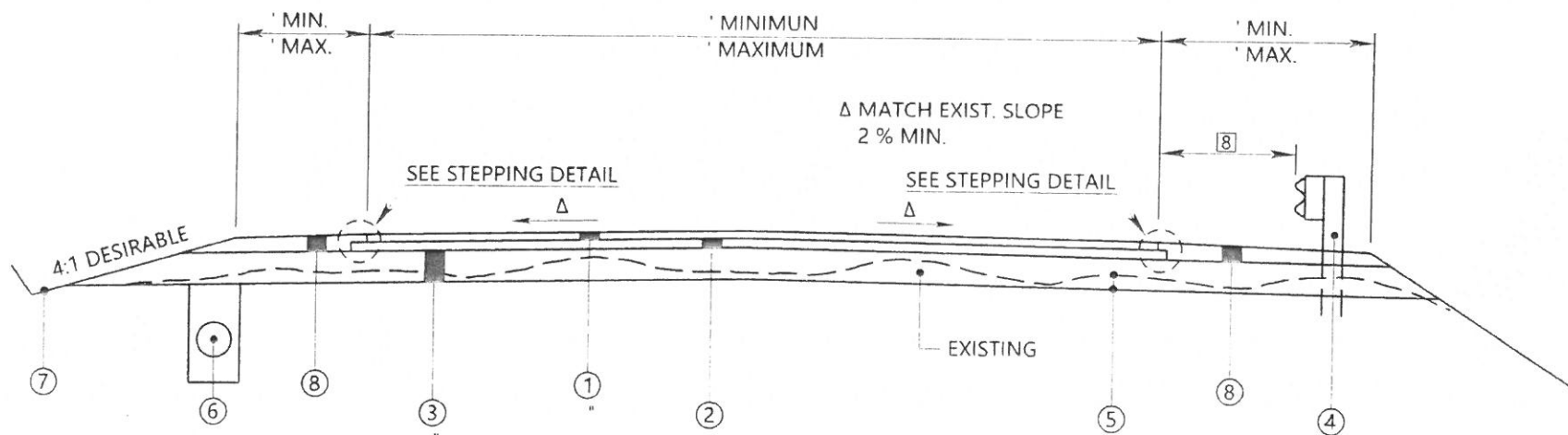
* Payment (Sq. Ft.)- Use Type 1 or Type 2 for top half (T/2) and Type 3 for bottom half.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PARTIAL DEPTH CORNER JOINT REPAIR

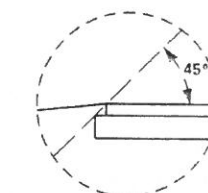
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401002- * ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401002- * ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001- * ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001- * ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 30700 - * AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑥ ITEM 606025- * INCH UNDERDRAIN PIPE OR
ITEM 606020-001, FABRIC UNDERDRAIN (AS SHOWN IN PLANS)
- ⑦ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- ⑧ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10

* SEQUENCE NUMBER



STEPPING DETAIL

NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

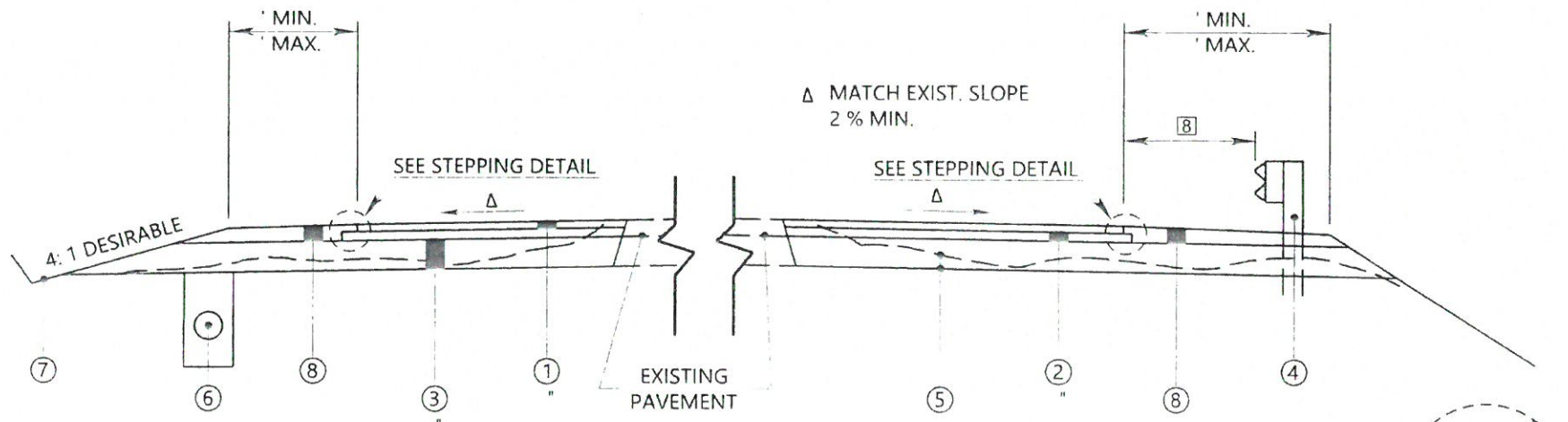
The design ESAL value on this project shall be ____.

- ⑧ GUARDRAIL TO BE LOCATED AT THE PREVAILING OFFSET IN ADJACENT SECTIONS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

TYPICAL SECTION FOR BASE FAILURE-FULL WIDTH

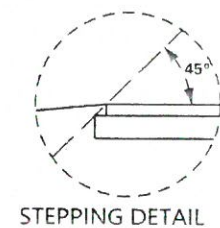
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401002-*, ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401002-*, ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-*, ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
ITEM 401001-*, ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 30700 -*, AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑥ ITEM 606025-*, INCH UNDERDRAIN PIPE OR
ITEM 606020-001, FABRIC UNDERDRAIN (AS SHOWN IN PLANS)
- ⑦ ITEM 229001-001, SHOULDERS AND DITCHES (SEE DETAIL Page 28)
- ⑧ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR
ITEM 307005-001, AGGREGATE BASE COURSE, SLAG, CLASS 10

* SEQUENCE NUMBER



NOTES:

The pavement design for this project shall be in accordance with ____ Traffic Design.

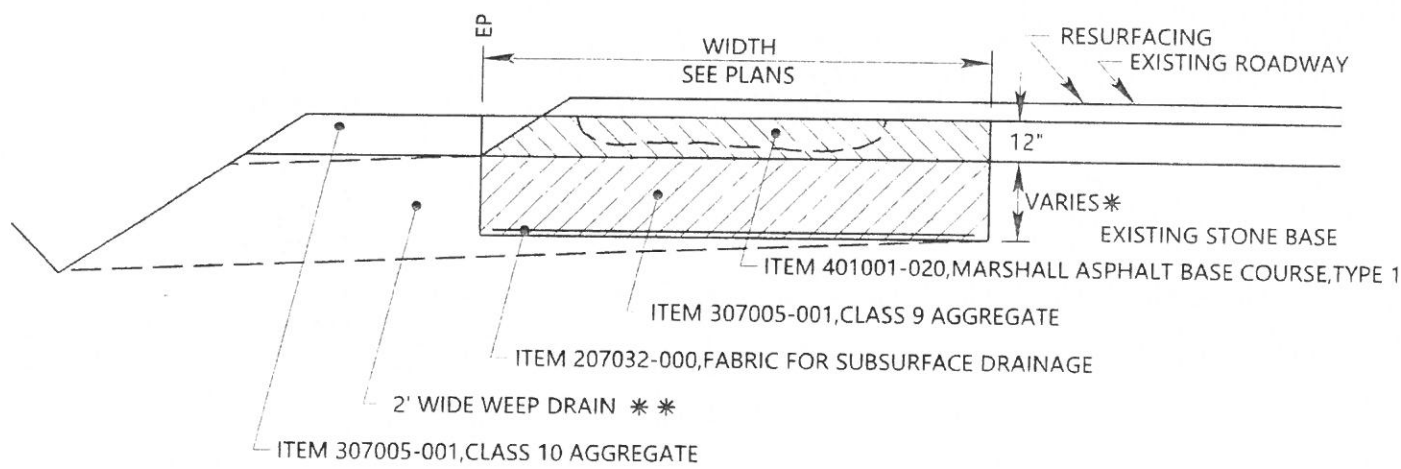
The design ESAL value on this project shall be ____.

- ⑧ GUARDRAIL TO BE LOCATED AT THE PREVAILING OFFSET IN ADJACENT SECTIONS.

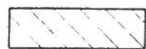
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

TYPICAL SECTION FOR BASE FAILURE-PARTIAL WIDTH

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



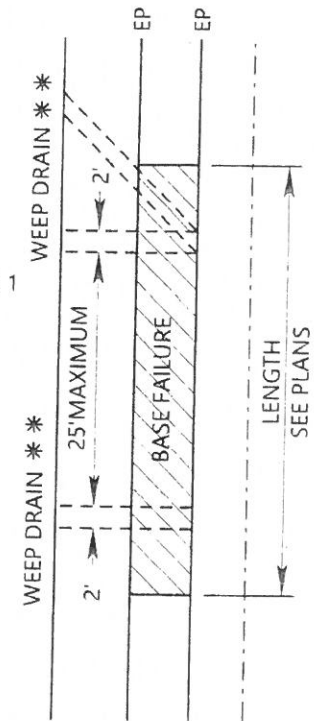
(ELEVATION VIEW)



TRENCH EXCAVATION SHALL BE SHAPED TO FROM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL WITH AND AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC. PAVEMENT SHALL BE SAW CUT AND SIDES OF TRENCH EXCAVATED TO NEAR VERTICAL AS POSSIBLE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE TRENCH BOTTOM PRIOR TO PLACING FABRIC. PAYMENT FOR EXCAVATION TO BE ITEM 207001-001, UNCLASSIFIED EXCAVATION.

* THICKNESS OF ITEM 307005-001, CLASS 9 AGGREGATE, TO BE AS DIRECTED BY THE ENGINEER (ESTIMATED AT 6")

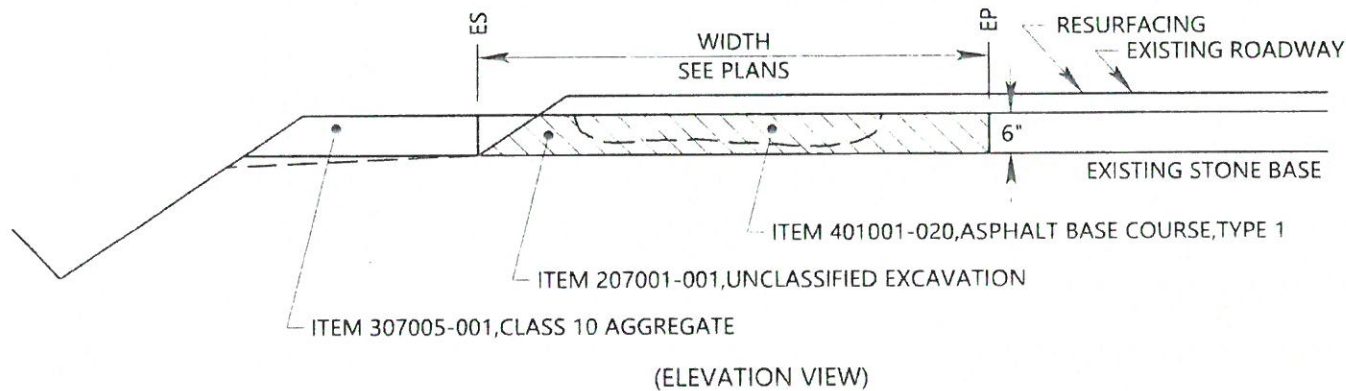
* * WEEP DRAINS SHALL BE LOCATED AT ALL LOW POINTS IN TRENCH. MAXIMUM SPACING BETWEEN WEEP DRAINS SHALL BE TWENTY FIVE (25) FEET. DRAINS MAY BE SKEWED WHERE NECESSARY TO MAINTAIN SLOPE AWAY FROM THE TRENCH AREA. PAYMENT FOR WEEP DRAINS TO BE INCLUDED IN ITEM 307005-001, CLASS 9 AGGREGATE BASE COURSE.

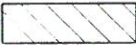


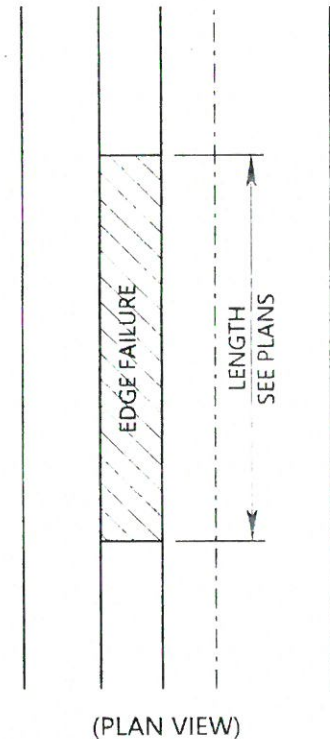
(PLAN VIEW)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
BASE FAILURE REPAIR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



 TRENCH EXCAVATION SHALL BE SHAPED TO FORM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL WITH AND AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC. PAVEMENT SHALL BE SAW CUT AND SIDES OF TRENCH EXCAVATED TO NEAR VERTICAL AS POSSIBLE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE TRENCH BOTTOM PRIOR TO PLACING ASPHALT.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

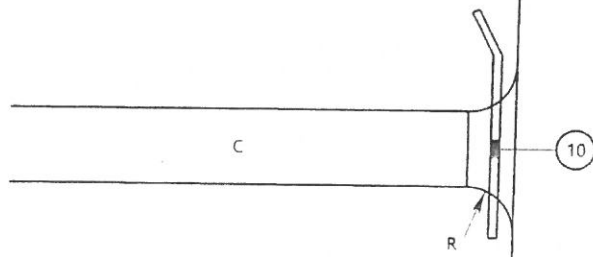
EDGE FAILURE REPAIR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

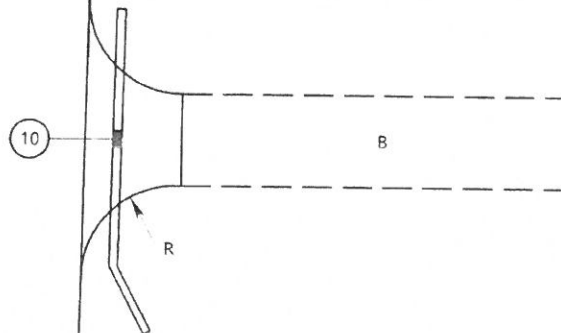
Apply mainline pavement to the back of radius or to the ditchline, whichever is less.

10 Item 606025, Underdrain Pipe or Item 606020-001, Fabric Underdrain as Specified in plans.

Apply wearing course overlay to the back of the radius or for the length as specified in the table.



Apply mainline pavement to back of radius or a minimum of 25 ft. whichever is greater. If stone side-road on State System is on a steep downgrade which causes mud or stone to be transferred to the mainline, mainline paving is to be extended as listed in the table.



If driveway or sideroad is not listed in the table at the right, stone entrance is to be built up with shoulder stone to the prevailing shoulder width and slope. Asphalt is to be tapered from the mainline surface for paved entrances to avoid bumps and to assure that no adverse slopes result when adjacent shoulders are finished to the desirable slope.

[illegible]

All approaches are to be tied-in with Asphalt as directed by the engineer. tons of Asphalt have been allocated for approaches.

DRIVEWAY AND SIDEROAD TREATMENT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

Diagram illustrating the placement of signs and lights for a two-lane road construction zone. The diagram shows the sequence of signs and their spacing relative to the work area.

Signs and Spacing (Left Side - Approaching from Left):

- 500' MIN. spacing between 'ROAD WORK AHEAD' and 'ONE LANE ROAD AHEAD'.
- 500' MIN. spacing between 'ONE LANE ROAD AHEAD' and the worker symbol sign.
- VARIES SEE NOTE 2 spacing between the worker symbol sign and the 'END ROAD WORK' sign.
- 100' MIN. spacing between the 'END ROAD WORK' sign and the work area.

Signs and Spacing (Right Side - Approaching from Right):

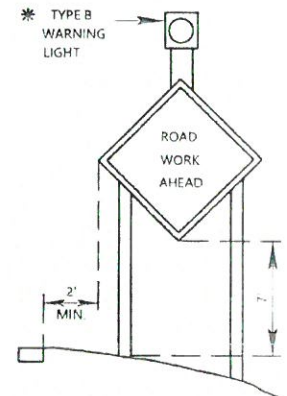
- 100' MIN. spacing between the 'END ROAD WORK' sign and the worker symbol sign.
- VARIES SEE NOTE 2 spacing between the worker symbol sign and the 'ONE LANE ROAD AHEAD' sign.
- 500' MIN. spacing between the 'ONE LANE ROAD AHEAD' sign and the 'ROAD WORK AHEAD' sign.

Legend:

- * TYPE B WARNING LIGHT

1. All warning signs shall have a minimum dimension of 48" x 48" and have black legend and border on a fluorescent orange background. Fluorescent orange sheeting see section 636 and 715 of specification.
2. The minimum distance from the Flagger Ahead sign to the Flagger is to be 200'. The maximum distance is to be determined by the Engineer, but not to exceed $\frac{1}{2}$ the length of a days operation or one mile whichever is less.
3. All portable signs are to be removed at completion of the days operation.
4. Longitudinal dimensions may be adjusted slightly to fit field conditions.
5. Flaggers shall be in sight of each other or in direct communication at all times.
6. The maximum traffic delay is to be minutes.
7. Any obstacles or excavated areas left unattended after working hours shall be protected by Type I or II barricades with flashing lights (Type A) at the expense of the Contractor.
8. Additional warning signs are to be placed on major intersecting roadways as indicated in the table below.
9. Payment for furnishing, installing, maintaining, and moving the "Advance Flagger" signs shall be incidental to Item 636014-001, "Flagger".

___ Type B Warning Lights
may be required.

[illegible]

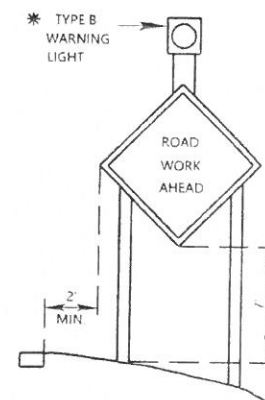
-  WORK AREA
-  SIGN ON PERMANENT SUPPORT
-  SIGN ON PORTABLE SUPPORT
-  FLAGGER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

1. All warning signs shall have a minimum dimension of 48" x 48" and have black legend and border on a fluorescent orange background. Fluorescent orange sheeting see section 636 and 715 of specification.
2. The minimum distance from the Flagger Ahead sign to the Flagger is to be 200'. The maximum distance is to be determined by the Engineer, but not to exceed ½ the length of a days operation or one mile whichever is less.
3. All portable signs are to be removed at completion of the days operation.
4. Longitudinal dimensions may be adjusted slightly to fit field conditions.
5. Flaggers shall be in sight of each other or in direct communication at all times.
6. The maximum traffic delay is to be __ minutes.
7. Any obstacles or excavated areas left unattended after working hours shall be protected by Type I or II barricades with flashing lights (Type A) at the expense of the Contractor.
8. Additional warning signs are to be placed on major intersecting roadways as indicated in the table below.
9. Payment for furnishing, installing, maintaining, and moving the "Advance Flagger" signs shall be incidental to Item 636014-001, "Flagger".

* A Type B Warning Light may be provided with each "Road Work Ahead" sign. The cost is to be bid to Item 636025-001.

___ Type B Warning Lights
may be required.

[illegible]

-  WORK AREA
-  SIGN ON PERMANENT SUPPORT
-  SIGN ON PORTABLE SUPPORT
-  FLAGGER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

TEMPORARY TRAFFIC CONTROL PLAN

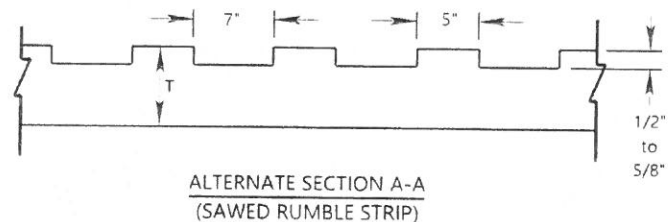
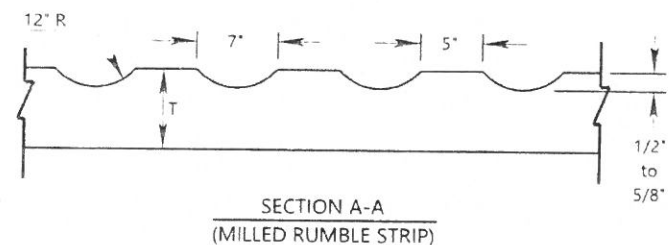
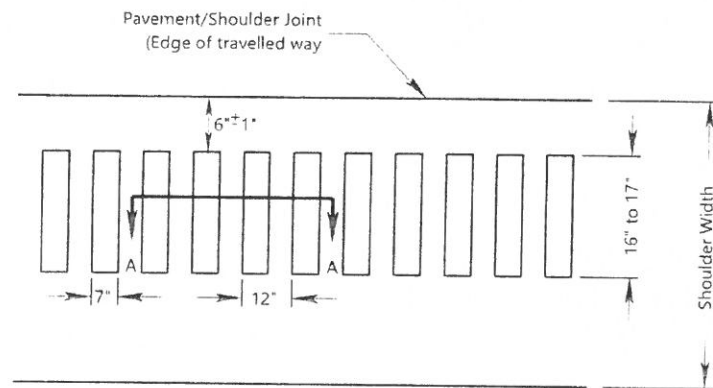
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

DEVICE	DESCRIPTION	VALUE IN UNITS	QUANTITY	TOTAL UNITS
* 1	SIGNS ON PORTABLE MOUNTS AND BARRICADES. (Total Sign Area 16 SQ.FT. or Greater.)	170		
* 2	SIGNS ON PORTABLE MOUNTS AND BARRICADES. (Total Sign Area Less Than 16 SQ.FT.)	80		
* 3	SIGNS ON PERMANENT POSTS. (Total Sign Area 16 SQ.FT. or Greater.)	180		
* 4	SIGNS ON PERMANENT POSTS. (Total Sign Area Less Than 16 SQ.FT.)	90		
* 5	BARRICADES - Type I	35		
* 6	BARRICADES - Type II	60		
* 7	BARRICADES - Type III	90		
** 8	DRUMS	60		
9	CONES	5		
10	VERTICAL PANELS OR GROUND MOUNTED DELINEATORS	10		
11	BARRIER OR GUARDRAIL MOUNTED DELINEATORS. (To Be Bid Incidental To The Cost of The Barrier or Guardrail.)	0		
12	TEMPORARY OVERLAYS AND TEMPORARY OVERSIZED SIGNS	300		
13	CHANNELIZER CONES	40		
		TOTAL		

* - ORANGE SIGN SHEETING TO BE REFLECTIVE FLOURESCENT ORANGE-TYPE V (Roll-Up Signs) OR TYPE IX OR XI (Rigid Signs)

** - DRUM SHEETING TO BE 6" TYPE III

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS				
TEMPORARY TRAFFIC CONTROL DEVICE QUANTITY TABLE				
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W/V				



NOTES

RUMBLE STRIPS SHALL BE PLACED IN ASPHALT SHOULDERS WHERE THE SHOULDER WIDTH IS 8' OR GREATER AND/OR IN THE MEDIAN SHOULDERS WHERE THE SHOULDER WIDTH IS 3' OR GREATER.

RUMBLE STRIP PLACEMENT WILL BE CONTINUOUS ON ASPHALT SHOULDERS UNLESS OTHERWISE NOTED.

RUMBLE STRIPS SHALL BE SAWED OR MILLED UNLESS OTHERWISE INDICATED. THE TOP OF THE RUMBLE STRIPS WILL BE NO HIGHER THAN THE TOP SURFACE OF THE PAVEMENT. ANY FAULTY OR INCORRECTLY INSTALLED RUMBLE STRIPS WILL BE CORRECTED AT THE CONTRACTORS EXPENSE.

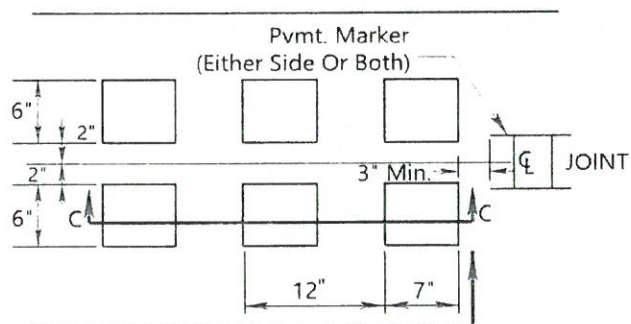
COST FOR RUMBLE STRIPS SHALL BE PAID FOR UNDER UNIT BID PRICE FOR ITEM 664002-001, EDGE LINE RUMBLE STRIP PER L.F. NOTE THAT L.F. OF RUMBLE STRIP IS MEASURED BY THE LINEAR FOOT OF PAVED SHOULDER TO RECEIVE RUMBLE STRIPS.

SEE "PROJECT NOTES" FOR ADDITIONAL COMMENTS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

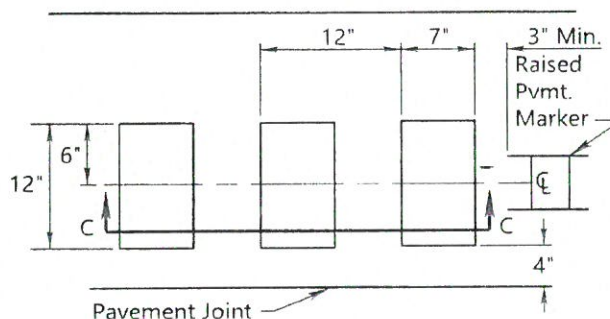
SAWED/MILLED RUMBLE STRIP FOR ASPHALT SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

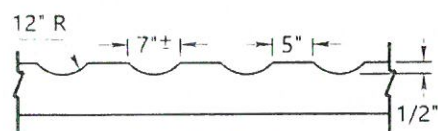


**CENTERLINE RUMBLE STRIP
TYPE B**

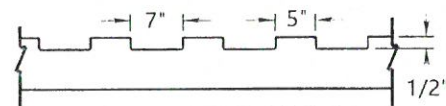
FOR ASPHALT PVMTS. WITH
CENTERLINE JOINT



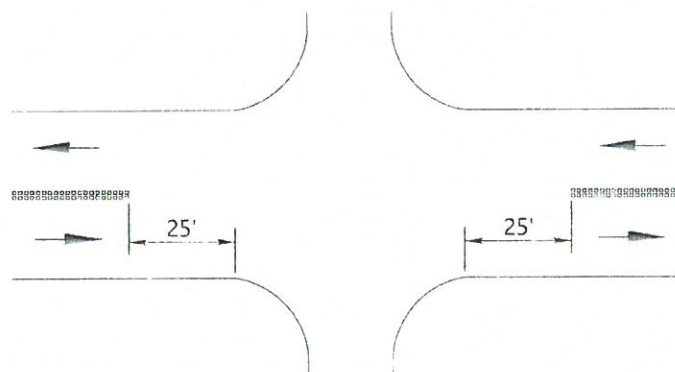
**CENTERLINE RUMBLE STRIP
TYPE A**



**SECTION C-C
(MILLED RUMBLE STRIP)**



**ALTERNATE SECTION C-C
(SAWED RUMBLE STRIP)**



**CENTERLINE RUMBLE STRIP
AT INTERSECTING ROADWAY**

NOTES

RUMBLE STRIP

Rumble strips shall be sawed or milled unless otherwise indicated. The top of the rumble strips will be no higher than the top surface of the pavement. Any faulty or incorrectly installed rumble strips will be corrected by the contractor at his expense.

Rumble strips shall not be installed on bridge decks, loop detector saw-cut locations, structures, approach slabs or in other areas identified by the Engineer.

When called for on plans, rumble strip depth shall be reduced to 3/8". Centerline rumble strips shall not be installed on asphalt pavement joint, unless unavoidable.

Remove debris from areas disturbed by milling operation before opening roadway to traffic.

Centerline rumble strip placement will be continuous, except as noted.

Centerline rumble strips shall be discontinued 3" min. from any adjacent raised pavement markers. See Volume II Detail TEM-4 for raised pvmt marker location and Special Details for recessed markers.

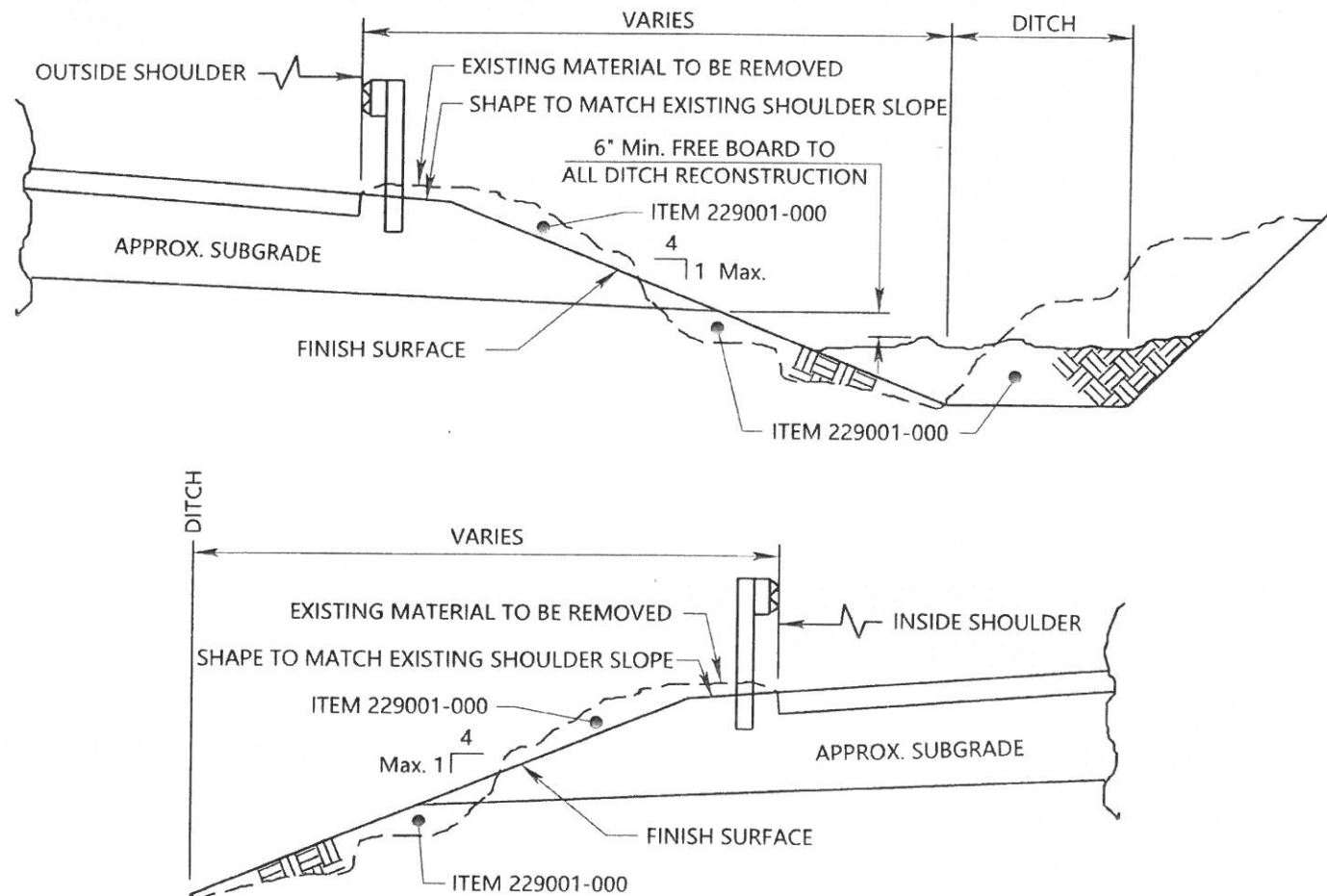
Centerline rumble strips shall begin/end 25' before/after the PC/PT of any intersecting roadway return radius.

For measurement and payment, the Type B centerline rumble strip shall be considered one strip, without regard to the gap.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CENTERLINE RUMBLE STRIPS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



NOTES:

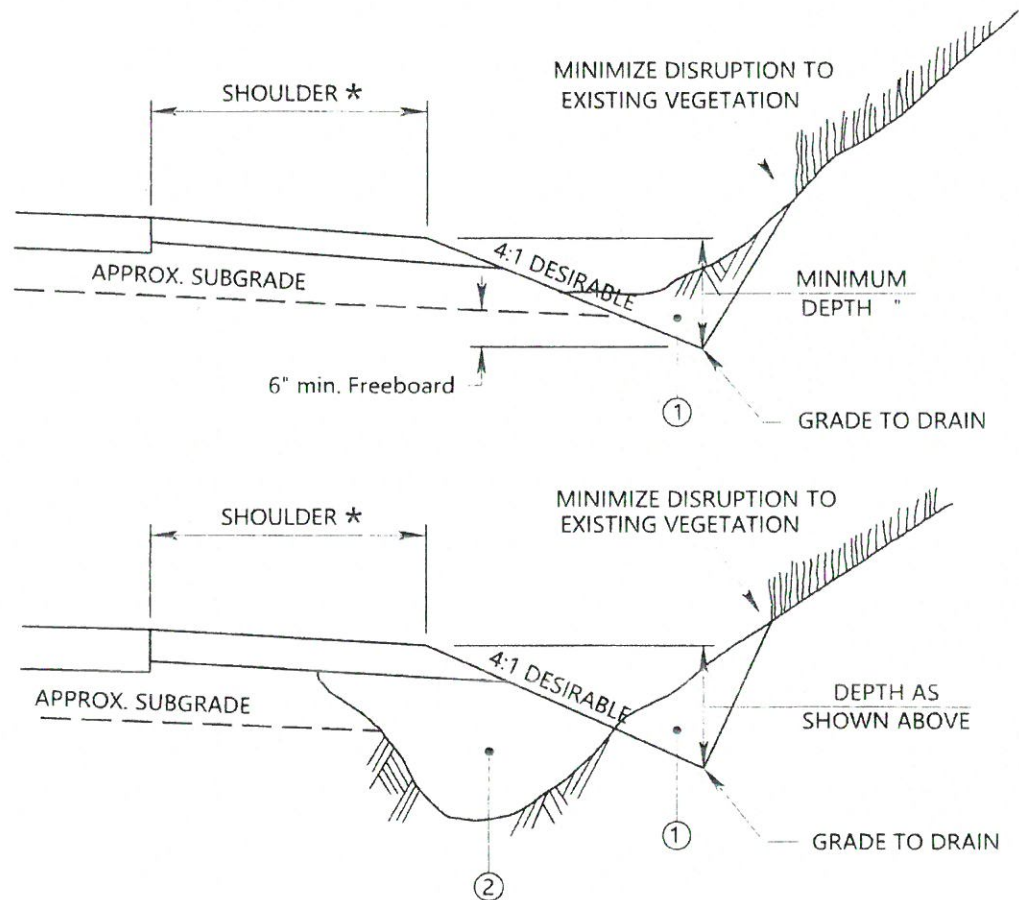
THIS DETAIL IS TO BE USED TO RE-ESTABLISH THE ORIGINAL CROSS SLOPE TO THE SHOULDER AND TO RE-ESTABLISH THE ORIGINAL DITCH DEPTH.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHAPING THE SHOULDER CROSS SLOPE UNDER GUARDRAIL ON RESURFACING PROJECTS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SHOULDERS AND DITCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



* WIDTH, SLOPE, AND MATERIAL AS SPECIFIED ON TYPICAL SECTIONS AND SHOULDER RECONSTRUCTION DETAIL.

LEGEND

① Item 229001-000, Shoulders & Ditches

This operation is intended to be minor shaping and scarifying of existing shoulder material plus shaping of ditches for proper drainage without leaving ditch soil on the shoulder area. This operation also includes cleaning of existing structure outlets and inlets.

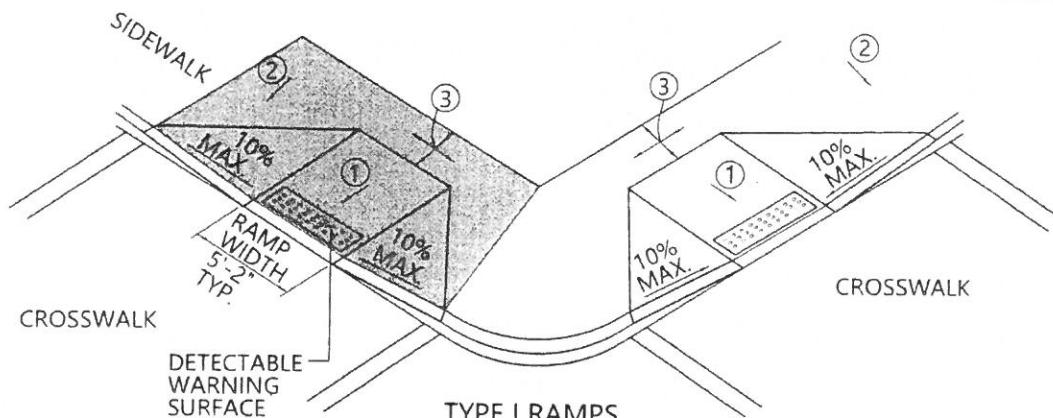
② Item 211008-000, Rock Borrow Excavation

The intent of this item is to provide proper foundation for the shoulder while restoring the original shoulder width reduced by erosion. Additional material, as directed by the engineer, may be required by recent erosion and will be paid for as 211008- , Rock Borrow Excavation.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

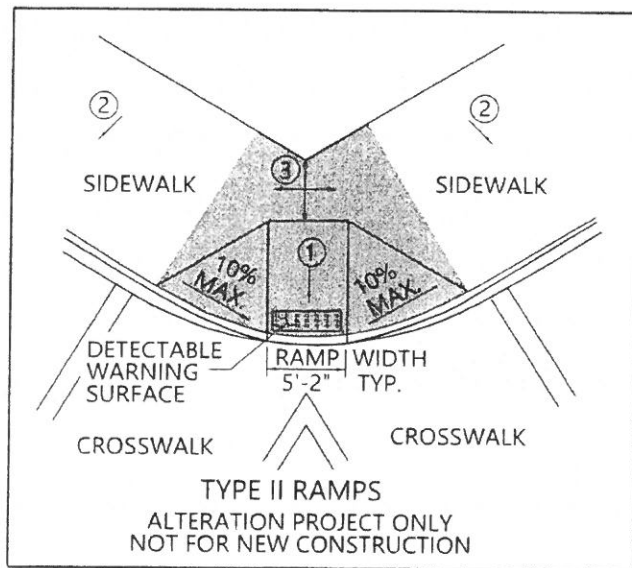
SHOULDER AND DITCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



TYPE I RAMP
SHOWN AT INTERSECTION

* SEPARATE PAY ITEMS



TYPE II RAMP
ALTERATION PROJECT ONLY
NOT FOR NEW CONSTRUCTION

- ① 8.33% (12:1) MAX. RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
- ② CROSS SLOPE: 2.00% MAX. INCLUDING CONSTRUCTION TOLERANCE.
- ③ CURB RAMPS REQUIRE A (4'-0") MINIMUM TURNING SPACE WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE NOTE REGARDING OBSTRUCTIONS ON SHEET 1 OF 3. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR CURB RAMPS

NOTES

RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE" (SEE PVT7 SHT. 3 OF 3) AS SHOWN FOR EACH RAMP TYPE. A COURSE BROOM FINISH, TRANVERSE TO FLARE SLOPES, OR EQUAL NON-SKID FINISH SHALL BE PROVIDED ON CONCRETE SURFACES.

NORMAL GUTTER FLOW LINE AND PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED.

1/4" PREFORMED EXPANSION JOINT FILLER, MEETING THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS, SHALL BE PLACED AT ALL LOCATIONS WHERE RAMP CONTACTS CURB, GUTTER, OR CONCRETE PAVEMENT. WHEN THE RAMP IS POURED SEPARATELY FROM THE SIDEWALK, THE EXPANSION MATERIAL SHALL BE PLACED AT ALL LOCATIONS WHERE THE NORMAL SIDEWALK AND THE RAMP ABUT.

DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE DRAINAGE STRUCTURE, EXCEPT WHERE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAMPS.

ANY GRATE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT GREAT THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 8.33% (12:1) SLOPE CANNOT BE OBTAINED DUE TO GRADE OF THE ADJACENT ROADWAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MAXIMUM LENGTH OF 15'-0".

A TURNING SPACE AS DEPICTED IN THE DETAILS SHALL BE PROVIDED AT THE TOP OF APPROPRIATE CURB RAMPS. THE TURNING SPACE SHALL HAVE A MINIMUM WIDTH OF 4'. WHEN NO OBSTRUCTIONS EXIST AT THE BACKSIDE OF THE LANDING, WHEN AN OBSTRUCTION EXISTS SUCH AS A BUILDING, LIGHT POLE, ETC. THE MINIMUM DIMENSION OF THE LANDING SHALL BE 5'.

CURB RAMP WIDTH SHALL MATCH SIDEWALK WIDTH PLUS CLEARANCE. TYPICAL SIDEWALK WIDTH IS 5'. MINIMUM WIDTH IS 4'.

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THE FOLLOWING CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, BUT ARE INCLUDED HERE FOR INFORMATION ONLY.

RAMP TYPES

- TYPE I (SHT. 1) FOR USE WHERE SIDEWALK EXTENDS TO STREET AND WHERE SIDEWALK WIDTH IS ADEQUATE FOR RAMP AND TURNING SPACE.
- TYPE II (SHT. 1) RAMP SHALL ONLY BE USED ON ALTERATION PROJECTS WHERE TWO SEPARATE CURB RAMPS CANNOT BE PROVIDED. THE TYPE II CURB IS NOT SUITABLE FOR NEW CONSTRUCTION.
- TYPE III (SHT. 2) PARALLEL RAMPS ARE FOR USE WHEN ADEQUATE SIDEWALK WIDTH FOR BOTH RAMPS AND TURNING SPACE CANNOT BE PROVIDED.
- TYPE IV (SHT. 3) COMBINES ASPECTS OF TYPE I AND TYPE III RAMPS AS NECESSARY. USE WHERE SIDEWALK IS SET BACK FROM STREET AND A GRASS OR LANDSCAPED STRIP IS PROVIDED BETWEEN SIDEWALK AND STREET.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL
REVISED STANDARD DETAIL

Prepared 7.1.99
REVISION DATE
07/21/10
10/22/13

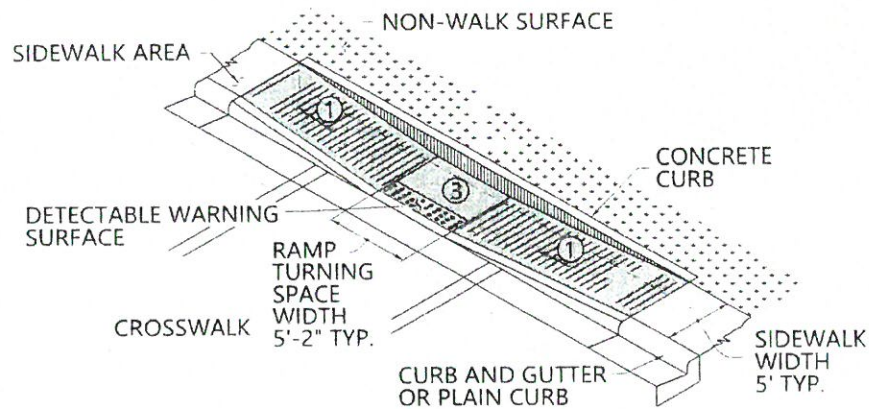
SIDEWALK RAMPS

(SHEET 1 OF 3)

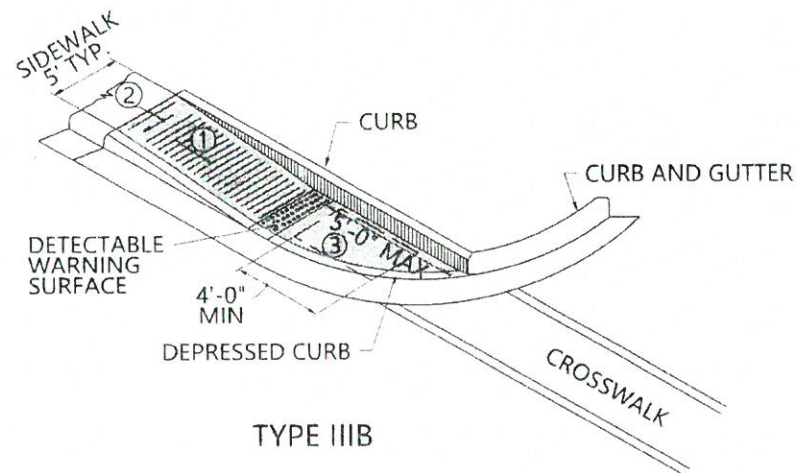
SHEET PVT 7

FOR DETECTABLE WARNING SURFACE
NOTES SEE PVT7 SHT. 3 OF 3

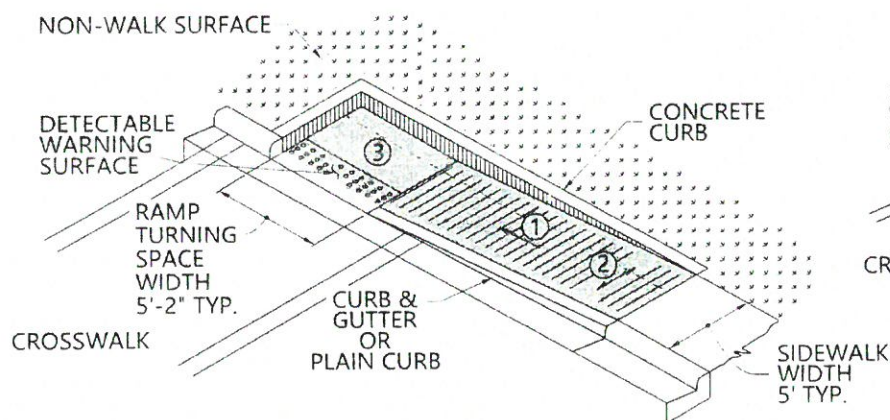
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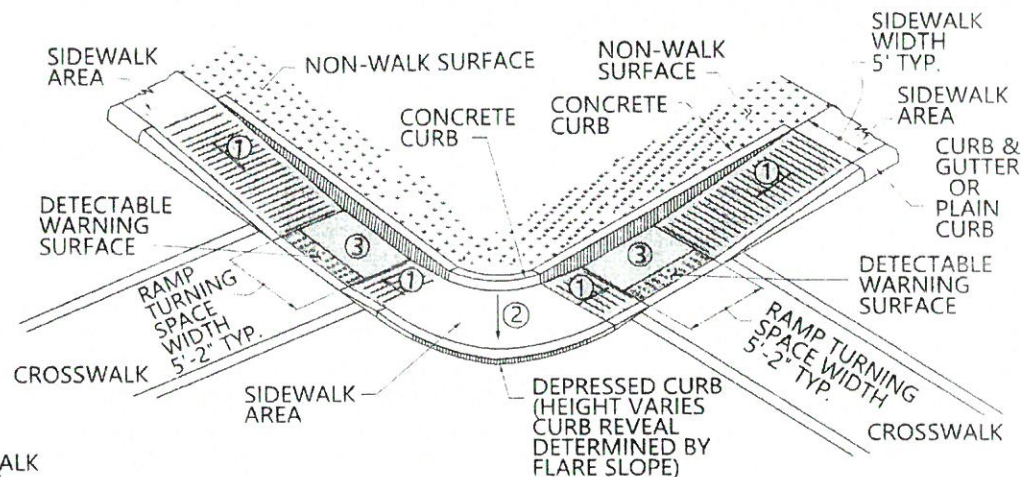
TYPE III



TYPE IIIB



TYPE IIIA



TYPE III RAMPS AT INTERSECTION

- ① 8.33% (12:1) MAX. RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
- ② CROSS SLOPE: 2.00% MAX. INCLUDING CONSTRUCTION TOLERANCE.
- ③ CURB RAMPS REQUIRE A (4'-0") MINIMUM TURNING SPACE WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE NOTE REGARDING OBSTRUCTIONS ON SHEET 1 OF 3. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR CURB RAMPS

CURB MAY NOT BE REQUIRED WHEN WALL OR BUILDING IS PRESENT

FOR DETECTABLE WARNING SURFACE NOTES SEE PVT7 SHT. 3 OF 3

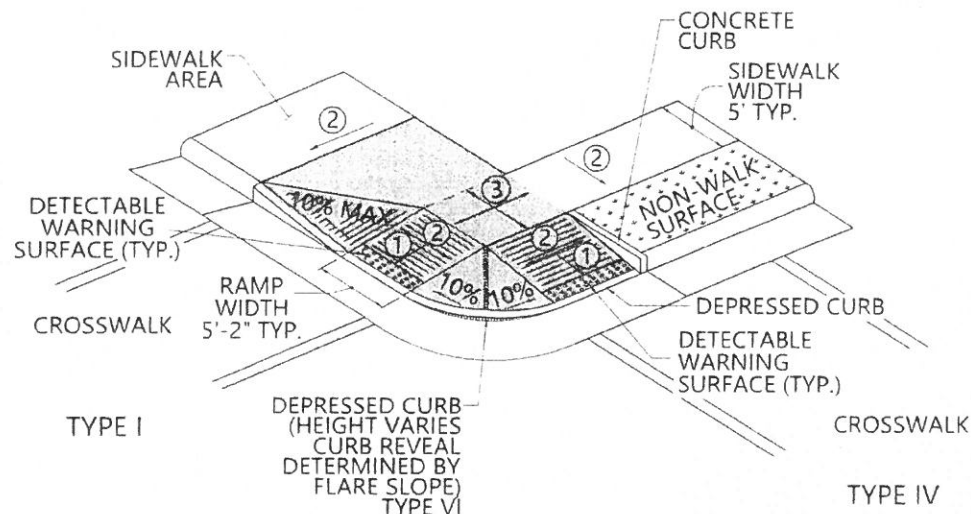
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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL

REVISION DATE
7/21/00
10/21/13

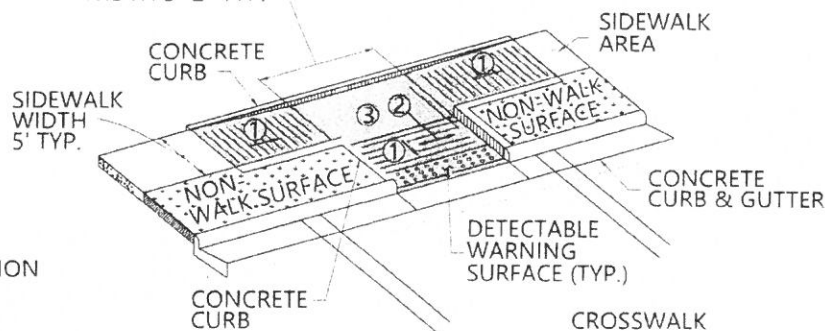
SIDEWALK RAMPS
(SHEET 2 OF 3)

SHEET PVT 7



TYPE I RAMP AND TYPE IV RAMP
SHOWN AT INTERSECTION
* TWO SEPARATE PAY ITEMS

RAMP TURNING SPACE
WIDTH 5'-2" TYP.



TYPE IV RAMP

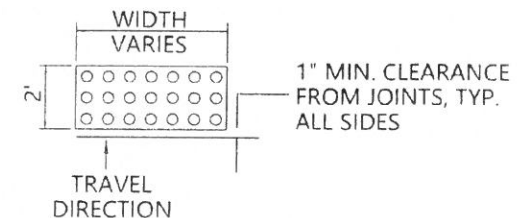
NOTES

THE APPROPRIATE DETAILS AND NOTES OF STANDARD SHEET PVT7, SHEETS 1 AND 2 SHALL APPLY TO THIS STANDARD SHEET.

DETECTABLE WARNING SURFACES SHALL EXTEND ACROSS THE FULL WIDTH OF THE CURB RAMP, LANDING OR TRANSITION.

DOMES SHALL BE ALIGNED IN THE PREDOMINANT DIRECTION OF THE CURB RAMP.

DESIGN AND PLACEMENT OF DETECTABLE WARNING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 609 OF THE SPECIFICATIONS AND THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG).



DETECTABLE WARNING SURFACE

- ① 8.33% (12:1) MAX. RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
- ② CROSS SLOPE: 2.00% MAX. INCLUDING CONSTRUCTION TOLERANCE.
- ③ CURB RAMPS REQUIRE A (4'-0") MINIMUM TURNING SPACE WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE NOTE REGARDING OBSTRUCTIONS ON SHEET 1 OF 3. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR CURB RAMPS

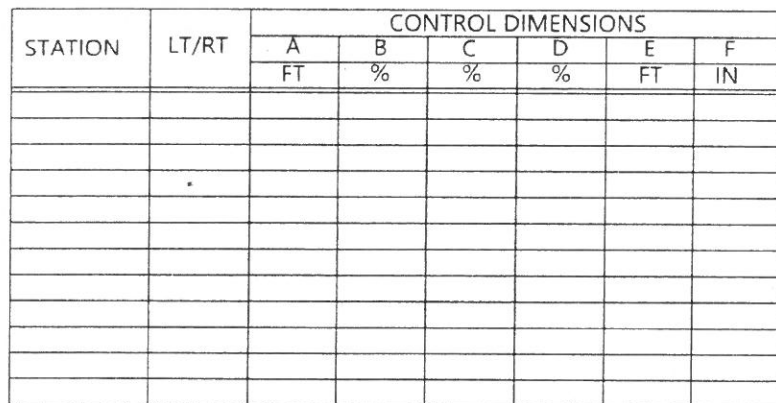
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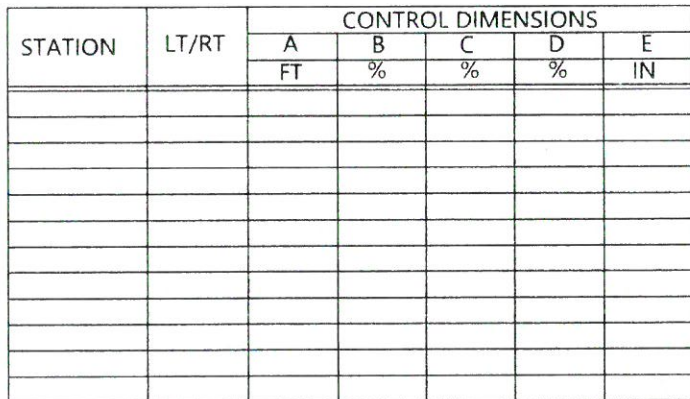
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL
REVISED STANDARD DETAIL

REVISION DATE
7/21/80
10/22/13

SIDEWALK RAMPS
(SHEET 3 OF 3)

SHEET PVT 7





THIS SHEET SHALL ONLY BE USED AT LOCATIONS WHERE THE STANDARD CURB RAMP ON SHEET PVT7 OF THE REVISED STANDARD DETAILS IS NOT APPLICABLE. ALL DESIGN ELEMENTS OF THE CURB RAMP SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE PROPOSED ACCESSIBILITY GUIDELINES FOR PEDESTRIANS FACILITIES IN THE PUBLIC RIGHT OF WAY (PROWAG) UNLESS A AMERICANS WITH DISABILITIES ACT EXCEPTIONS JUSTIFICATION REPORT IN DD-811 IS APPROVED BY THE ADA BOARD.

DETECTABLE WARNING SURFACE SHALL BE IN ACCORDANCE WITH SHEET PVT 7 OF THE REVISED STANDARD DETAILS.

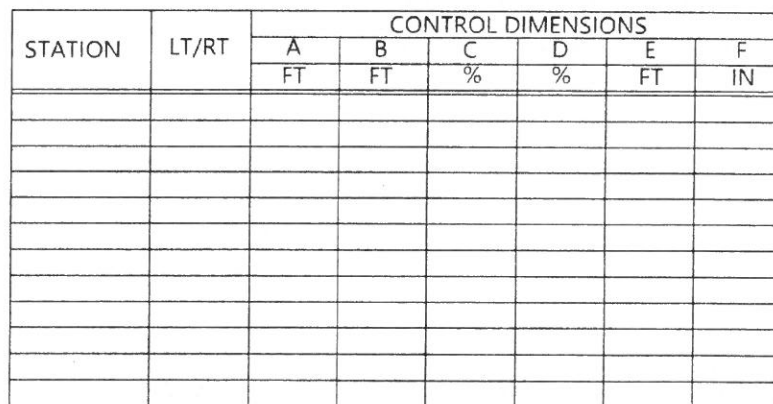
1/4" PREFORMED EXPANSION JOINT FILLER, MEETING THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS, SHALL BE PLACED AT ALL LOCATIONS WHERE RAMP CONTACTS CURB, GUTTER, OR CONCRETE PAVEMENT. WHEN THE RAMP IS POURED SEPARATELY FROM THE SIDEWALK, THE EXPANSION MATERIAL SHALL BE PLACED AT ALL LOCATIONS WHERE THE NORMAL SIDEWALK AND THE RAMP ABUT.

REFER TO THE DETAIL FOR A TYPE IIIA SIDEWALK RAMP ON SHEET PVT 7 OF THE REVISED STANDARD DETAILS FOR ANY DIMENSIONS NOT PROVIDED ON THIS SHEET.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CURB RAMP-TYPE IIIA

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



INTERSTATE & APD PROJECTS

NOTES:

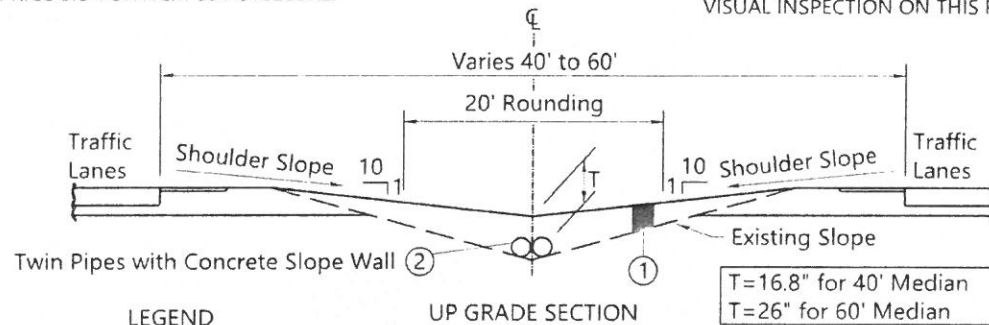
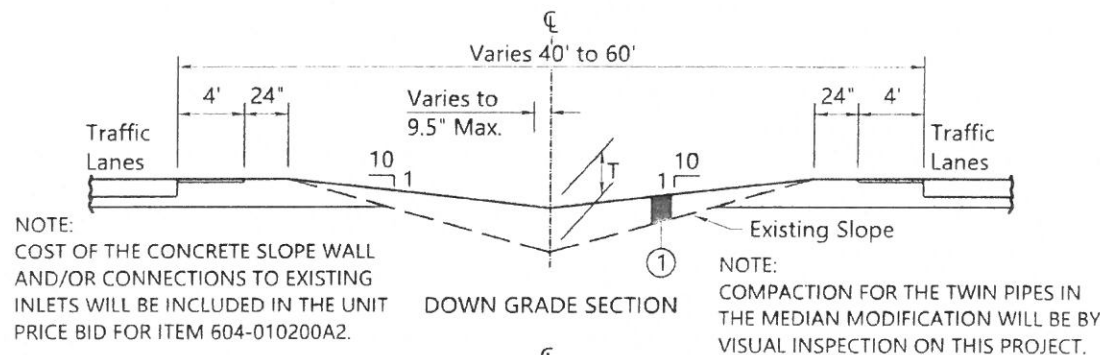
All modifications are to be seeded, mulched, and fertilized. Fertilizer, seeding, and mulching will be as specified in Section 652 of the Standard Specifications. No additional payment will be made for this work. The cost of this work will be included in the unit bid price for 211001-000, Unclassified Borrow Excavation.

Existing guardrail is to be removed prior to grading for median modifications. Drums will be placed on 25' centers along the shoulders for the entire length of the modification until the guardrail has been reinstalled. All work related to the median modifications, ie, removing existing guardrail, adjusting inlets, installing pipes, grading, seeding, mulching, fertilizing, concrete slope walls, and installing or resetting guardrail, should be completed in such a manner as to be a continuous operation. The proposed guardrail is to be re-established within 72 hours (3 days) from initial removal.

If the guardrail is not re-established after three days and the adjacent lane is open to traffic, the contractor is required to install a positive barrier system consisting of temporary concrete barrier attached to the bridge parapet walls by approved connections and approach end treatments. This positive barrier system will remain in place until the guardrail is permanently installed. The cost of this work will be incidental to Item 211001-000 and no additional payment will be made.

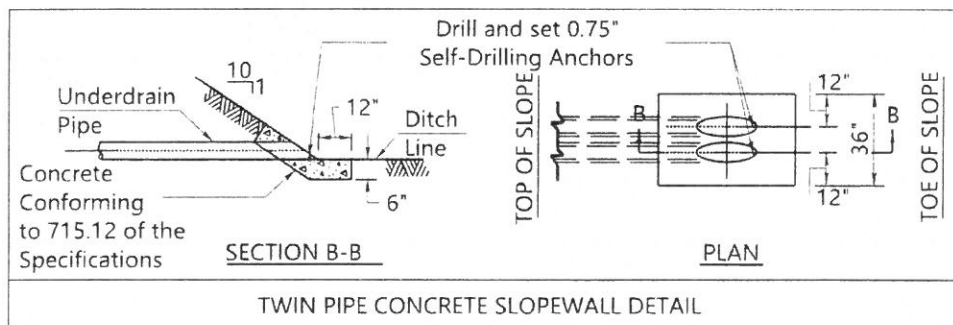
Where existing median underdrain outlet pipes are in the proposed median modification location, the outlet pipes are to be connected to the proposed twin pipes or existing inlets and modified to allow for proper drainage as directed by the project engineer. No additional payment will be made for this work. Cost to be included in the bid price for Item 211001-000, Unclassified Borrow Excavation.

For length of modification, see Median Modification Table.



LEGEND

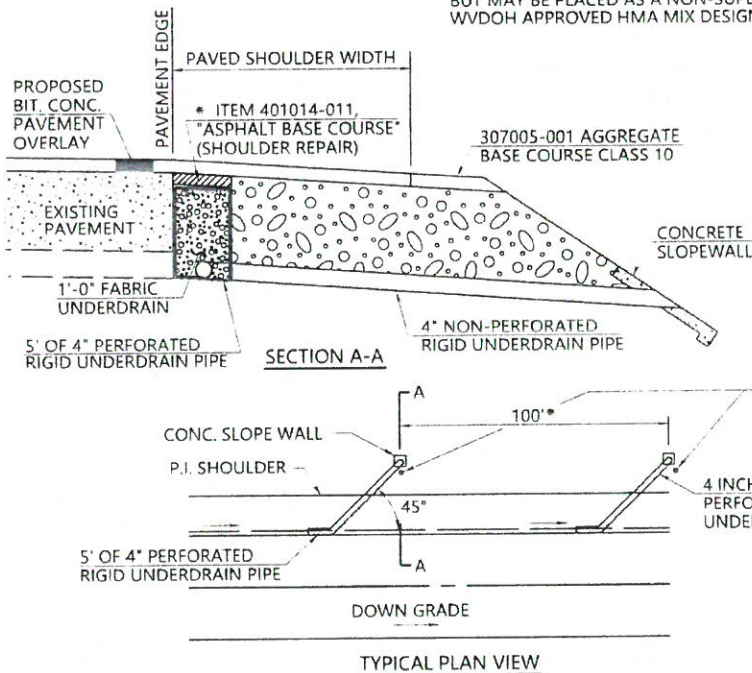
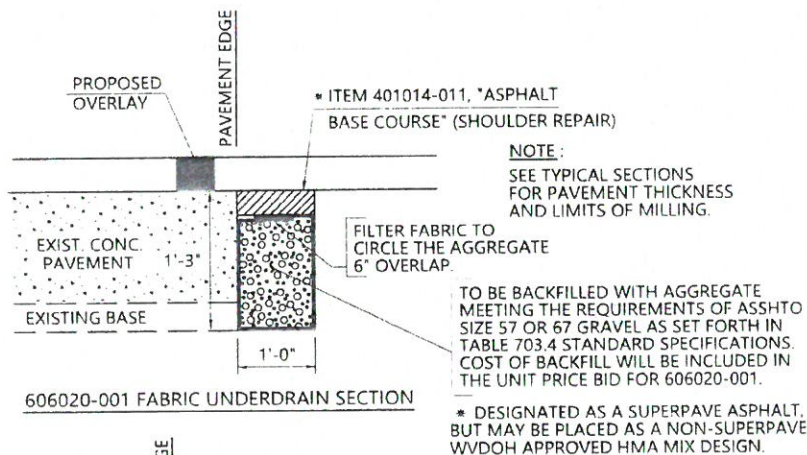
- ① ITEM 211001-000, UNCLASSIFIED BORROW EXCAVATION
- ② ITEM 604001-006, 8 INCH METALIC COATED CURRUGATED STEEL PIPE



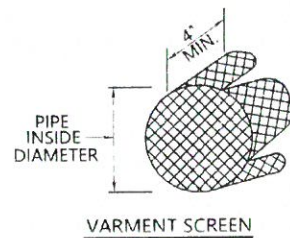
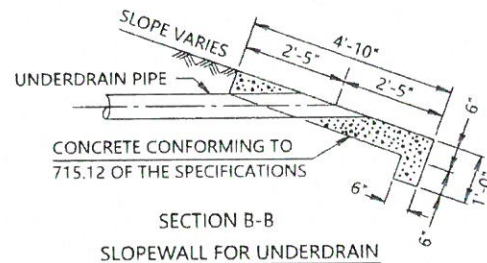
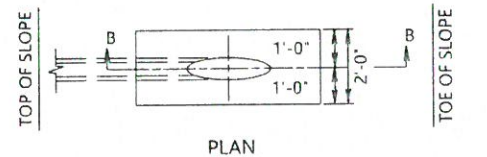
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MEDIAN MODIFICATION AT BRIDGES & MEDIAN OBSTACLES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



* WHEN THE LENGTH OF AGGREGATE UNDERDRAIN SPECIFIED IS LESS THAN 100 LINEAR FEET, THE PLACEMENT OF THE OUTLET PIPE WILL BE FIELD DETERMINED AND APPROVED BY THE PROJECT ENGINEER.



THE CONTRACTOR WILL BE REQUIRED TO PLACE A GROUND MOUNTED FLEXIBLE DELINEATOR POST AT EACH CONCRETE SLOPE WALL UNDERDRAIN LOCATION. THE CONSTRUCTION DETAILS, MATERIAL AND LABOR WILL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE STANDARD SPECIFICATION 657 AND 661 AND THE STANDARD DETAILS BOOK VOLUME II - SIGNS, LIGHTING AND MARKING. ALL COSTS ASSOCIATED WITH THIS WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 606020-001, *AGGREGATE FILLED FABRIC UNDERDRAIN*.

THE GROUND MOUNTED FLEXIBLE DELINEATOR POST WILL BE FLEX-STAKE MODEL HD 604, SAFE-HIT CORP. GUIDEPOST, CARSONITE INTERNATIONAL CORP. SURVIVOR, OR CARSONITE INTERNATIONAL CORP. GREENLINE - CGDV OR CGDB. POST LENGTH TO BE 54\"/>

IF POSTS ARE DESIGNED WITH A FLAT OR SEMI-FLAT SURFACE FOR MOUNTING REFLECTIVE SHEETING, THEY SHALL HAVE VERTICAL STRIP(S) 3\"/>

ITEM 606020-001 AGGREGATE FILLED FABRIC UNDERDRAIN

NOTES

THE COST OF THE CONCRETE SLOPE WALLS OR CONNECTIONS TO EXISTING INLETS WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 606020-001.

THE COST OF THE 4\"/>

ALL OUTLET PIPES TO BE INSTALLED WITH A MINIMUM SLOPE OF 2%.

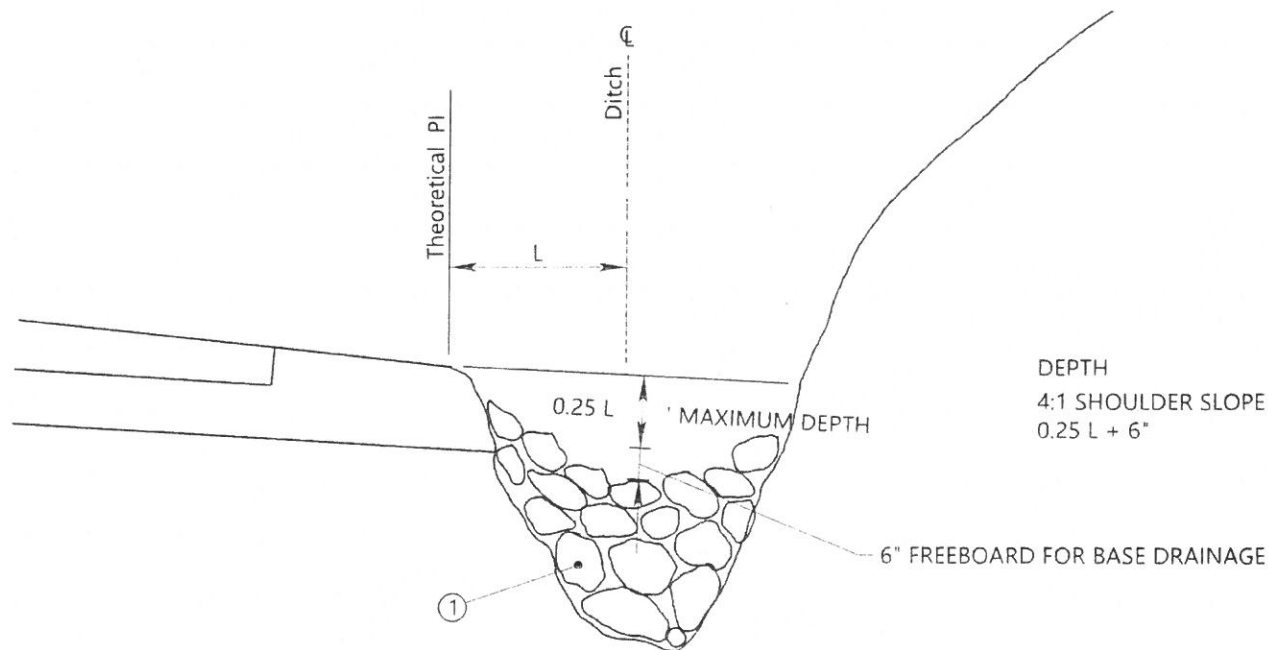
THE CONTRACTOR WILL BE RESPONSIBLE FOR PLACING SLOPE WALLS IN RELATION TO FINAL SHOULDER GRADE. ANY SLOPE WALL NOT MEETING FINAL SHOULDER GRADE WILL BE REPLACED AT CONTRACTORS EXPENSE.

A VARMENT SCREEN FABRICATED FROM COMMERCIALY AVAILABLE GALVANIZED HARDWARE SCREEN IS TO BE SNUGLY FITTED INTO EACH SLOPEWALL. THE SCREEN WIRES SHALL BE WELDED AT A SPACING IN EACH DIRECTION OF 1/4\"/>

EXISTING EDGEDRAIN HEADWALLS ARE TO BE REMOVED AS DIRECTED BY THE ENGINEER. COST TO BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 606020-001, AGGREGATE FILLED FABRIC UNDERDRAIN.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS AGGREGATE FILLED FABRIC UNDERDRAIN

NOT TO SCALE				
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

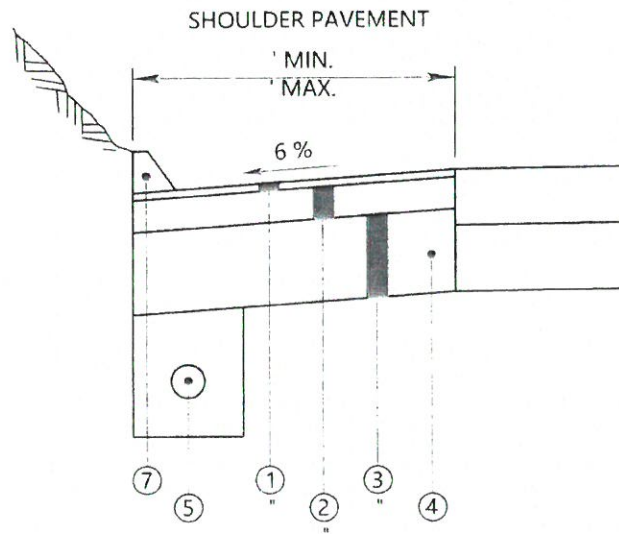


① Item 211008-000, ROCK BORROW EXCAVATION

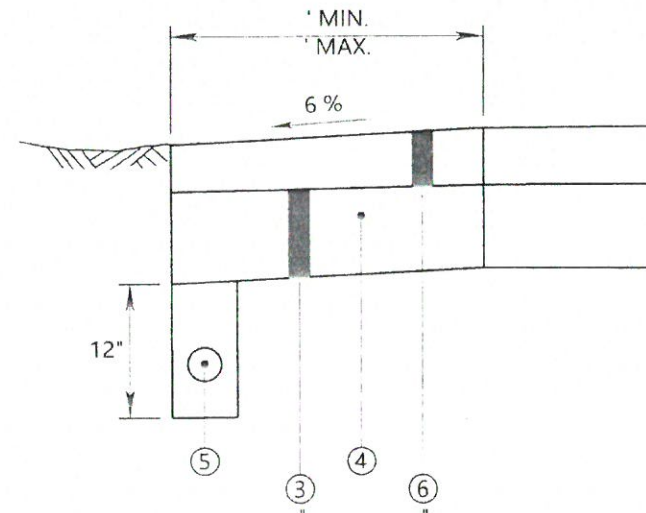
The intent of this operation is to eliminate hazardous ditch areas where erosion, especially on steep grades, has deepened the ditches beyond the limits of safe vehicle operation. The maximum size of rock in the top layer should be 4"; however, larger rock will be permitted in lower layers as appropriate for the conditions.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
CORRECTING DEEP DITCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



CURB SECTION ALONG HILL



SHOULDER IN FLAT AREA

LEGEND

- ① ITEM 401002- * ASPHALT WEARING COURSE, TYPE
- ② ITEM 401001- * ASPHALT BASE COURSE, TYPE
- ③ ITEM 307001- * AGGREGATE BASE COURSE, CLASS
- ④ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑤ ITEM 606025- * INCH UNDERDRAIN PIPE OR ITEM 606020- FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ⑥ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10
ITEM 307005-001, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑦ ITEM 610005- * BITUMINOUS CURBING, TYPE

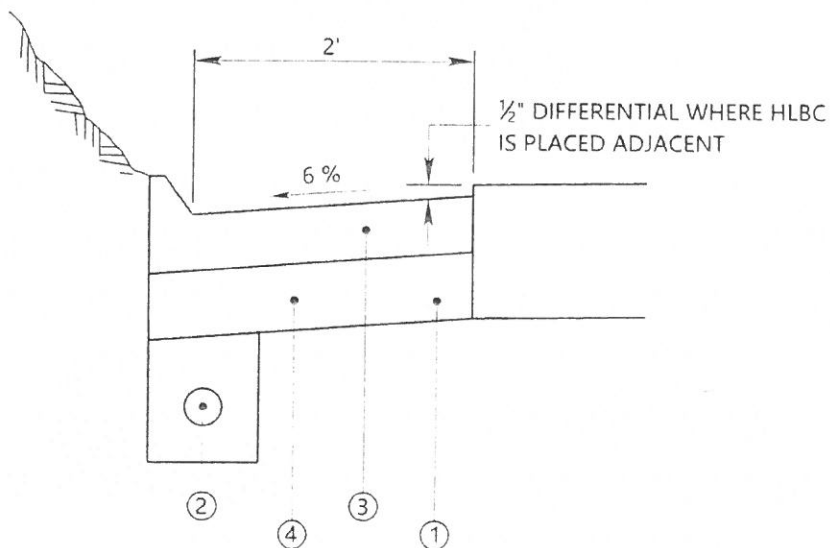
* SEQUENCE NUMBER

NOTE: SURFACE DRAINAGE TO BE COLLECTED IN A POSITIVE MANNER AS SHOWN IN THE PLANS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

NON-DITCH DETAILS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 307001-*, AGGREGATE BASE COURSE, CLASS
- ② ITEM 606025-*, INCH UNDERDRAIN PIPE OR ITEM 606020- , FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ③ ITEM 610003-*, COMBINATION CONCRETE CURB AND GUTTER, TYPE
- ④ ITEM 207001-001, UNCLASSIFIED EXCAVATION

* SEQUENCE NUMBER

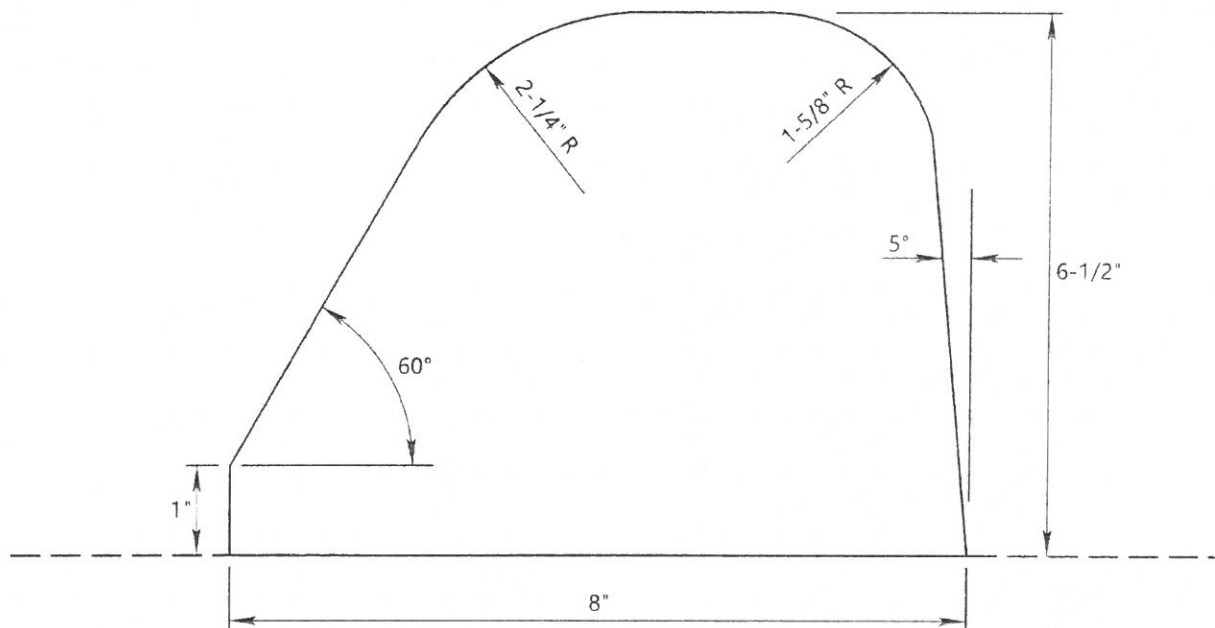
NOTE: SURFACE DRAINAGE TO BE COLLECTED IN A POSITIVE MANNER AS SHOWN IN THE PLANS.

FOR ADDITIONAL DIMENSIONS SEE STANDARD PVT6 THIS DETAIL IS TO BE USED IN SPECIAL CASES ONLY.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

NON-DITCH DETAILS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



ITEM 610005-002, BITUMINOUS CURB, TYPE II

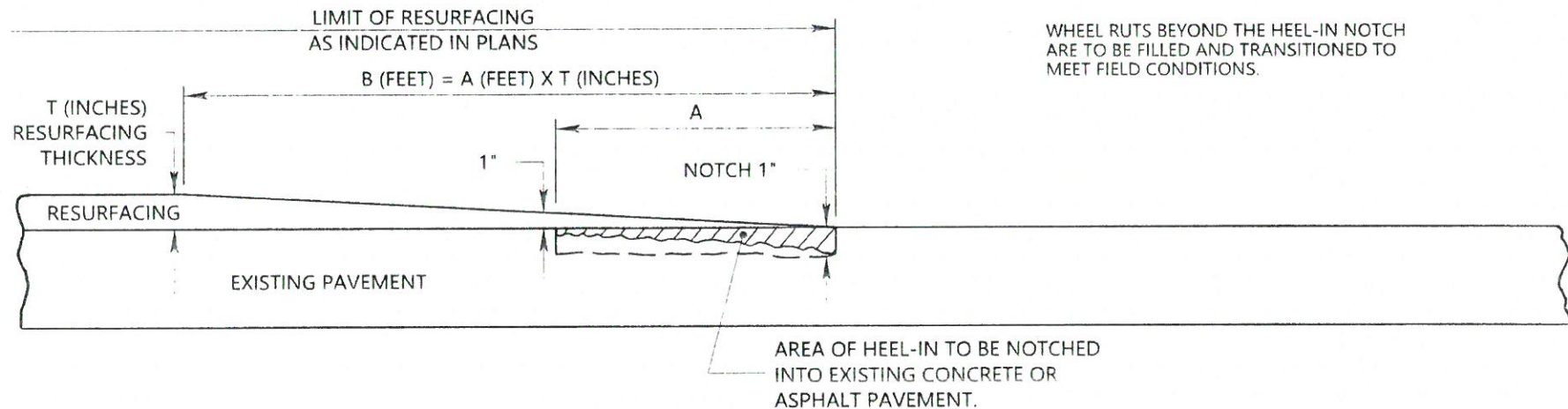
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

BITUMINOUS CURBING-TYPE II

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

TEMPORARY WEDGES AT HEEL-INS

THE CONTRACTOR MAY ELECT TO CUT THE REQUIRED HEEL-INS SUCH THAT TRAFFIC MUST BE MAINTAINED OVER THE HEEL-IN AREAS PRIOR TO THE PLACEMENT OF THE PERMANENT ASPHALT MATERIAL. IF THE CONTRACTOR CHOOSES THIS METHOD AS AN ALTERNATE TO CUTTING THE HEEL-INS AND BACKFILLING WITH PERMANENT ASPHALT PRIOR TO RESTORING TRAFFIC, IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PLACE TEMPORARY ASPHALT WEDGES 10 FEET IN LENGTH FOR EACH 1 INCH OF EXISTING SURFACE REMOVED AT THE VERTICAL FACE. FOR EXAMPLE, IF 2 INCHES ARE REMOVED AT THE VERTICAL FACE, THE TEMPORARY ASPHALT WEDGE SHALL BE 20 FEET IN LENGTH. THE WEDGES SHALL BE CONSTRUCTED OF ITEM 401001-011, TYPE 19, PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 401.14. THESE TEMPORARY WEDGES SHALL BE REMOVED IMMEDIATELY PRIOR TO PLACING THE PERMANENT SURFACE. THE COST OF THIS WORK WILL BE INCLUDED IN VARIOUS PAVEMENT ITEMS.

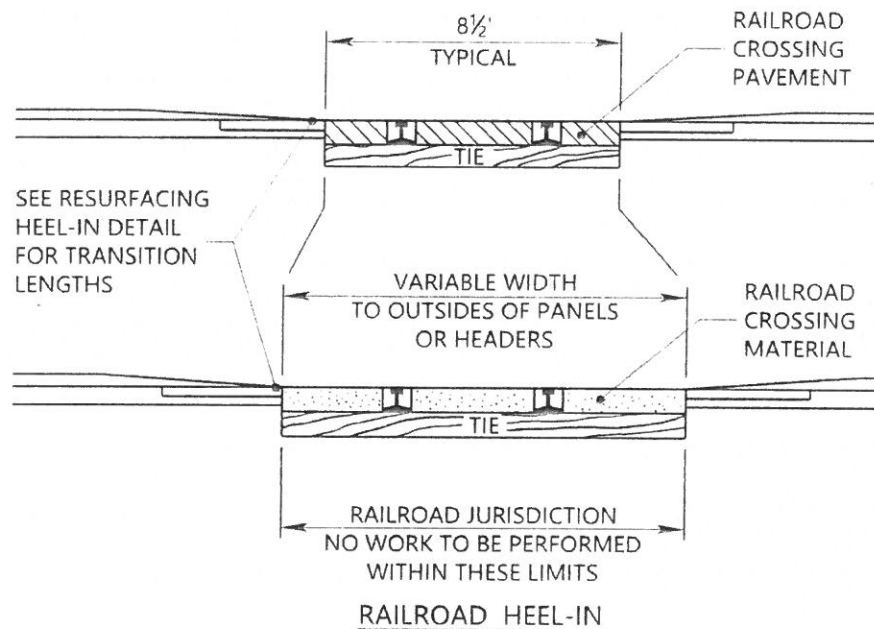


1. PAYMENT FOR HEEL-IN TO BE INCLUDED IN VARIOUS PAY ITEMS OF THIS PROJECT
2. THIS DETAIL TO BE USED AT TERMINI OF RESURFACING PROJECTS AND AT ALL TERMINI FOR SKIP RESURFACING PROJECTS.
3. THIS DETAIL TO BE USED AT LOCATIONS FOR HEEL-IN INTERSECTIONS OF THIS PROJECT.
4. THE FOLLOWING NUMBER(S) OF HEEL-INS FOR THE MAINLINE ON THIS PROJECT SHALL BE:
PERPENDICULAR
SKEWED AT °

POSTED SPEED LIMIT	A
25 mph	12'
30 TO 35 mph	14'
40 TO 45 mph	16'
50 TO 55 mph	18'
60 TO 70 mph	25'

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS **RESURFACING HEEL-IN DETAIL**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



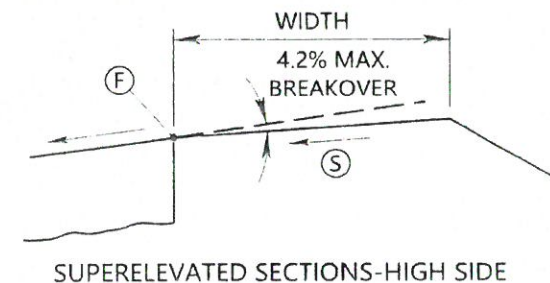
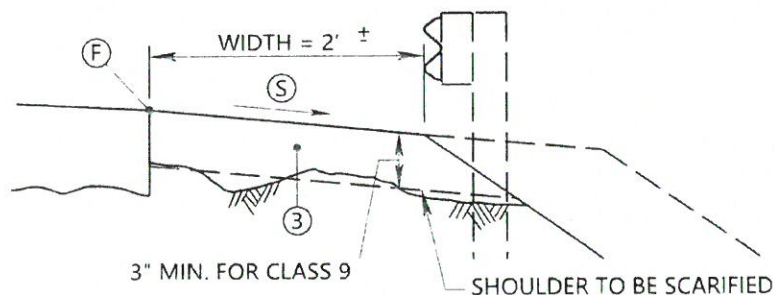
RAILROAD CROSSING HEEL-IN:

1. THE CONTRACTOR SHALL OBTAIN A RAILROAD FLAGGER(S) FROM THE AFFECTED RAILROAD PER SECTION 107.8, TO PERFORM THE SOLE TASK OF PROVIDING WARNINGS TO THE WORKMEN OF APPROACHING TRAINS WHILE WORK IS BEING PERFORMED AT THE RAILROAD CROSSING. THE COST SHALL BE INCLUDED IN THE SECTION 401 ITEMS.
2. THE CONTRACTOR SHALL AVOID DAMAGE TO THE CROSSING SURFACE MATERIAL AND ALL OTHER RAILROAD FACILITIES.
3. THIS HEEL-IN DETAIL APPLIES AT ALL TRACKS ENCOUNTERED ON THE PROJECT.
4. NO WORK SHALL BE PERFORMED WITHIN 10' OF THE CENTER OF THE RAILROAD TRACK WITHOUT PERMISSION OF THE AFFECTED RAIL ROAD.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

HEEL-IN AT RAILROAD CROSSINGS & BRIDGES

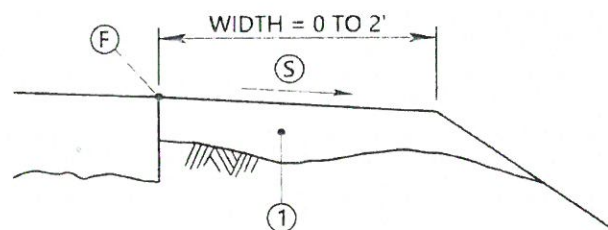
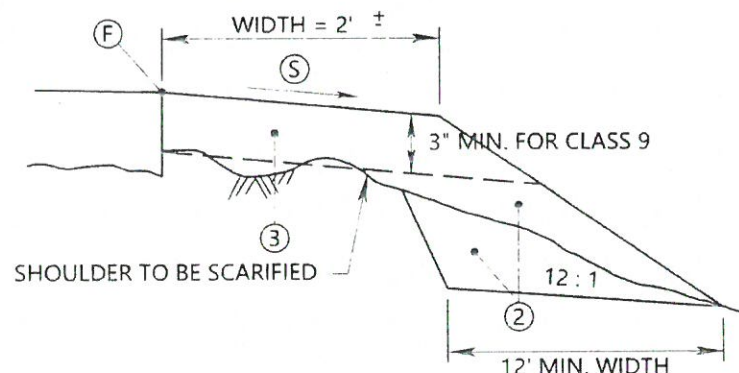
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND

- ① ITEM 401001-*, ASHALT BASE COURSE, TYPE
- ② ITEM 211008-000, ROCK BORROW EXCAVATION
The intent of this item is to provide proper foundation for the shoulder while restoring the original shoulder width reduced by erosion. Additional material, as directed by the Engineer, may be required by recent erosion and will be paid for as 211008-000. Excavation of benches for placing, 211008-000 will be included in 211008-000.
- ③ ITEM 307005-001, AGGREGATE BASE COURSE, CLASS 10
This item includes any necessary removal of existing shoulder material to a minimum of 3" below the finished pavement elevation when Class 9 aggregate is specified. Material removed shall be reused within the project limits or waived as directed by the Engineer. Scarifying shall be in accordance with Section 308.3.1 of the Specifications.
- ④ FINISHED PAVEMENT ELEVATION
- ⑤ SHOULDER SLOPE
Normal Sections : 6 %.
Superelevated : Match rate of superelevation or reduce as shown above
Minimum slope to be ¾" per foot, on low side of superelevation.
Paved Shoulders : 4 % or superelevated.

* SEQUENCE NUMBER

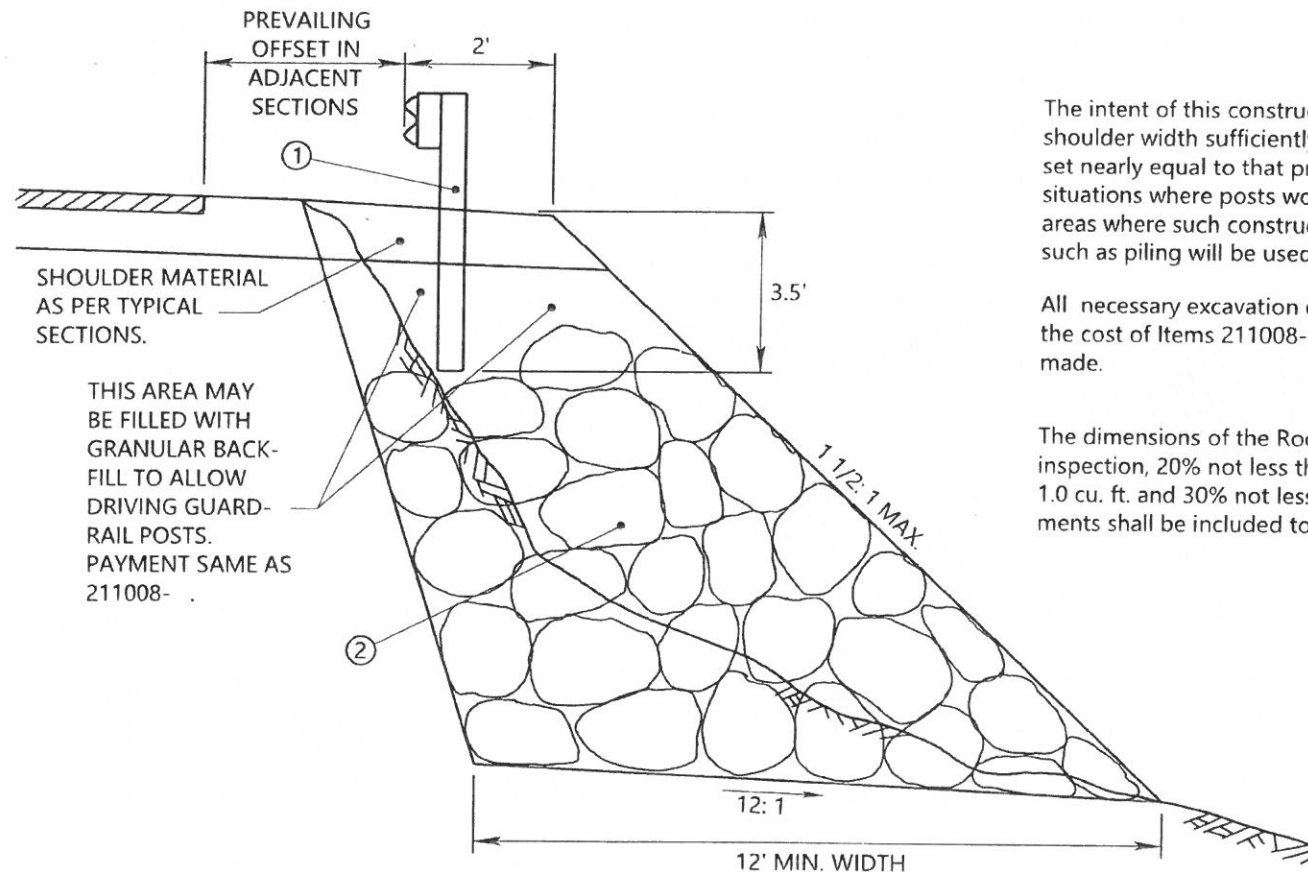


NORMAL SECTIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SHOULDER RECONSTRUCTION

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 21100*-000, ROCK BORROW EXCAVATION

* SEQUENCE NUMBER

The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections avoiding situations where posts would not provide proper strength. In areas where such construction is not practical, special designs such as piling will be used if specified in the plans.

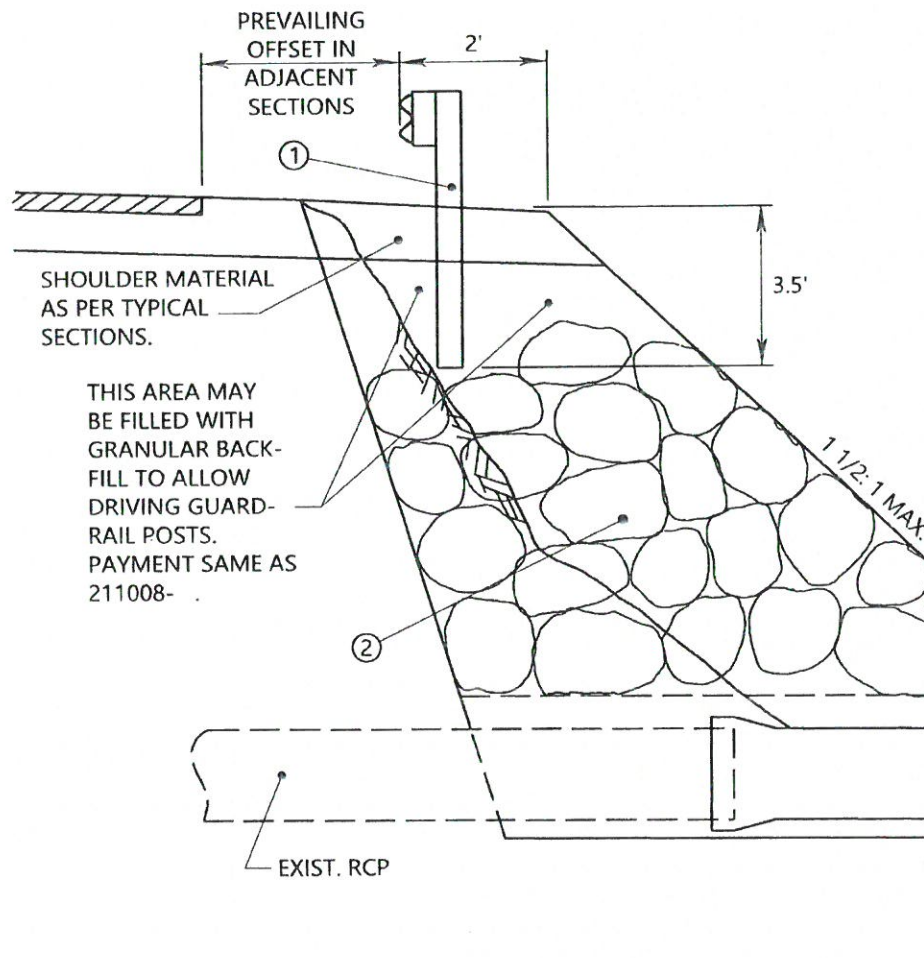
All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

The dimensions of the Rock Borrow shall be, based on visual inspection, 20% not less than 1.5 cu. ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

RESTORING SHOULDERS FOR GUARDRAIL & SLIVER FILLS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections and resetting RCP that has been separated on the outlet end.

The cost of resetting RCP will be incidental to the cost of Item 211008-000.

All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

The dimensions of the Rock Borrow shall be, based on visual inspection, 20% not less than 1.5 cu. ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

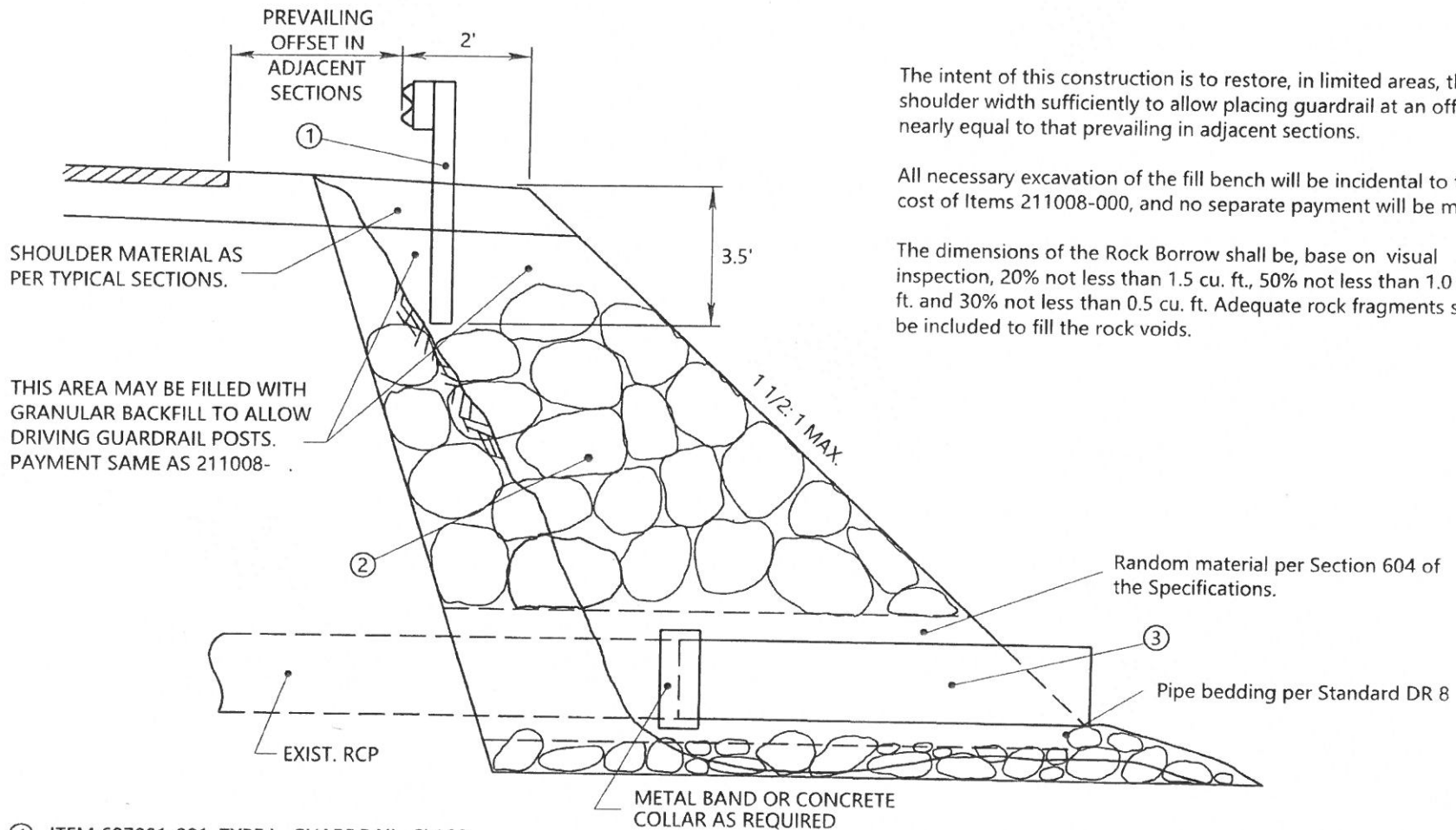
- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 21100*-000, ROCK BORROW EXCAVATION

* SEQUENCE NUMBER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

RESETTING RCP & RESTORING SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections.

All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

The dimensions of the Rock Borrow shall be, base on visual inspection, 20% not less than 1.5 cu. ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 21100*-000, ROCK BORROW EXCAVATION
- ③ PIPE (AS SHOWN ON PLANS)

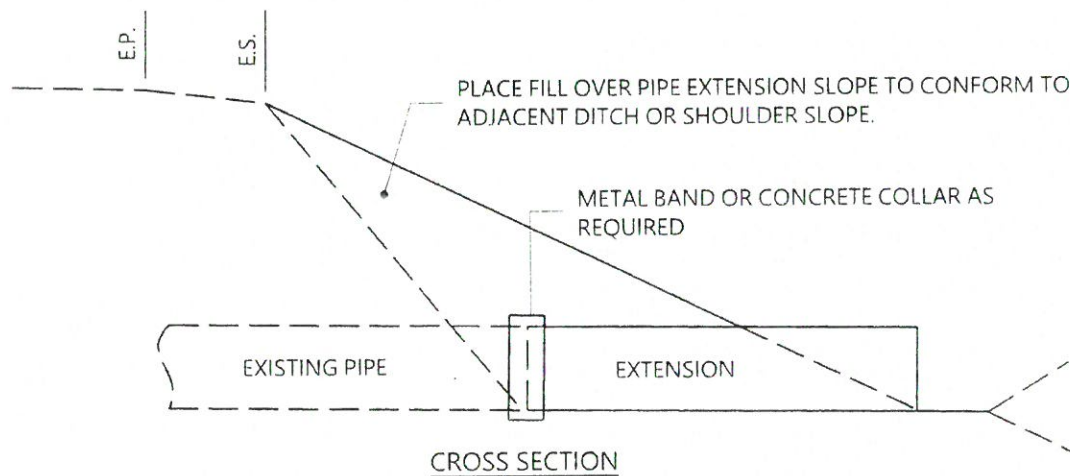
Testing of the pipe material will not be required, however; the Contractor will be required to provide certification that the material meets Section 604 of the Specifications.

* SEQUENCE NUMBER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

EXTENDING PIPE & RESTORING SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

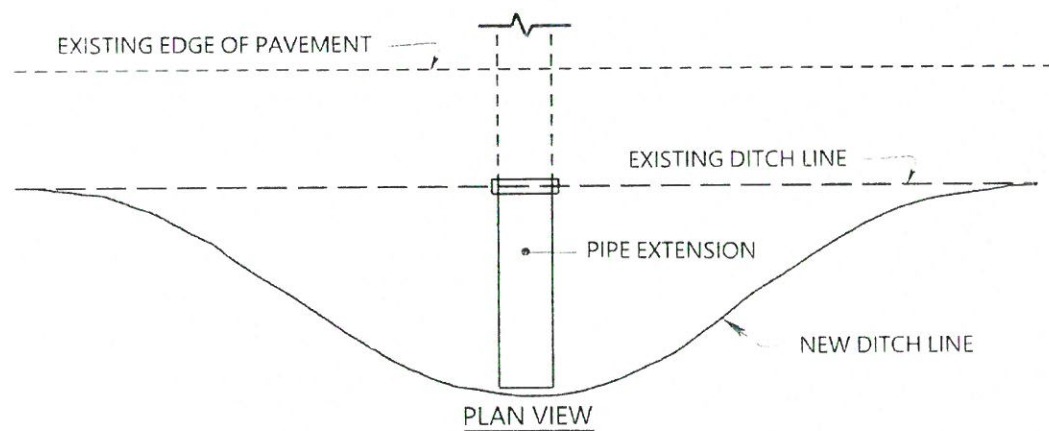


NOTES:

Fill area around pipe extension with suitable random material. Fill is to be placed in six inch loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of fill material and reshaping of existing ditch to new ditch grade is to be included in the unit bid price for pipe.

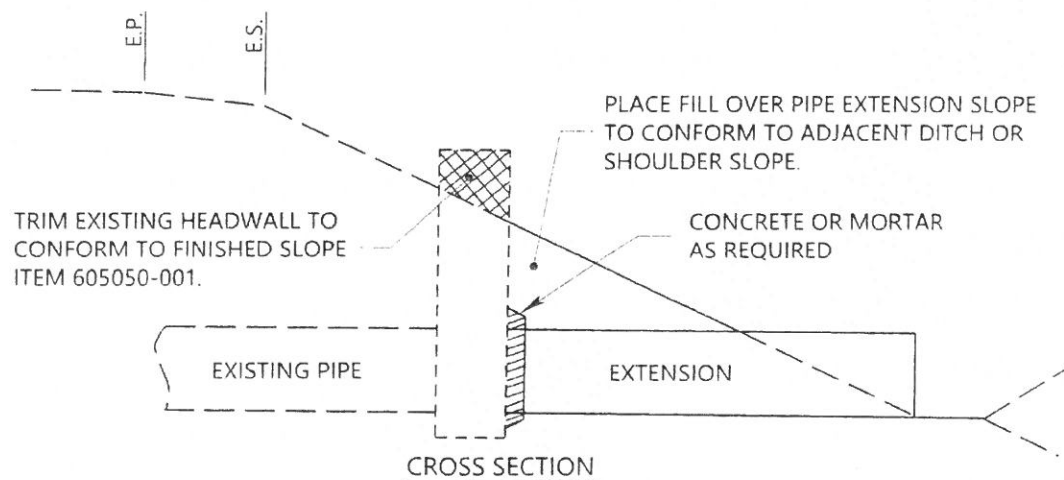
The size and type of pipe will be as called for on the plans. Testing of the pipe material will not be required, however, the Contractor will be required to provide certification that the material meets Section 604 of the Specifications.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PIPE EXTENSION

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

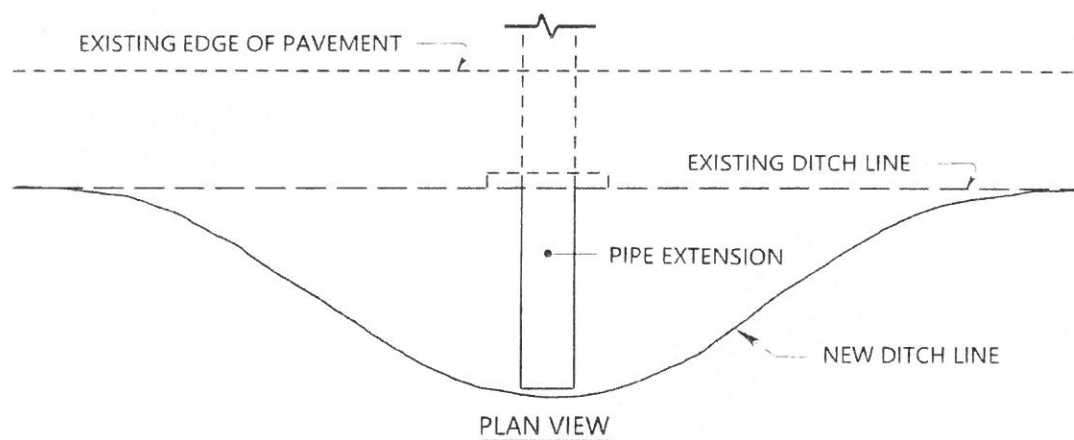


NOTES :

Fill area around pipe extension with suitable random material. Fill is to be placed in six inch loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

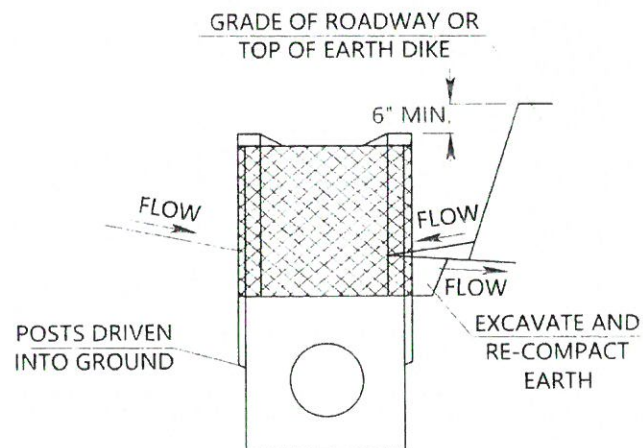
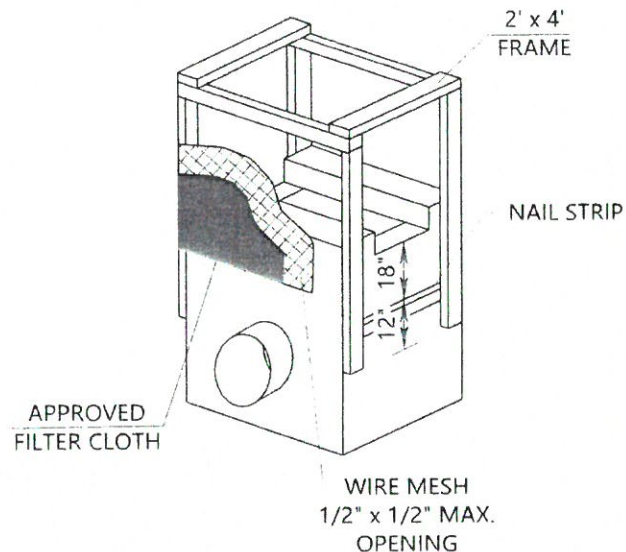
The cost of fill material and reshaping of existing ditch to new ditch grade is to be included in the unit bid price for pipe.

The size and type of pipe will be as called for on the plans. Testing of the pipe material will not be required, however the Contractor will be required to provide certification that the material meets Section 604 of the Specifications. Testing of the concrete or mortar is not required.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS PIPE EXTENSION AT HEADWALL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



STANDARD INLET PROTECTION DETAIL (SIP) OR AND APPROVED EQUAL.

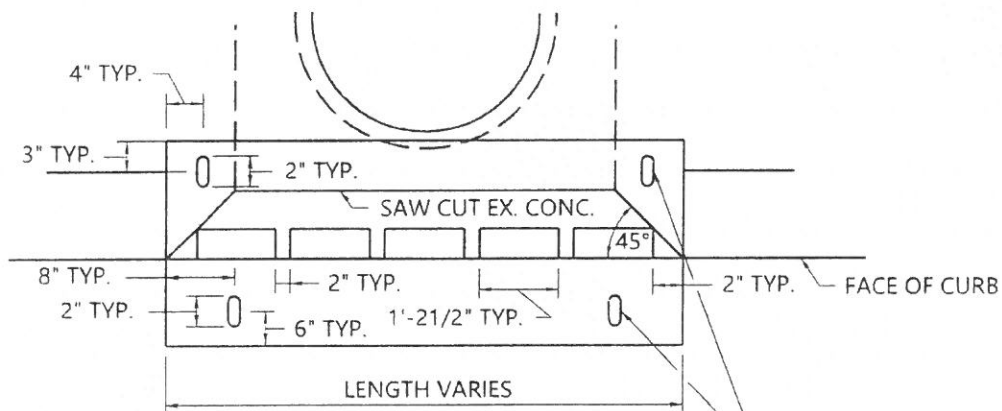
STANDARD INLET PROTECTION CONSTRUCTION SPECIFICATIONS

1. EXCAVATE COMPLETELY AROUND THE INLET TO A DEPTH OF 18" BELOW THE NOTCH ELEVATION.
2. DRIVE THE 2" X 4" CONSTRUCTION GRADE LUMBER POST 1' INTO THE GROUND AT EACH CORNER OF THE INLET. PLACE NAIL STRIPS BETWEEN THE POSTS ON THE ENDS OF INLET. ASSEMBLE THE TOP PORTION OF THE 2' X 4' FRAME USING THE OVERLAP JOINT SHOWN ON DETAIL 23A. THE TOP OF THE FRAME (WEIR) MUST BE 6" BELOW ADJACENT ROADWAYS WERE FLOODING AND SAFETY ISSUES MAY ARRISE.
3. STRETCH THE $\frac{1}{2}$ " X $\frac{1}{2}$ " WIRE MESH TIGHTLY AROUND THE FRAME AND FASTEN SECURELY. THE ENDS MUST MEET AND OVERLAP AT A POST.
4. STRETCH THE GEOTEXTILE CLASS E TIGHTLY OVER THE WIRE MESH WITH THE GETEXTILE EXTENDING FROM THE TOP OF THE FRAME TO 18" BELOW THE INLET NOTCH ELEVATION. FASTEN THE GEOTEXTILE FIRMLY TO THE FRAME. THE ENDS OF THE GEOTEXTILE MUST MEET AT A POST, BE OVERLAPPED, AND FOLDED, THEN FASTENED DOWN.
5. BACKFILL AND COMPACT FILL MATERIAL UNTIL THE LAYER OF EARTH IS LEVEL WITH THE NOTCH ELEVATION ON THE ENDS AND TOP ELEVATION ON THE SIDES.
6. IF THE INLET IS NOT IN A SUMP, CONSTRUCT A COMPACTED EARTH DIKE ACROSS THE DITCH LINE DIRECTLY BELOW IT. THE TOP OF THE EARTH DIKE SHOULD BE AT LEAST 6" HIGHER THAN THE TOP OF THE FRAME.
7. THE STRUCTURE MUST BE INSPECTED PERIODICALLY AND AFTER EACH RAIN AND THE GEOTEXTILE REPLACED WHEN IT BECOMES CLOGGED.
8. PAY ITEM 642040-001 INLET PROTECTION EA.

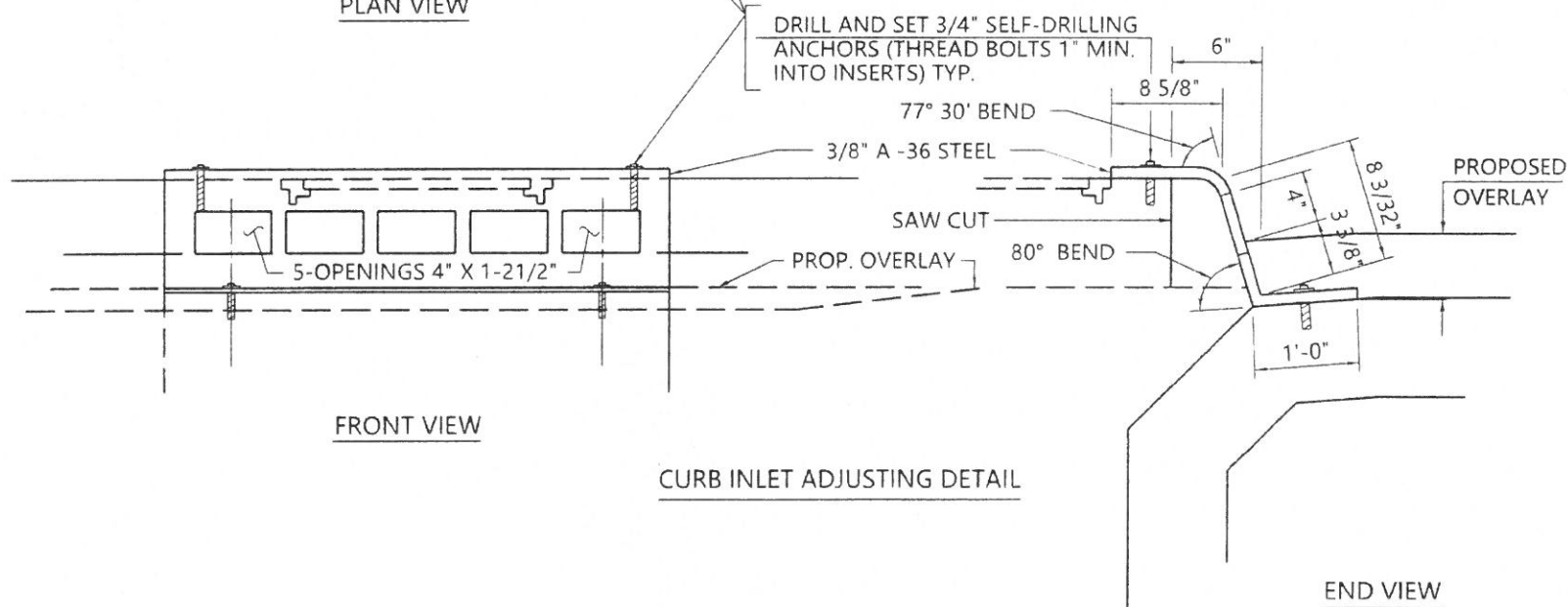
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

STANDARD INLET PROTECTION DETAIL

Public Roads Div.	State Dist No.	State Project No.	Federal Project No.	County
W.V.				



PLAN VIEW



FRONT VIEW

CURB INLET ADJUSTING DETAIL

END VIEW

NOTES

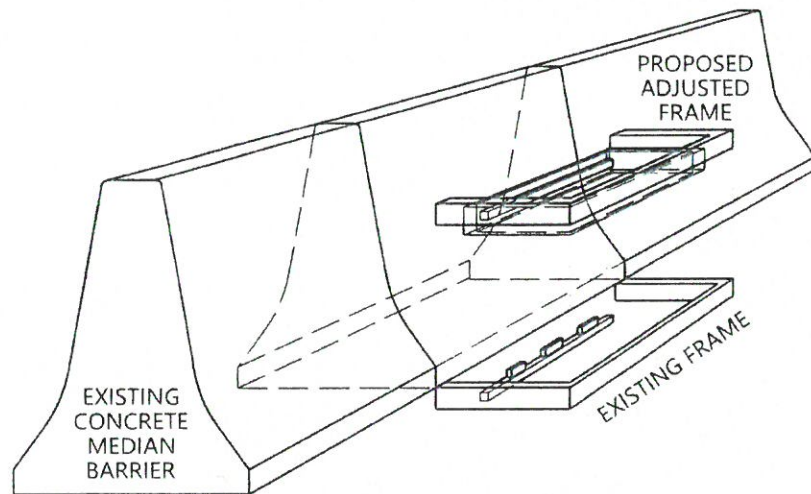
CURB FACE PLATE SHALL BE FABRICATED FROM 3/8" THICK A-36 STEEL, SHOP BENT OR SHOP WELDED. FINISH PLATE SHALL BE COATED WITH INORGANIC ZINK-RICH PAINT CONSISTING OF A PRIMER COAT CONFORMING TO STANDARD SPECIFICATION 711.20.2.

THE COST OF ADJUSTING INLETS SHALL INCLUDE ALL LABOR AND MATERIALS REQUIRED TO SAW CUT EXISTING CONCRETE AND THE FABRICATION AND INSTALLATION OF THE 3/8" THICK GRATE PLATE AS DETAILED HERE-IN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD MEASURE THE EXISTING INLET AND MODIFY DIMENSIONS TO INSURE PROPER FIT.

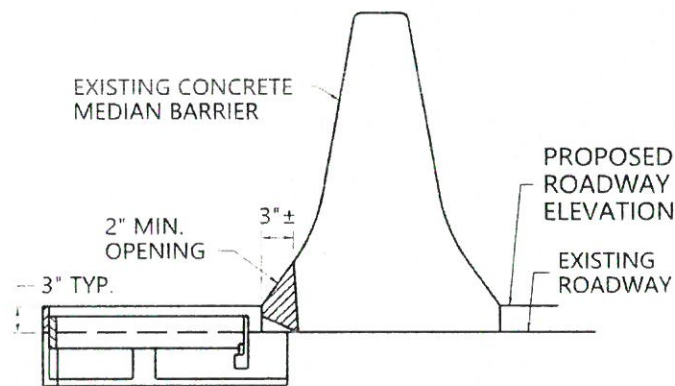
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

INLET ADJUSTMENT

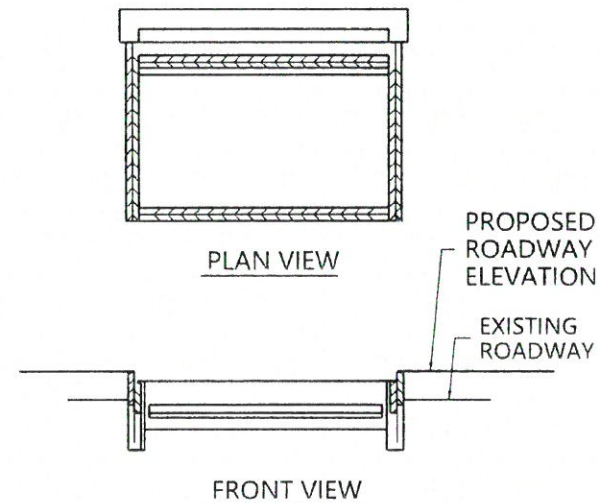
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



MEDIAN BARRIER INLET ADJUSTING DETAIL



END VIEW



NOTES

THE CONTRACTOR SHALL REPAIR ANY DAMAGES TO EXISTING INLETS. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ADJUSTING INLETS AT EACH LOCATION.

ADJUSTING FRAME TO BE CONSTRUCTED OF 1" STRUCTURAL STEEL PLATE, FIELD MEASURED AND WELDED AS ONE UNIT TO INSURE PROPER FIT. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ADJUSTING INLETS AT EACH LOCATION.

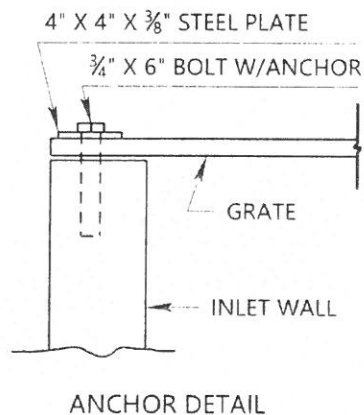
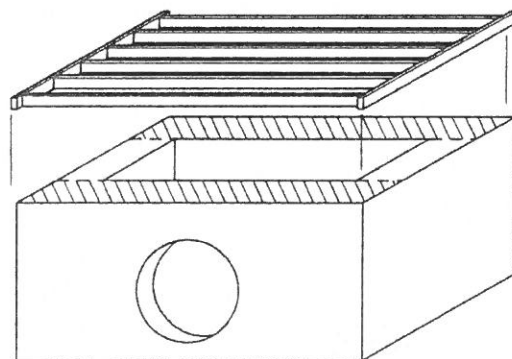
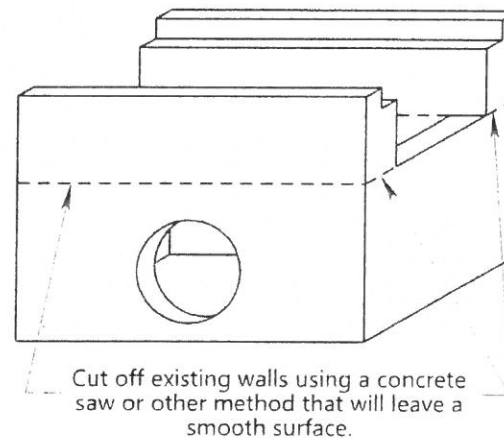
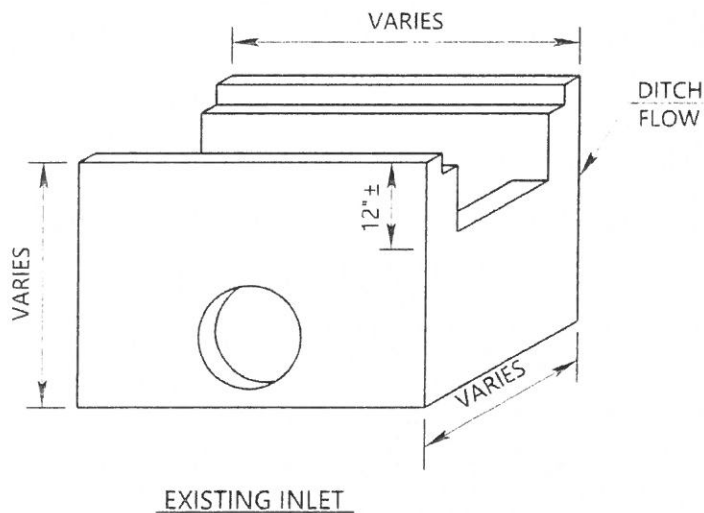
EXISTING INLETS WITH LOOSE BRICK AND/OR BROKEN CONCRETE SHALL BE RE-BRICKED AND/OR REFORMED WITH CONCRETE. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ADJUSTING INLETS AT EACH LOCATION.

ALL GRATE AND FRAME MEMBERS SHALL MEET THE REQUIREMENTS FOR STRUCTURAL STEEL OF 709.12 OF THE SPECIFICATIONS. CROSS MEMBERS SHALL BE JOINED TO THE END STRAPS WITH 3/8" WELDS ON BOTH SIDES OF EACH END. FRAME MEMBERS SHALL BE JOINED WITH 3/8" WELDS AT THE OUTSIDES OF THE CORNERS. THE UPPER PORTION OF THE INLET SHALL BE CAST WITH FRAME IN PLACE OR PLACED IN FRESH CONCRETE IMMEDIATELY AFTER CASTING. THE GRATE AND THE INSIDE OF THE FRAME SHALL BE PAINTED WITH TYPE "A" ASPHALT-BASE EMULSION MEETING THE REQUIREMENTS OF ASTM SPECIFICATION D 1187, OR WITH VINYL-TYPE PAINT IN ACCORDANCE WITH THE REQUIREMENTS OF 615 OF THE SPECIFICATIONS EXCEPT THAT THE BLAST CLEANING REQUIREMENTS PRIOR TO PAINTING ARE WAVED. THE COLOR OF THE TOP COAT FOR VINYL PAINT SHALL MEET THE REQUIREMENTS OF THE FEDERAL STANDARD 595. NO.14062. MEMBERS AND WELDS SHALL BE CLEANED BEFORE PAINTING

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

INLET ADJUSTMENT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



NOTES :

The Contractor will perform all work and supply all materials necessary to complete inlet modification as specified.

Use standard Type G Inlet grate of sufficient size to cover inlet opening.

Grate to be fabricated per Type G Inlet Standard Detail.

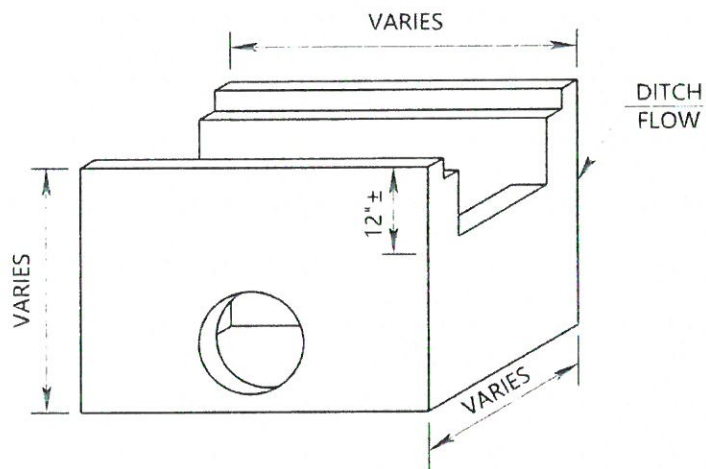
Anchors to be self-drill such as Star 3400 series Self-Drill Shield, Phillips Red Head Self-Drill Anchor or equal as approved by the Engineer.

Anchors to be placed in two sides (opposite). Testing requirements for the anchors has been waived.

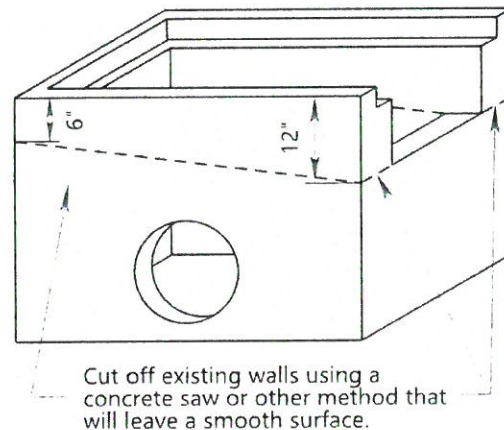
All work will be paid for as Item 605012-001, Adjust Inlet Type C, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
ADJUSTING TYPE C INLET (FLAT)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



EXISTING INLET



NOTES :

The Contractor will perform all work and supply all materials necessary to complete inlet modification as specified.

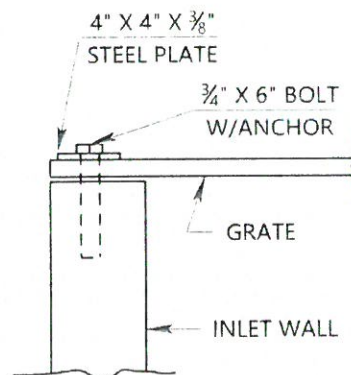
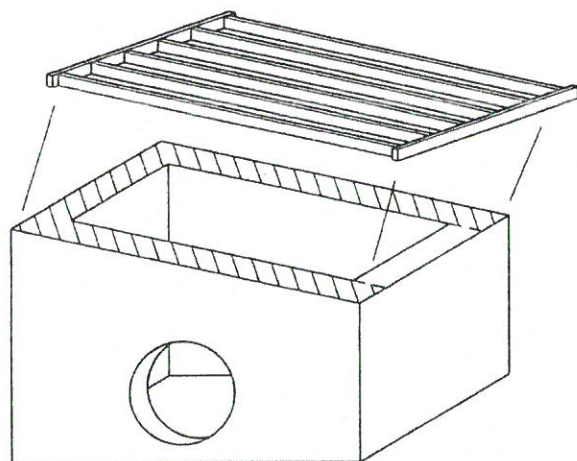
Use standard Type G Inlet grate of sufficient size to cover inlet opening.

Grate to be fabricated per Type G Inlet Standard Detail.

Anchors to be self-drill such as Star 3400 series Self-Drill Shield, Phillips Red Head Self-Drill Anchor or equal as approved by the Engineer.

Anchors to be placed in two sides (opposite). Testing requirements for the anchors has been waived.

All work will be paid for as Item 605012-001, Adjust Inlet Type C, per each.

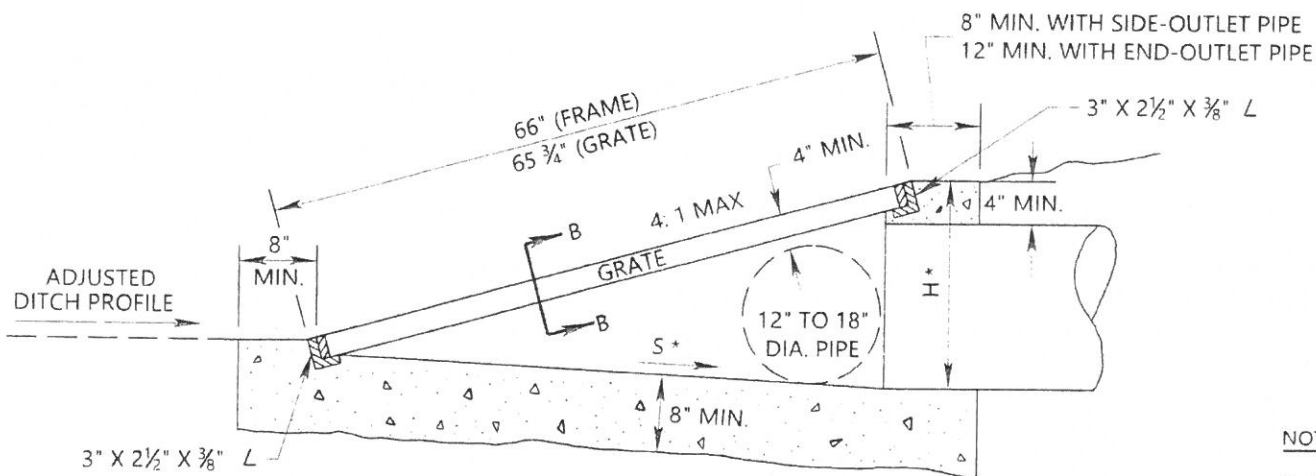


ANCHOR DETAIL

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

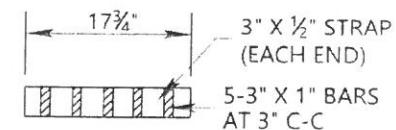
ADJUSTING TYPE C INLET (SLOPE)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



* SLOPE & HEIGHT VARIES
TO ACCOMIDATE PIPE
DIAMETER.

SECTION A-A



SECTION B-B

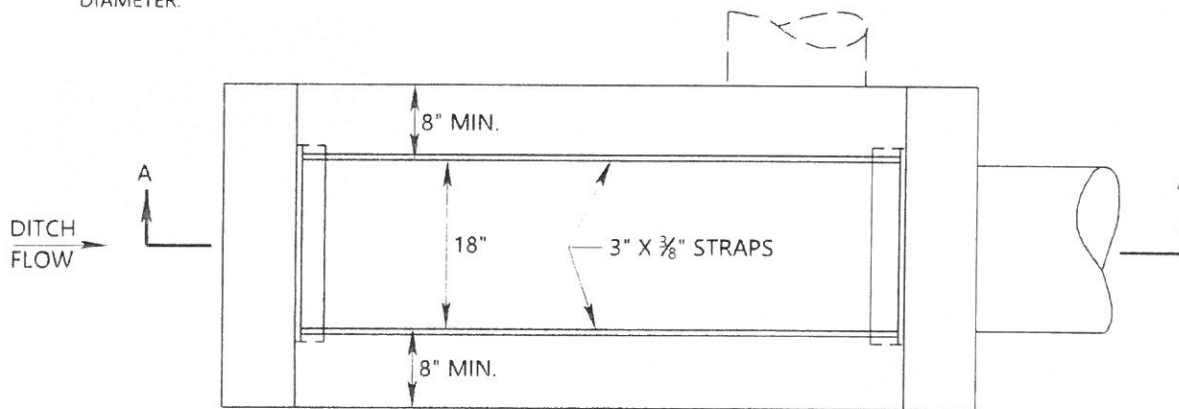
NOTES:

Grate and frame to be fabricated as per Type G Inlet Standard Detail. $2 \frac{3}{4}'' \times 1''$ bars and $2 \frac{3}{4}'' \times \frac{7}{16}''$ straps may be substituted for the bars and straps as shown hereon.

Concrete for constructing the inlet shall have mix proportions in accordance with Section 605 of the Specifications; however, testing will not be required.

All work, including pipe extension if called for on the plans, is to be included in the cost of inlet.

Item 605051-001, Type U Inlet, per each.

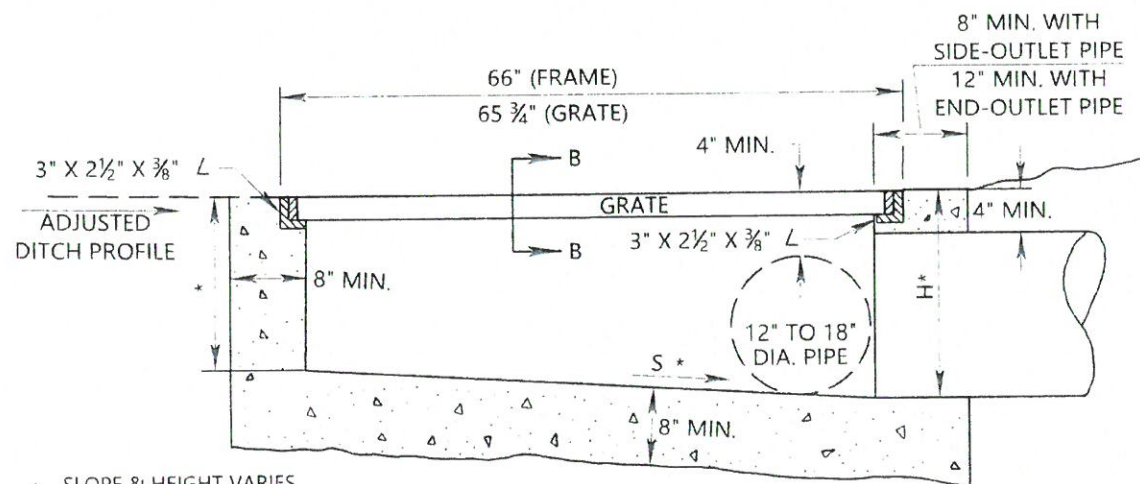


PLAN
(GRATE NOT SHOWN)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

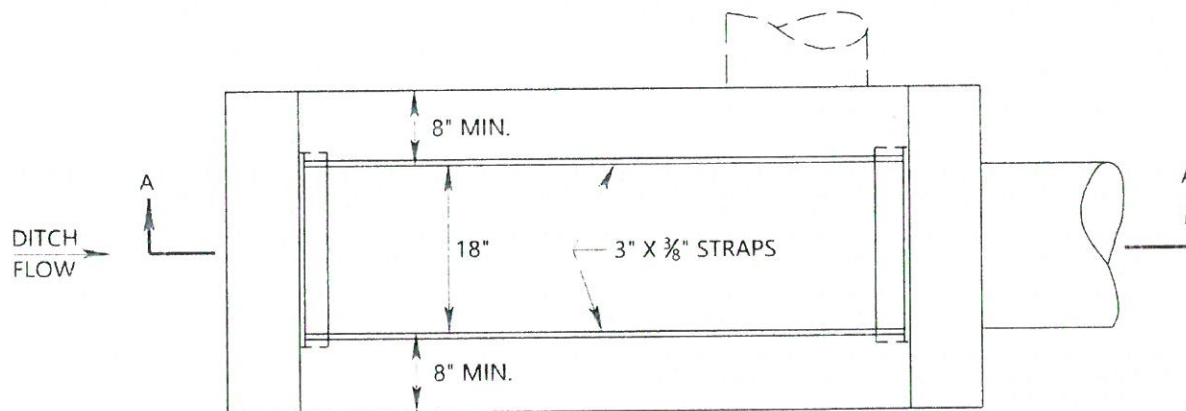
TYPE U INLET (1 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

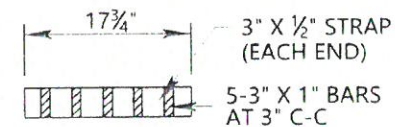


* SLOPE & HEIGHT VARIES TO ACCOMODATE PIPE DIAMETER.

SECTION A-A



PLAN
(GRATE NOT SHOWN)



SECTION B-B

NOTES:

Grate and frame to be fabricated as per Type G Inlet Standard Detail. 2 3/4" x 1" bars and 2 3/4" x 7/16" straps may be substituted for the bars and straps as shown hereon.

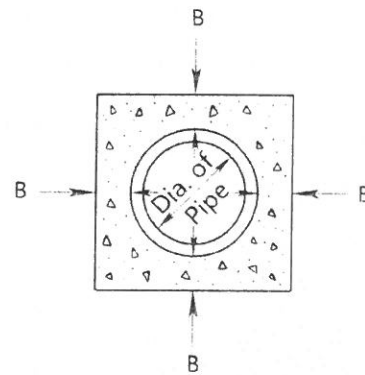
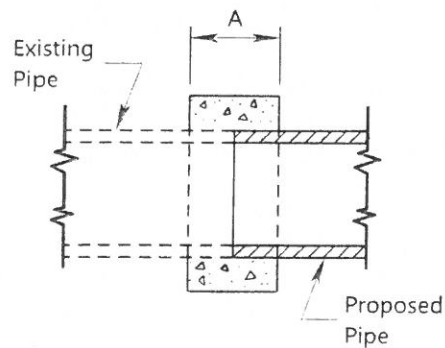
Concrete for constructing the inlet shall have mix proportions in accordance with Section 605 of the Specifications; however, testing will not be required.

All work, including pipe extension if called for on the plans, is to be included in the cost of inlet.

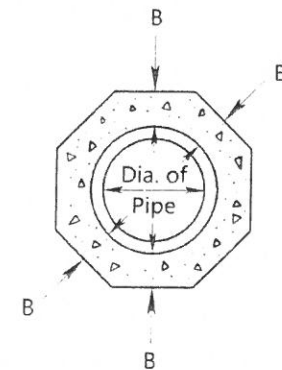
Item 605051-001, Type U Inlet, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
SPECIAL TYPE U INLET (2 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



48" AND UNDER



OVER 48"

DIAMETER OF PIPE	A	B	CU. YD. CONC.*	DIAMETER OF PIPE	A	B	CU. YD. CONC.*
15"	1'-0"	0'-6"	0.18	48"	2'-0"	1'-0"	2.10
18"	1'-0"	0'-6"	0.21	54"	2'-6"	1'-0"	2.09
21"	1'-0"	0'-6"	0.24	60"	3'-0"	1'-6"	4.31
24"	1'-0"	0'-6"	0.27	72"	3'-0"	1'-6"	5.03
30"	1'-6"	0'-9"	0.75	84"	3'-0"	2'-0"	7.94
36"	1'-6"	0'-9"	0.92	96"	3'-0"	2'-0"	8.90
42"	2'-0"	1'-0"	1.84	108"	3'-0"	2'-0"	9.87

* FOR INFORMATION ONLY

NOTES:

A and B are minimum dimensions. Forming will not be required if minimum dimensions are obtained. Metal connecting bands may be substituted for a concrete collar to join existing and new metal pipes. The cost of metal bands are to be included in the unit bid price for the various pipes.

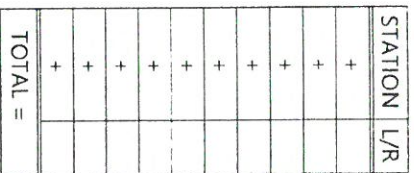
Concrete for constructing the collar shall be in accordance with Section 715.12 of the Specifications; however, testing will not be required. The cost of concrete collar is to be included in the unit bid price of proposed pipe.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

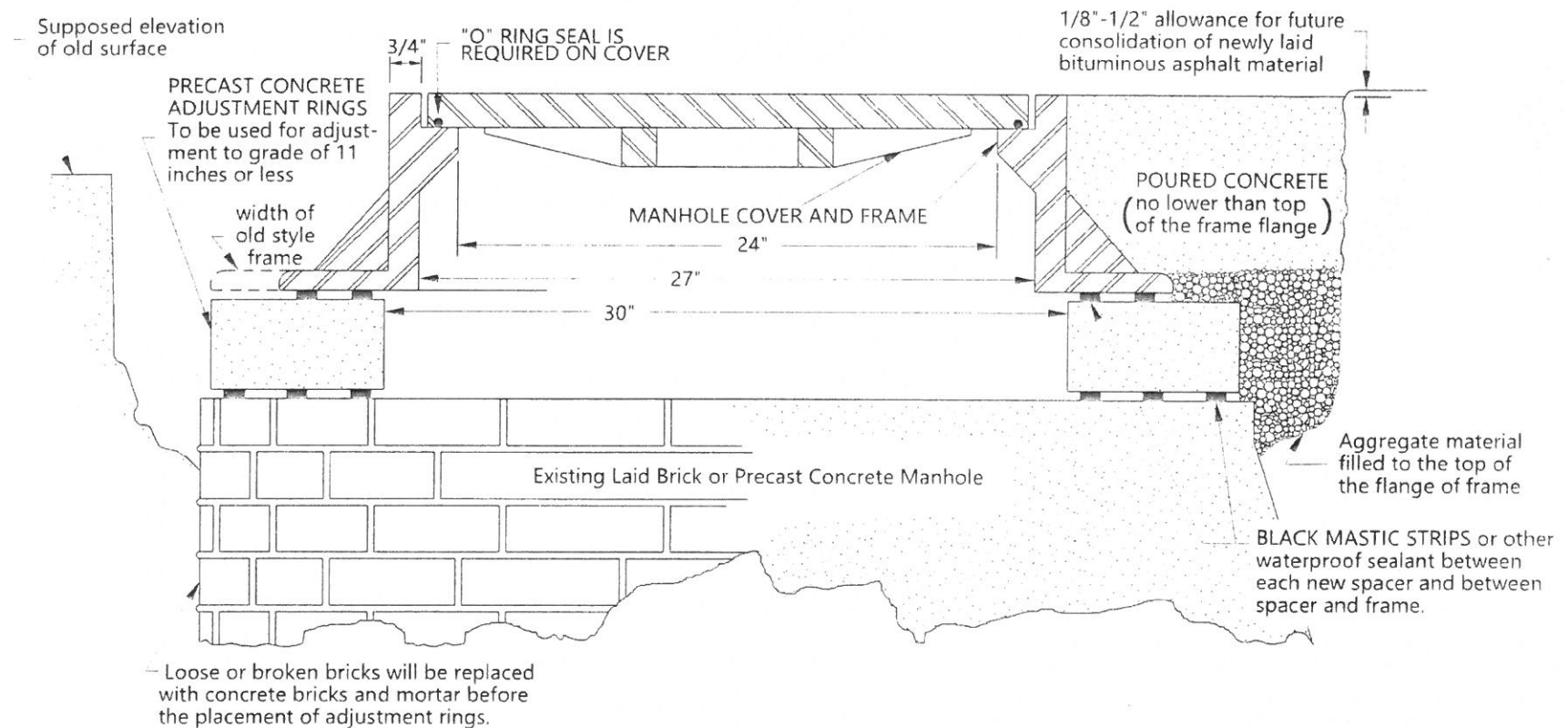
CONCRETE COLLAR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

ITEM 670019-



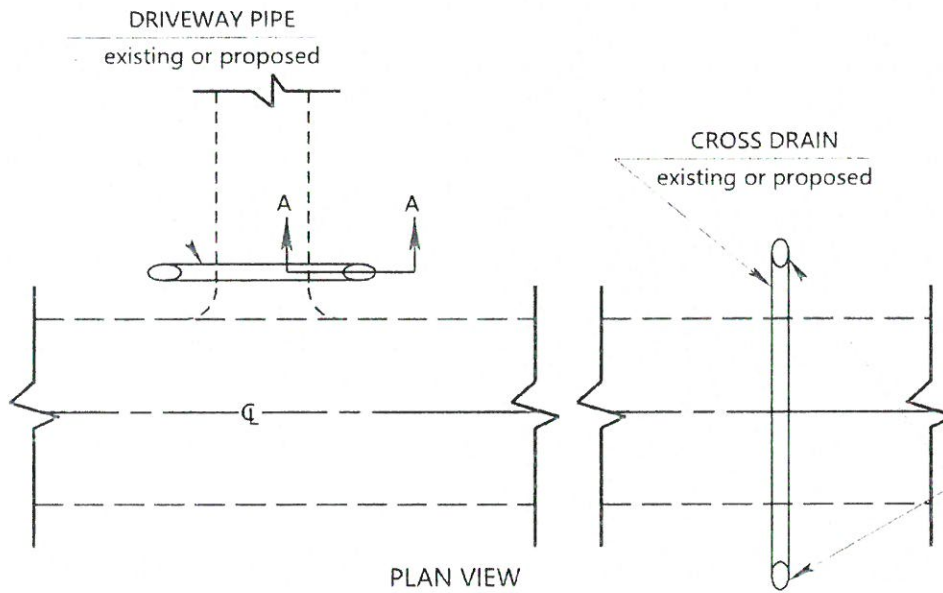
Cross - Section Detail of Sanitary Sewer Manhole Cover Adjustment



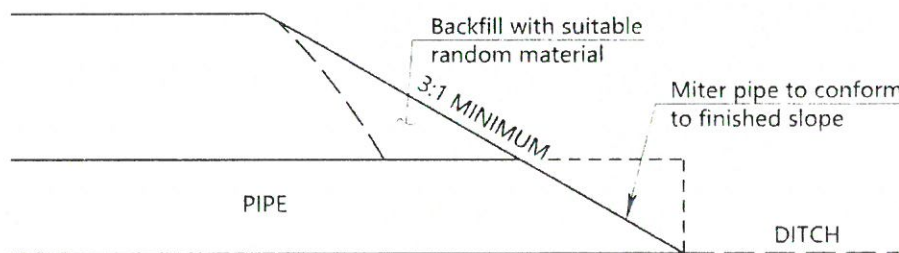
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

SANITARY SEWER MANHOLE COVER ADJUSTMENT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



Miter pipe and site grade to conform to adjacent slope



SECTION A-A

NOTES :

This detail will only apply to the locations designated on the plans. The cost of mitering, site grading, and any fill material required for existing pipe modifications is to be incidental to the various unit bid prices of this project. The cost of mitering site grading new pipe installations is to be included in the unit bid price of the new pipe.

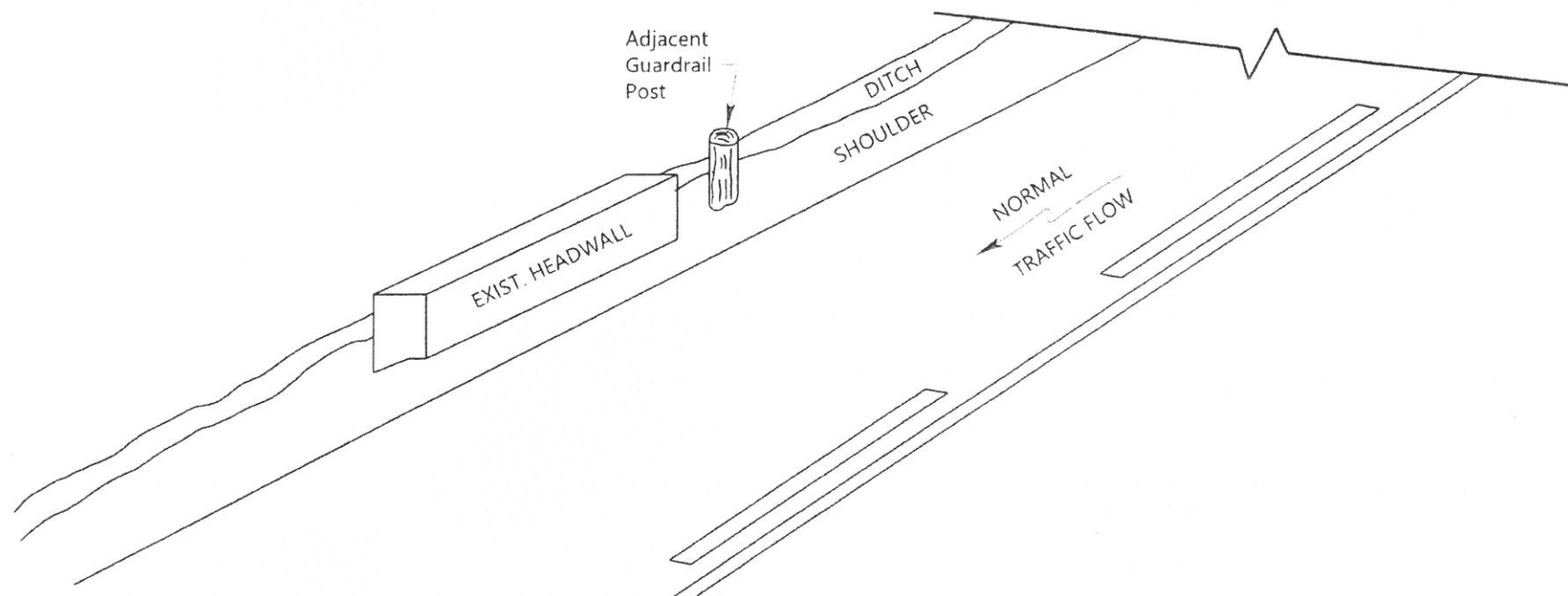
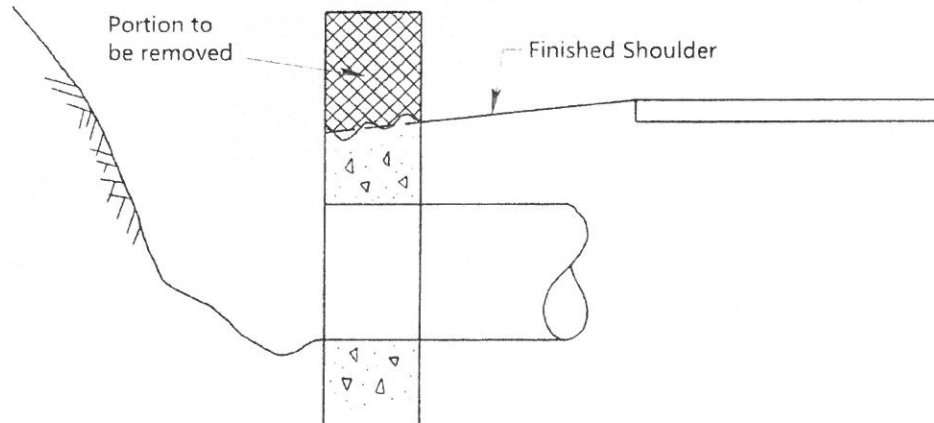
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PIPE MITER DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

The intent of this operation is to eliminate roadside hazards formed by concrete headwalls above the finished shoulder elevation on roads where operating speeds are expected to exceed 25mph. The headwalls, as listed in the table, are to be adjusted by removal of the top concrete by jackhammering or by other suitable methods as approved by the Engineer to achieve a top surface free of hazardous sharp edges and to avoid damages to the remaining headwall. Any adjacent guardrail posts which are used only as a hazard warning device are to be removed as a part of this operation.

Payment for this work is to be Item 605050-001 Adjusting Concrete Headwall, per each.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

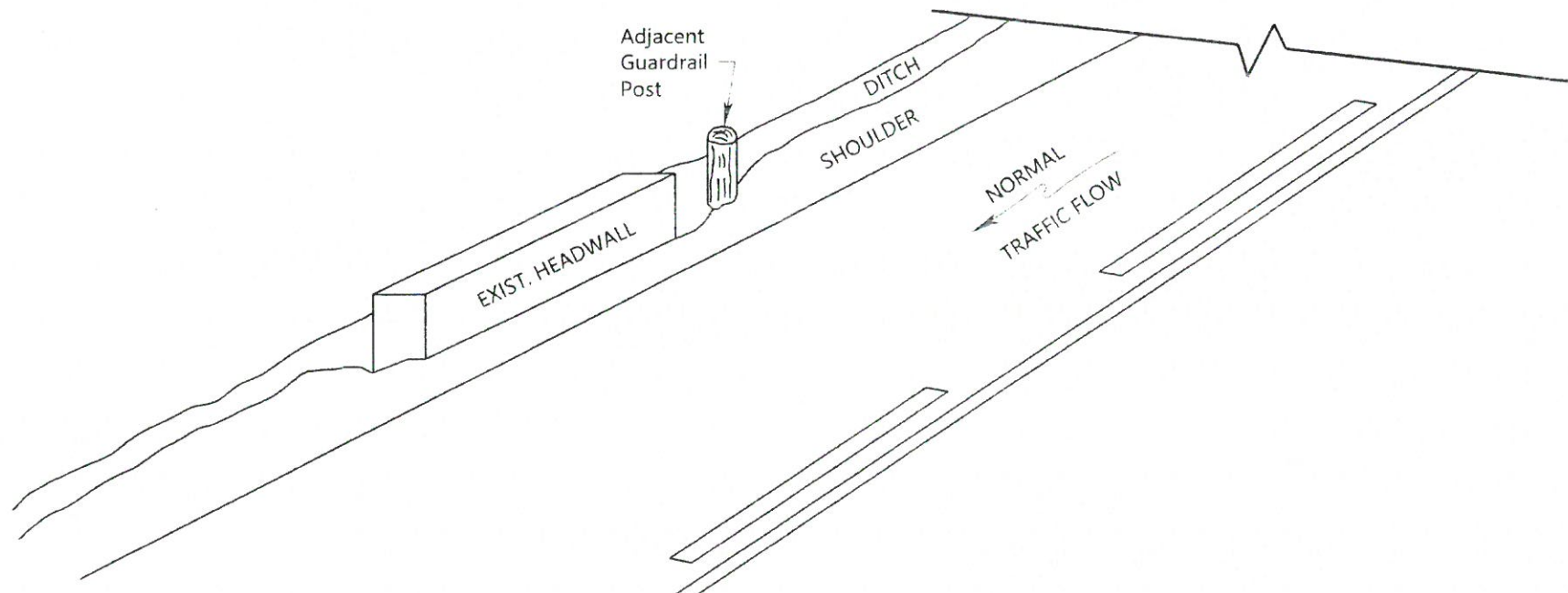
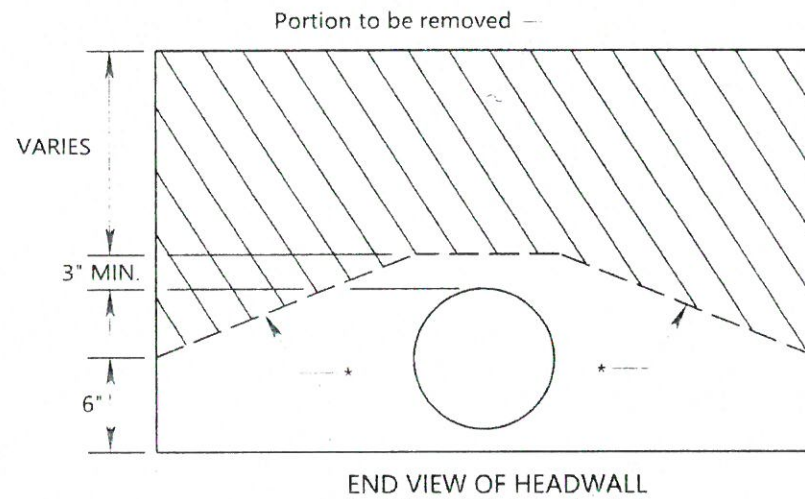
ADJUSTING CONCRETE HEADWALLS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

The intent of this operation is to eliminate roadside hazards formed by concrete headwalls above the finished shoulder elevation on roads where operating speeds are expected to exceed 25mph. The headwalls, as listed in the table, are to be adjusted by removal of the top concrete by jackhammering or by other suitable methods as approved by the Engineer to achieve a top surface free of hazardous sharp edges and to avoid damages to the remaining headwall. Any adjacent guardrail posts which are used only as a hazard warning device are to be removed as a part of this operation.

Payment for this work is to be Item 605050-001 Adjusting Concrete Headwall, per each.

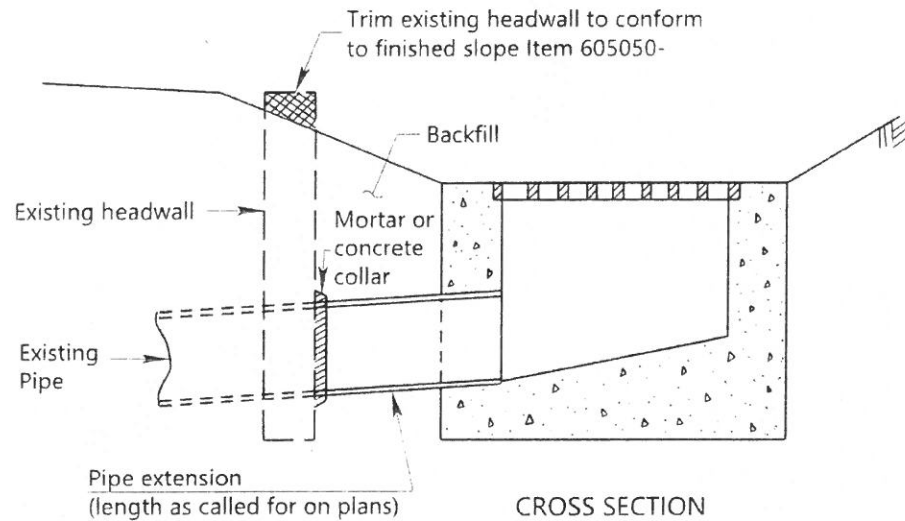
* LINE OF REMOVAL TO MATCH EXISTING SLOPE INTERSECTION.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

ADJUSTING CONCRETE HEADWALLS

Public Roads D.v.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



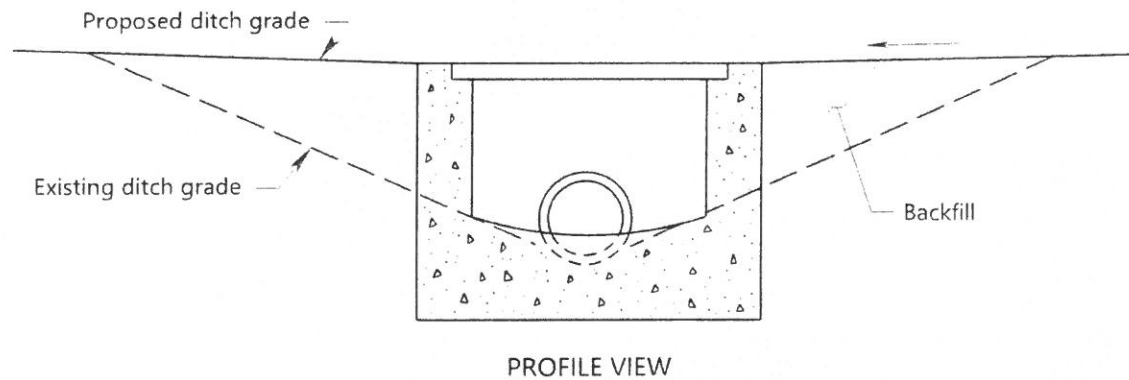
NOTES:

See Standard DR6-G for inlet details.

Fill area around inlet with suitable random material. Fill is to be placed in 6" loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of backfill material and reshaping existing ditch to new grade is to be included in the unit price bid for Item 605009-001, Type G Inlet, per each.

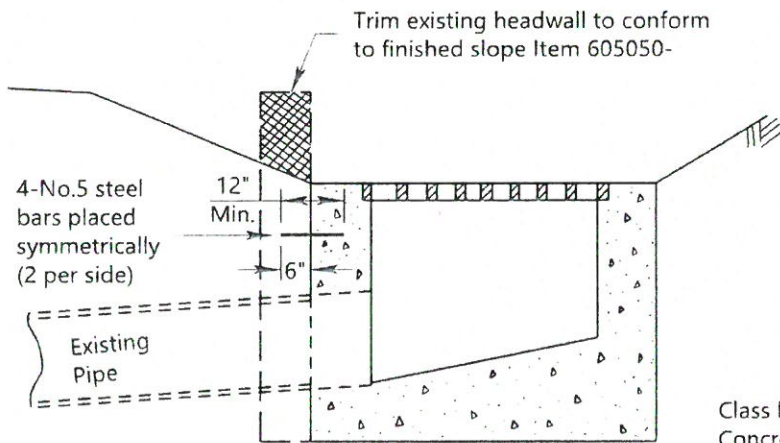
The pipe extension, as called for on the plans, shall be in accordance with Section 604 of the Specifications. Testing of the material will not be required, however; the Contractor will be required to provide certification that the materials meet Section 604 of the Specifications. Testing of mortar will not be required.



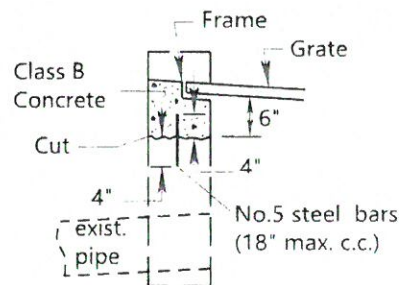
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

TYPE G INLET PLACEMENT

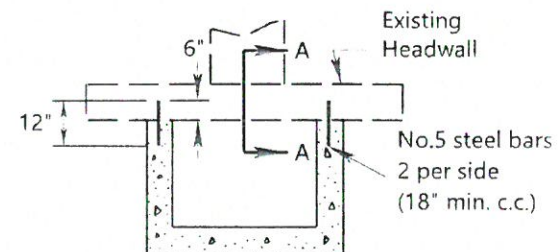
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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CROSS SECTION

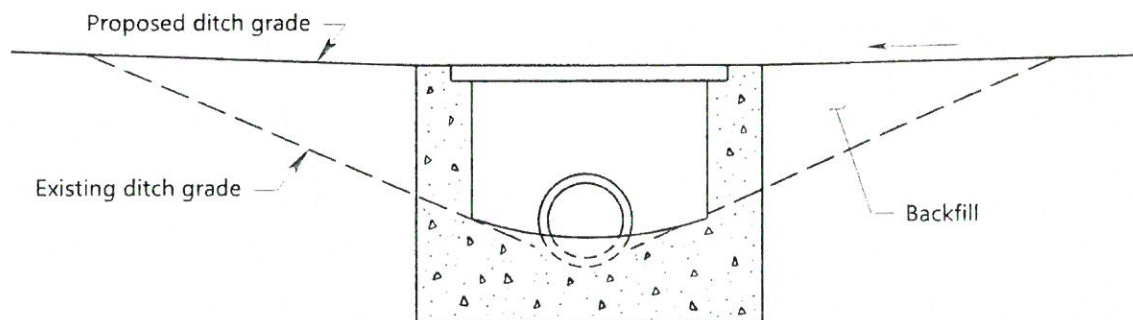


SECTION A-A



OPTIONAL CONSTRUCTION

Elimination of Inlet Wall



PROFILE VIEW

NOTES:

See Standard DR6-G for inlet details.

Fill area around inlet with suitable random material. Fill is to be placed in 6" loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of backfill material and reshaping existing ditch to new grade is to be included in the unit price bid for Item 605009-001, Type G Inlet, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

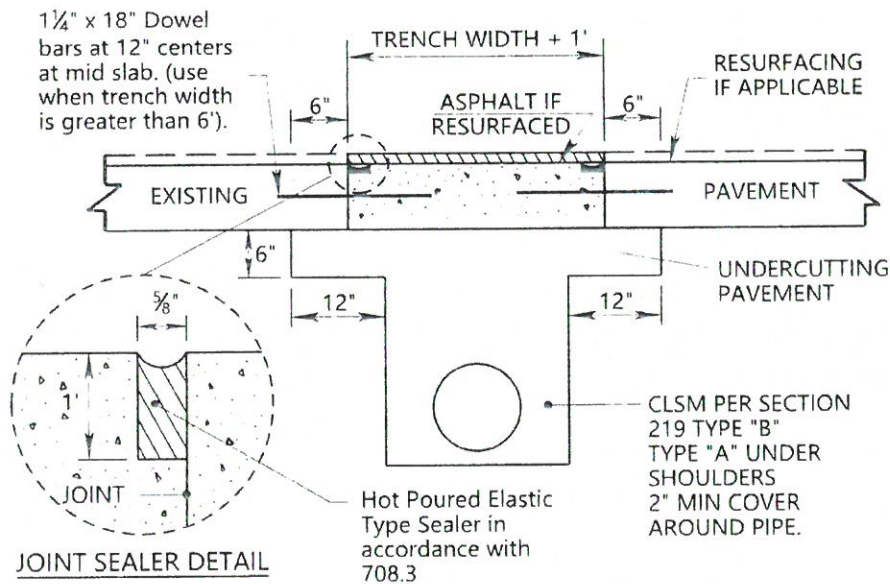
TYPE G INLET PLACEMENT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



7. Traffic is to be maintained at all times by the use of appropriate traffic control devices. Use of metal plates, having sufficient rigidity to span Type A trench, is required to prevent wheel loads from being transmitted to the CLSM. The plates are to be securely anchored to prevent movement caused by traffic. The plates are to be left in place until the CLSM has attained a 50% of its compressive strength. Cost of such plates is to be included in the unit price bid for pipe.

REPAVING PIPE TRENCHES



TYPE D TRENCH
CONCRETE PAVEMENT

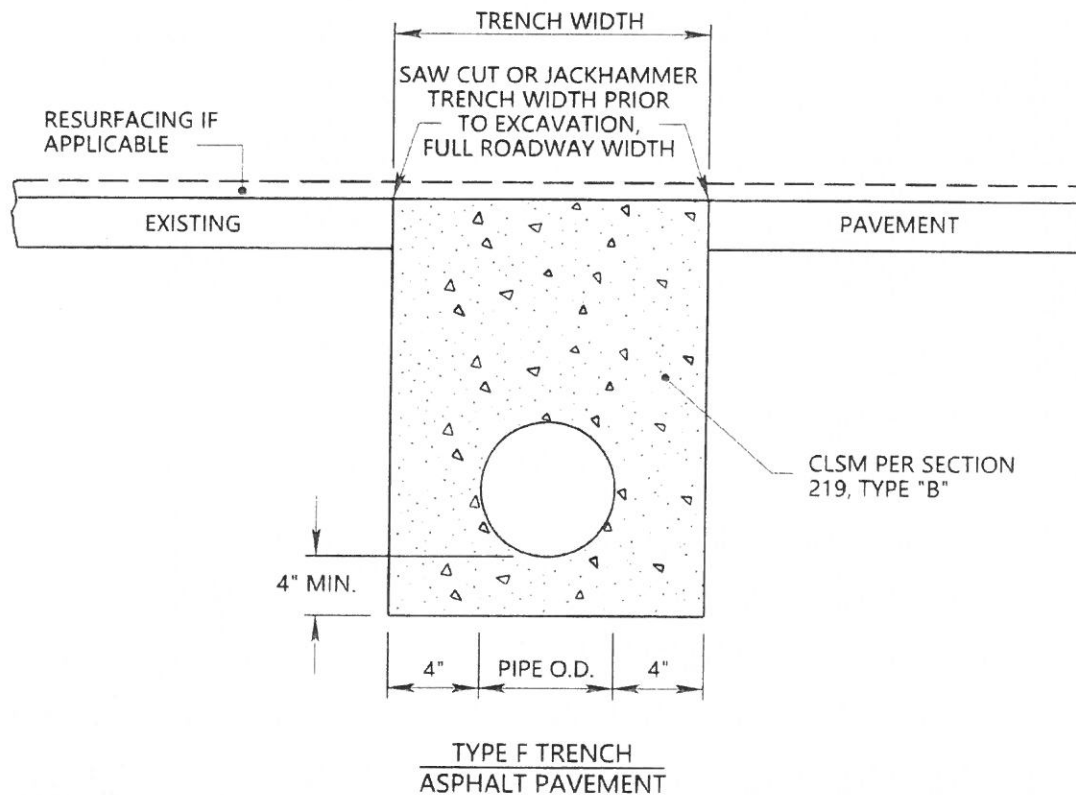
NOTES:

1. Type D trenches to be used as applicable whether or not specified in the plans.
2. Concrete surface to be rough for bonding of asphalt if area to be resurfaced. Trench to be completed before resurfacing.
3. Payment for asphalt to be in tons of material specified for the project, if such items are not specified cost is to be included in unit price of pipe. H.L.B.C base or patching and leveling may be used.
4. Cost of all labor, materials, and equipment to complete the work to the surface of the existing pavement in accordance with the applicable detail(s) shall be included in the unit price for the pipe.
5. Testing of steel bars and dowels is waived; however the Engineer must verify dimensions.
6. Traffic is to be maintained at all times by the use of appropriate traffic control devices. Use of metal plates, having sufficient rigidity to span Type D trenches, is required to prevent wheel loads from being transmitted to the concrete. The plates are to be securely anchored to prevent movement caused by traffic. The plates are to be left in place until the concrete has attained a compressive strength. Cost of such plates is to be included in the unit price bid for pipe.
7. Concrete shall be constructed in accordance with Section 501 except that testing is waived if from a Certified Supplier.
8. Dowel bars are to be coated in accordance with Section 709.15 of the Specifications.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

REPAVING PIPE TRENCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



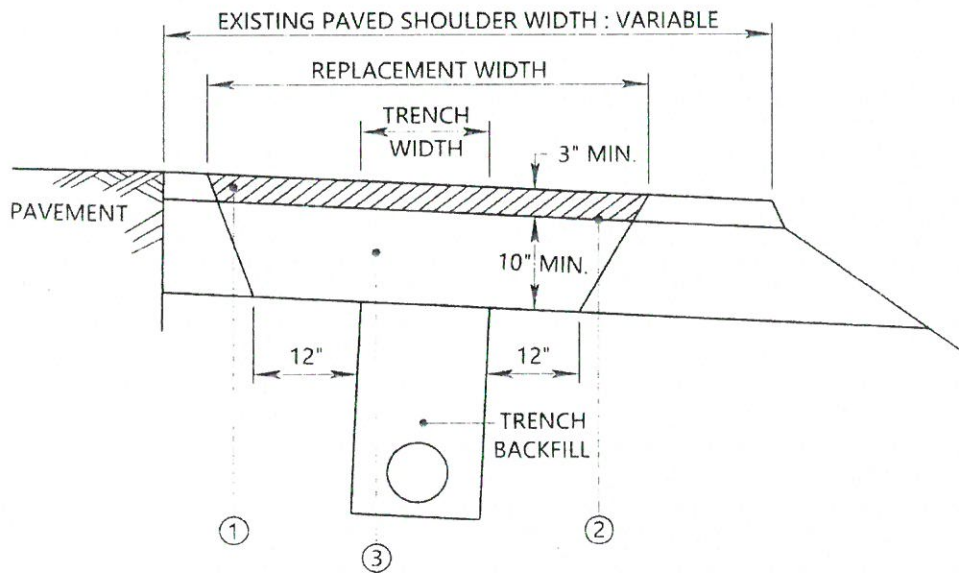
WHEN NO OVERLAY IS SPECIFIED THE CONTROLLED LOW-STRENGTH MATERIAL (CLSM) SHALL BE A MIN. OF 1000 psi FOR DOH PIPES ONLY. NOT TO BE USED FOR UTILITY PIPES.

NOTE: IF TYPE F TRENCH IS USED WHERE THERE IS NO EXISTING OR PROPOSED INLET, THE CLSM SHALL BE POURED FULL DEPTH 2' PAST EACH E.P. THE PIPE SHALL BE ENCASED IN 4" OF CLSM AN ADDITIONAL 10' MAX. BEYOND E.P. IF THERE IS AN EXISTING OR PROPOSED INLET THE CLSM SHALL BE POURED FULL DEPTH TO THE INLET.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

REPAVING PIPE TRENCHES IN PAVED SHOULDER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



NOTES:

Asphalt and Class I Aggregate shall be placed to thicknesses equal to existing shoulder thicknesses or to the minimums as shown, which ever are greater.

Trench shall be backfilled and compacted in accordance with 670.4.5 of the Specifications.

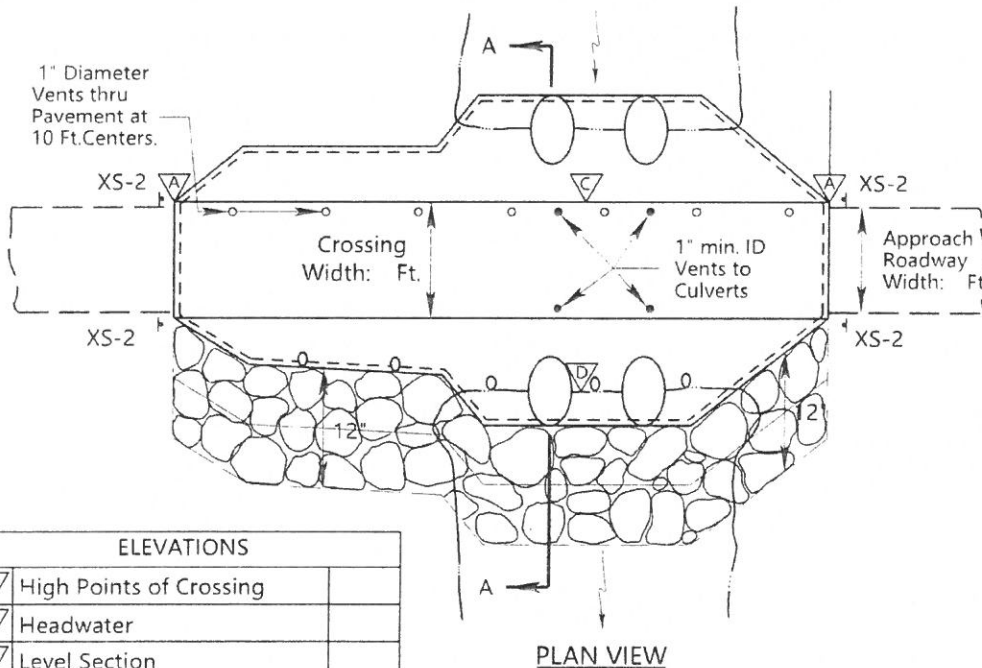
- ① ITEM 401001- *, ASPHALT BASE COURSE, TYPE
- ② ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- ③ ITEM 307001- *, AGGREGATE BASE COURSE, CLASS

* SEQUENCE NUMBER

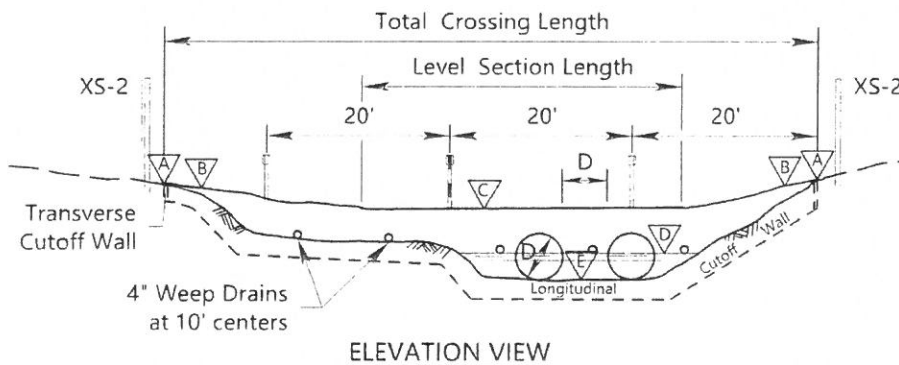
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

REPAVING PIPE TRENCHES IN PAVED SHOULDER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



ELEVATIONS	
	High Points of Crossing
	Headwater
	Level Section
	Normal Daily Stream Flow
	Streambed (Downstream)



WEEP DRAINS

Weep drains are to be placed on downstream side only. Any type of pipe which will provide adequate forming of weep holes thru the wall may be used. Cost of pipe is to be included in various bid items.

CULVERT PIPES

Although these details indicate use of 2 culverts as typical situation, the crossing for this location requires pipe culvert(s); and sufficient quantities are included in the contract documents.

INCIDENTAL ITEMS

No separate payment for joint sealer, #5 bars, or vent pipes.

HAZARD MARKERS & DELINEATORS

XS-2 Hazard Markers as per Standard Sheet TP5-2 are to be installed at each corner of structure. U-Channel (2.00 #/FT.) as per Standard Sheet TEI-7A shall be used for hazard marker supports and for mounting bidirectional 3 1/4" delineators at maximum 20' spacing each side of structure. Cost of all materials and labor for installation of hazard markers and delineators is to be included in the various bid items and no separate payment will be made. At least one post to be striped with black paint as shown in detail.

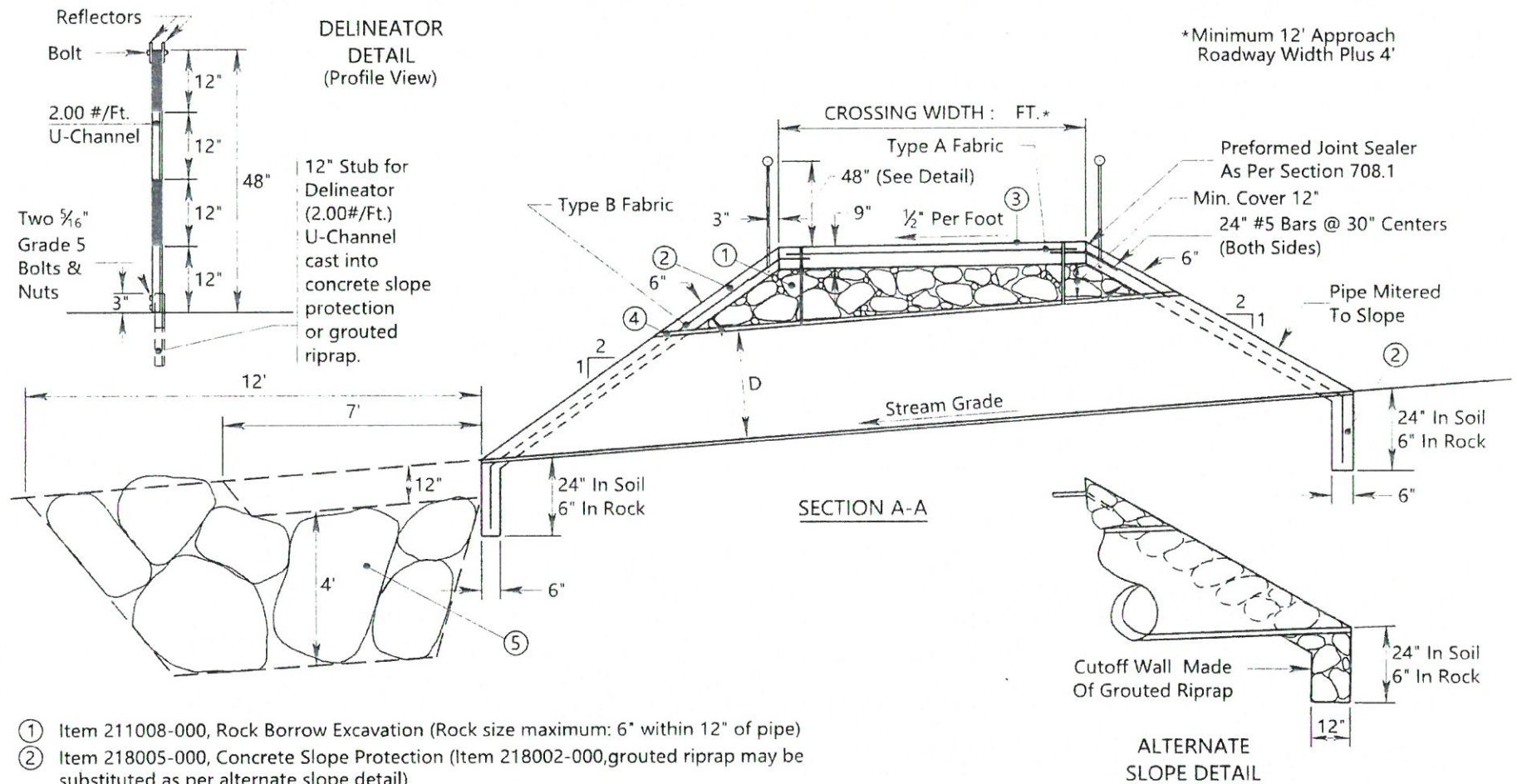
VENT PIPES

Vents may be commercially-available ABS, PVC, or PE.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

LOW-WATER CROSSING (1 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



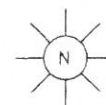
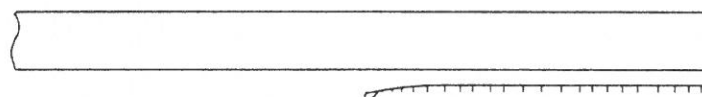
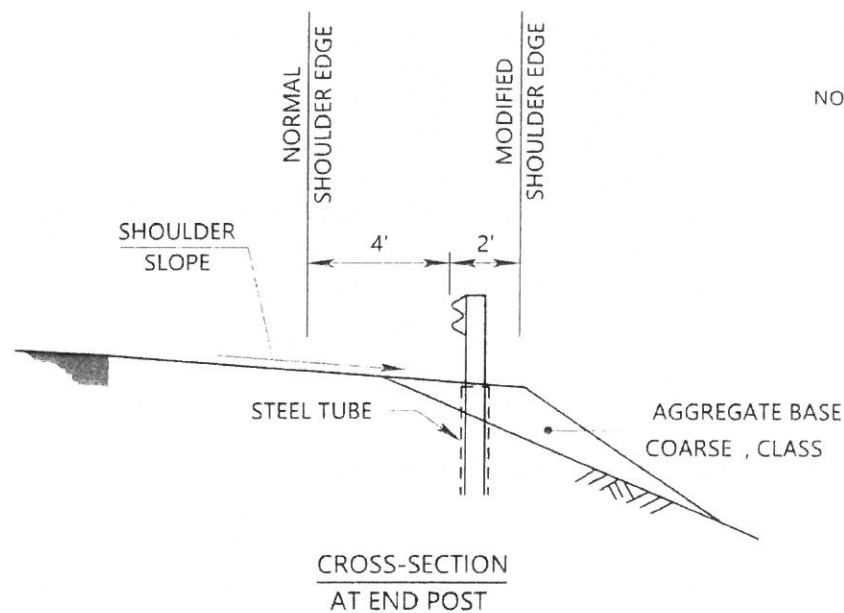
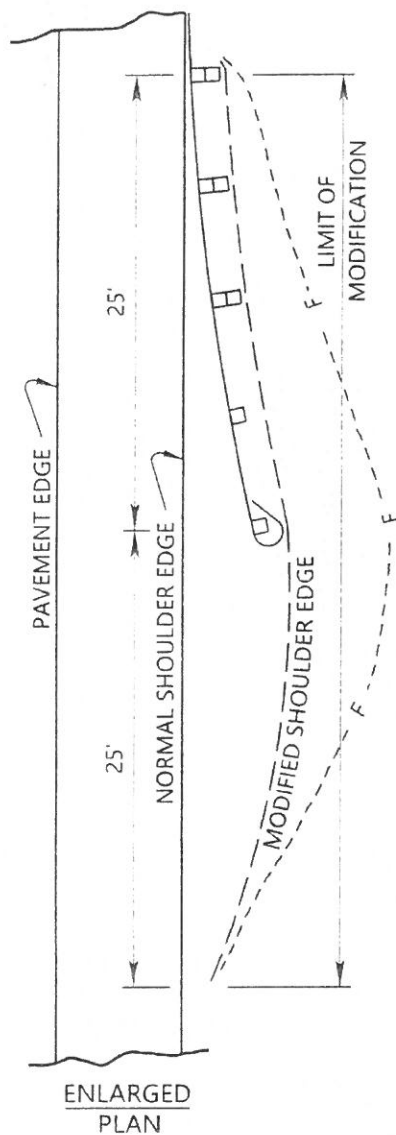
- ① Item 211008-000, Rock Borrow Excavation (Rock size maximum: 6" within 12" of pipe)
- ② Item 218005-000, Concrete Slope Protection (Item 218002-000, grouted riprap may be substituted as per alternate slope detail)
- ③ Item 501001-009, 9 Inch Reinforced Portland Cement Concrete Pavement
- ④ Item 604 - , * Pipe,
- ⑤ Item 211008-000, Rock Borrow Excavation (Rock size minimum 18", maximum 48") (Not required where stream is on bedrock)

* SEQUENCE NUMBER

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

LOW-WATER CROSSING (2 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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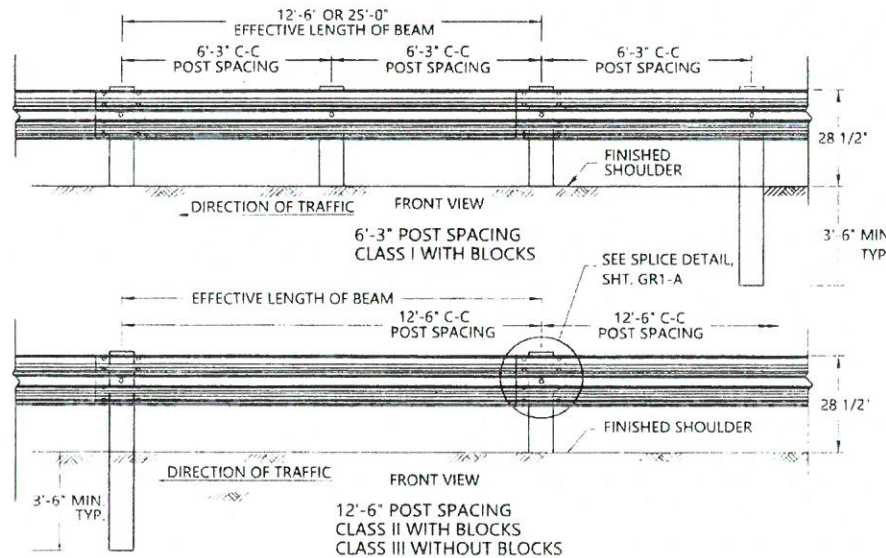


NOTE : REFER TO STANDARD DETAILS
FOR GUARDRAIL DIMENSIONS,
OFFSETS, AND OTHER DETAILS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

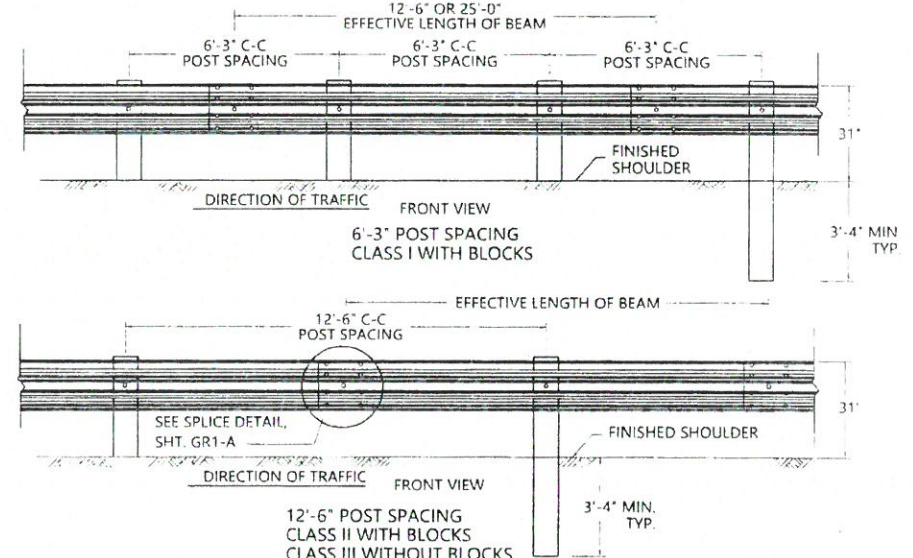
MODIFICATION OF SHOULDER FOR FET

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



28 1/2" HEIGHT GUARDRAIL

Splice locations for 28 1/2" Guardrail shall be on the post.



31" HEIGHT GUARDRAIL

Splice location for 31" Guardrail are generally off the post. However, for tight post spacings, splices on the posts are necessary and acceptable.

GUARDRAIL HEIGHT

Transitions in guardrail height shall be accomplished at a rate of 1" vertical distance in 12.5' (one element) of horizontal distance. Height transitions shall end before end treatments or connections begin.

Height transitions between 28 1/2" and 31" require moving the splice on/off the post by placing one additional post at half the normal spacing.

Guardrail height shall be as indicated on plans.

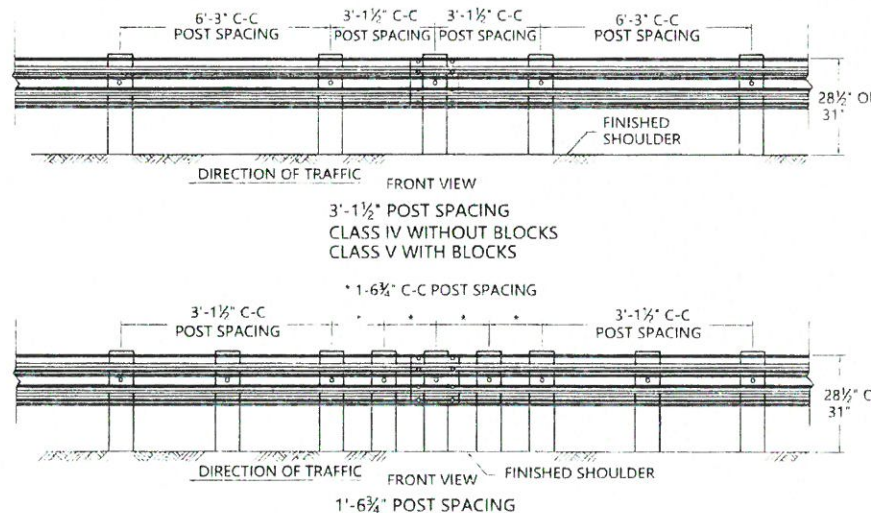
Construction tolerances for rail height is plus/minus 1".

The Standard Trailing End Treatment is acceptable for both 28 1/2" and 31" guardrail height.

Approach Terminals-Separate approved product lists will be maintained for both 28 1/2" & 31" terminal height.

Guardrail that ties to Cut Slope Terminals (CST) must be transitioned per the standard details down to 28 1/2" height (the height of the CST).

Three Beam transitions shall be per Standard GR-11 dated 11-13-12 for 28 1/2" and dated 11-21-12 for 31".



1'-6 3/4" POST SPACING

NOTES

Guardrail systems on NHS routes must meet NCHRP 350 or the most current AASHTO Manual for Assessing Safety Hardware (MASH) crash testing criteria and have an eligibility letter to be used on WVDOT projects.

Guardrail shall be secured to the blocks, post and other elements by 5/8" dia bolts and nuts conforming to the details herein and to the requirements of 712.4 of the Standard Specifications. Nuts shall conform to ASTM A563, Grade A or better.

Approach and Trailing End Treatments shall be as shown or specified on the Plans or directed by the Engineer.

The pay quantity of guardrail will be the Linear Feet of guardrail measured along the face of the rail from center to center of end posts. Cost of the Terminal Section Buffer End shall be included in the cost of the Guardrail.

The approach slope to the face of all guardrail shall be 10:1 or flatter.

The Type, Class and Height of Guardrail shall be as shown in the Plans.

Lap Guardrail in Direction of Traffic.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

REVISED STANDARD DETAIL

REVISION	DATE
1	11-13-12

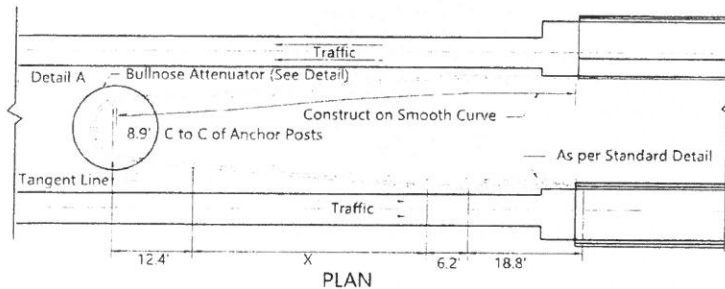
GUARDRAIL CLASS
GUARDRAIL HEIGHT

REPLACES SHEET GR1

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

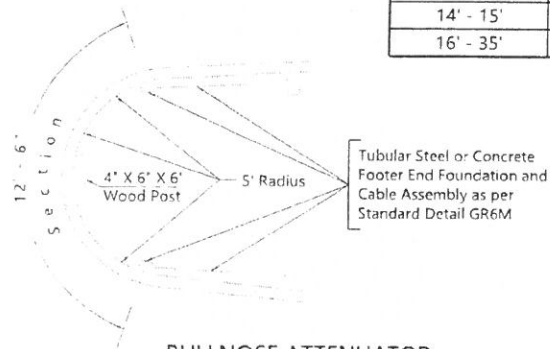
GUARDRAIL CLASS GUARDRAIL HEIGHT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

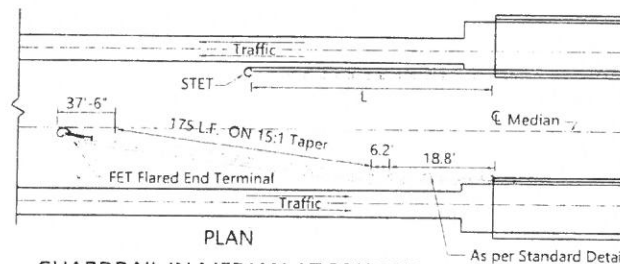


GUARDRAIL IN MEDIAN AT BRIDGES
(BULLNOSE ATTENUATOR)

DISTANCE BETWEEN WALLS	X	Y1	Y2
14' - 15'	37.4'	2.5'	4.0'
16' - 35'	62.4'	4.2'	5.7'

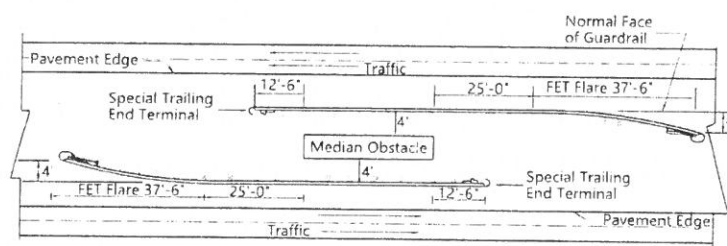


BULLNOSE ATTENUATOR

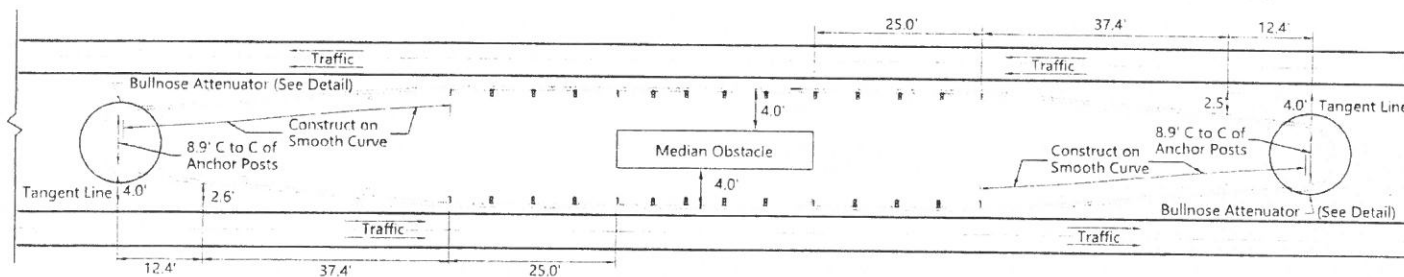


GUARDRAIL IN MEDIAN AT BRIDGES
(WHEN MEDIAN WIDTH IS GREATER THAN THE MAXIMUM WIDTH FOR THE BULLNOSE ATTENUATOR)

MEDIAN WIDTH	L
40' - 41'	62.5'
42' - 43'	50'
44' - 45'	37.5'
46'	25'
47'	12.5'
47'	None



GUARDRAIL FOR MEDIAN OBSTACLE
(WHEN MEDIAN WIDTH IS GREATER THAN THE MAXIMUM WIDTH FOR THE BULLNOSE ATTENUATOR)



GUARDRAIL FOR MEDIAN OBSTACLE
(BULLNOSE ATTENUATOR)

NOTES

Standard details as shown for median bridges and median obstacle are for use on tangent sections of roadway. Minor adjustments to the lengths as shown may be necessary when these details are used in superelevated sections of roadway.

Depressed medians shall have 10:1 or flatter slopes with rounded shoulders at those locations specified in the Median Modification Table.

The cost of furnishing and installing the Bullnose Attenuator including the 5.0' radius guardrail section, the 4' x 6' x 6' wood post, 2 each STET End Foundations complete with Anchor Plate, Cable Assembly, Soil Plate, ect. as per Standard Sheet GR6, shall be included in the unit bid price for "Bullnose Attenuator", per each. Normal guardrail components shall be paid for as guardrail per linear foot.

Offset dimensions for the Bullnose Attenuator are measured from the tangent line to the face of the rail.

The 8.9' distance as shown between the end foundations in Bullnose Attenuator detail is measured from centerline to centerline of Anchor Posts.

The 5.0' radius guardrail panel is to be lapped to the outside of each approach rail. All other guardrail is to be lapped in the direction of traffic.

The Bullnose Attenuator will not be used as median treatment for twin bridges if the distance between the face of parapet walls is greater than 35.0'.

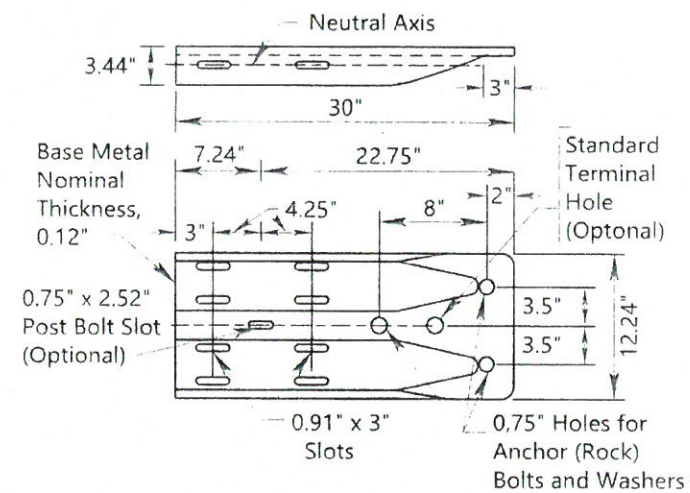
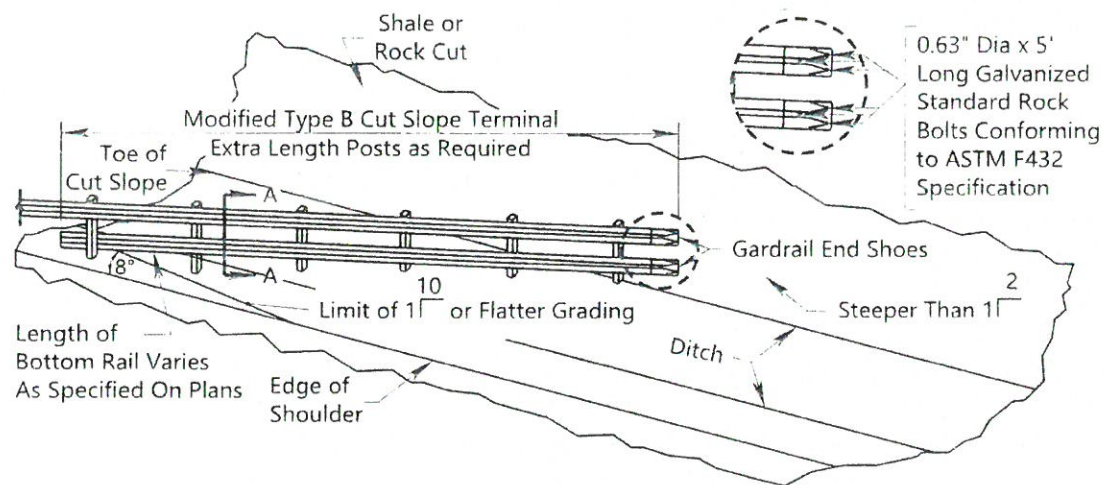
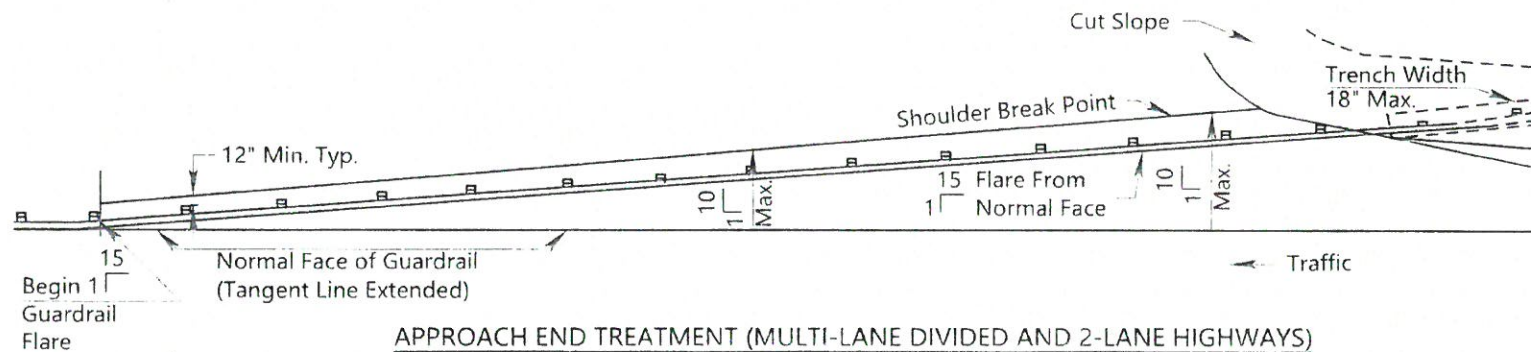
The Bullnose Attenuator may be used in lieu of the detail as shown for the median obstacle if conditions permit (i.e. 4.0' to obstacle, 14.0' to 35.0' between faces of the guardrail). The Bullnose Attenuator will be located a minimum of 50.0' in advance of obstacle.

When the minimum 4.0' clearance between a roadside/median obstacle and the face of the guardrail can not be obtained, additional strength to decrease rail deflection will be necessary. This shall be accomplished by reducing post spacing (additional posts), double facing the rail, supplying larger post sections, or other methods acceptable to the Engineer. There will be no additional compensation to the contractor for this work. Cost to be included in the price of guardrail per linear foot. For details of the Flared End Terminal (FET), see Special Detail Sheet GR5. For details of the Standard Bridge Transition/Connection, see Standards. For details of the Standard Trailing End Terminal (STET), see Standard Sheet GR7.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL AT MEDIAN BRIDGES, GUARDRAIL FOR MEDIAN

Public Roads Div.	State Dist No.	State Project No.	Federal Project No.	County
W.V.				



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MODIFIED CUT SLOPE TERMINAL (1 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTES

THIS DETAIL IS APPLICABLE WHERE A CUT SLOPE TERMINAL IS DESIRED, BUT ADDITIONAL GRADING OR PLACEMENT OF MATERIAL INTO THE ROADWAY DITCH IS NOT DESIRED. THE TOP OF THE GUARDRAIL RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT MUST REMAIN CONSTANT.

MODIFIED TYPE A (SOFT SHALE OR SOIL) CUT SLOPE TERMINAL GUARDRAIL SHALL BE THAT GUARDRAIL WHICH (1) IS TO EXTEND A MINIMUM OF TWO 75' SPANS INTO THE CUT SLOPE, FROM THE FIRST POST BEYOND THE TOE OF THE CUT SLOPE, AS DETAILED HEREIN, AND (2) IS TO TERMINATE A MINIMUM OF 12" BELOW THE GROUND ELEVATION OF THE BACK SLOPE, AS DETAILED HEREIN, EXCEPT IN AREAS OF HEAVY ROCK OUTCROPPING WHERE THE MINIMUM DEPTH MAY BE 6".

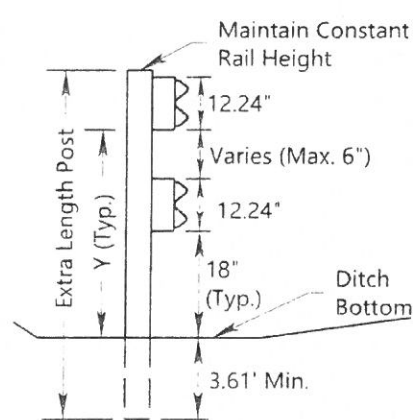
MODIFIED TYPE B (SHALE OR ROCK) CUT SLOPE TERMINAL INSTALLATION SHALL CONSIST OF ANCHORING THE GUARDRAIL AGAINST THE FACE OF THE CUT SLOPE UTILIZING GUARDRAIL END SHOES AND ROCK BOLTS, AS DETAILED HEREIN.

POSTS, BLOCKS, AND RAIL ELEMENTS SHALL BE THE SAME TYPES USED IN THE NORMAL GUARDRAIL INSTALLATION, EXCEPT FOR THE ADDITIONAL LENGTH POSTS WHOSE LENGTH WILL BE DETERMINED IN THE FIELD. THESE POSTS ARE TO BE MODIFIED TO ACCEPT THE ADDITIONAL GUARDRAIL SECTION. UNDERGROUND POSTS MAY BE W6" x 8.5" IN LENGTH, IN AREAS OF HEAVY ROCK OUTCROPPING. GUARDRAIL BLOCKS SHALL NOT BE USED ON ANY POSTS COMPLETELY UNDERGROUND.

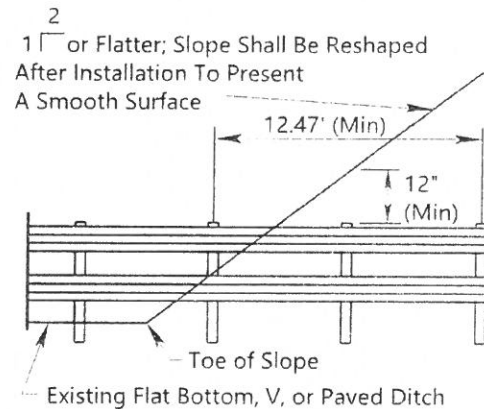
A TRENCH NO GREATER THAN 17.22" IN WIDTH SHALL BE EXCAVATED INTO THE CUT SLOPE TO ACCOMMODATE THE MODIFIED TYPE A TERMINAL INSTALLATION. THE CONTRACTOR SHALL SO ARRANGE HIS WORK SEQUENCE TO PROVIDE THAT EACH MODIFIED TYPE A CUT SLOPE TERMINAL INSTALLATION SHALL BE EXCAVATED, POSTS DRIVEN, RAIL ELEMENTS AND GUARDRAIL COMPONENTS ASSEMBLED, THE TRENCH BACKFILLED, AND DISTURBED SLOPE SHAPED, SEEDED AND MULCHED, ALL IN ONE CONTINUOUS OPERATION.

THE COST OF FURNISHING AND INSTALLING MODIFIED CUT SLOPE TERMINAL (A OR B) SHALL INCLUDE EXCAVATING, BACKFILLING, RESHAPING, SEEDING AND MULCHING THE TRENCH, ADDITIONAL LENGTH GUARDRAIL POSTS AS REQUIRED, DRILLING HOLES INTO THE CUT SLOPE, FURNISHING AND INSTALLING ROCK BOLTS, END SHOES AND HARDWARE FOR BOTH THE UPPER AND LOWER GUARDRAIL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 607025-001, "CUT SLOPE TERMINAL, TYPE A OR B MODIFIED" PER EACH.

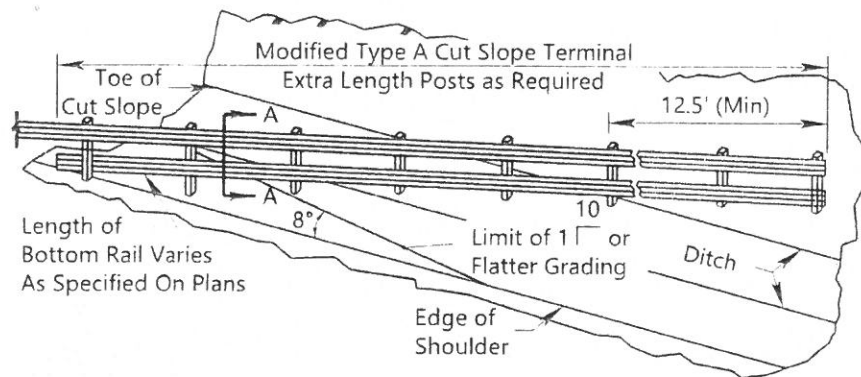
NORMAL GUARDRAIL COMPONENTS: I.E. POSTS, BLOCKS, RAIL ELEMENTS, HARDWARE, ECT. SHALL BE PAID FOR AS GUARDRAIL PER FOOT.



Discontinue Bottom Rail When $Y \leq 18"$
Section A - A



END VIEW (TYPE A CUT SLOPE TERMINAL)

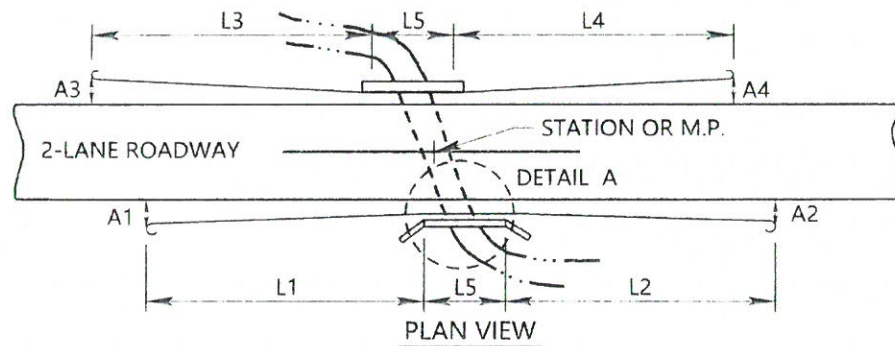


MODIFIED TYPE A (SOFT SHALE OR SOIL) CUT SLOPE TERMINAL INSTALLATION

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

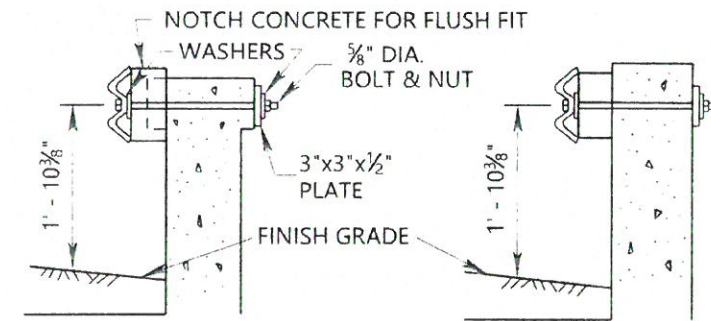
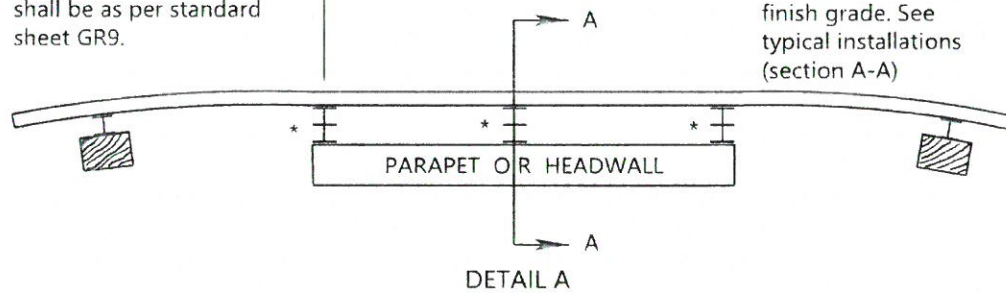
MODIFIED CUT SLOPE TERMINAL (2 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

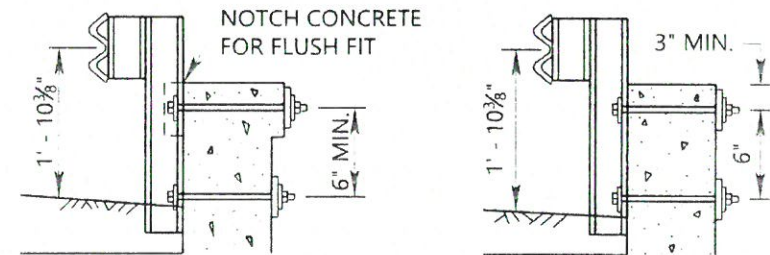


Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.

Minimum 25 Ft. length of 3'-1 1/2" spacings. Post spacing for first 18'-9" shall be as per standard sheet GR9.



SECTION A-A



GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

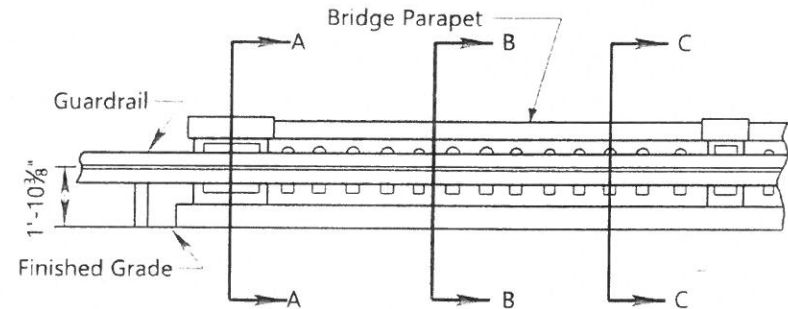
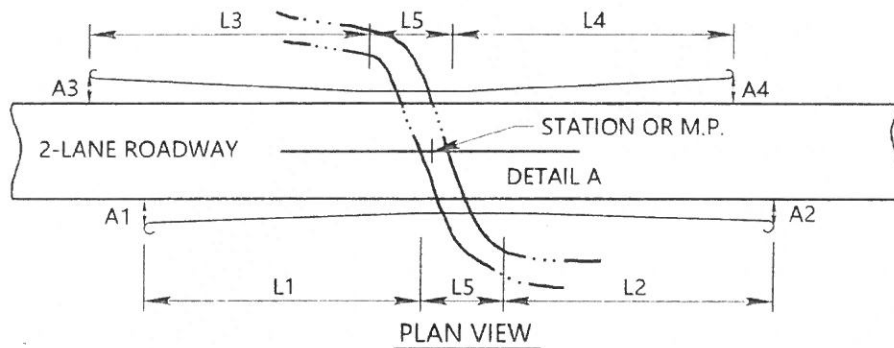
Guardrail to be attached at each end of headwall or parapet and at a maximum of 3'-1 1/2" spacings along the entire length. All bolts, nuts, washers, and plates to be galvanized and meet strength requirements of similar items as depicted in the standards. Cost of all necessary hardware and installation procedures such as notching and drilling concrete included in the unit price bid for guardrail. Refer to guardrail standards.

Refer to special details for attaching guardrail to parapet if guardrail is not continued across structure.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

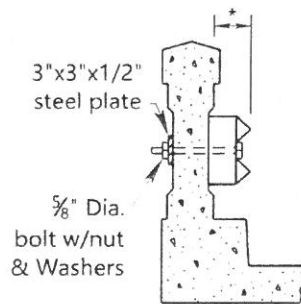
GUARDRAIL INSTALLATION ON HEADWALLS AND PARAPETS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

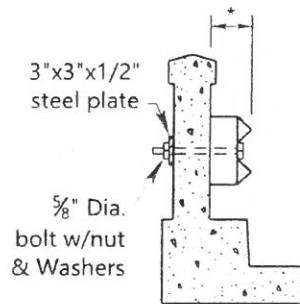


Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.

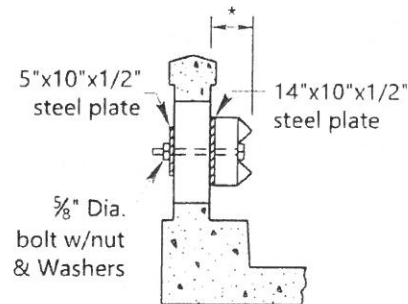
* Block thickness varies.
Guardrail to be flush
with curb.



SECTION A-A
(at end post)



SECTION B-B
(at solid parapet)



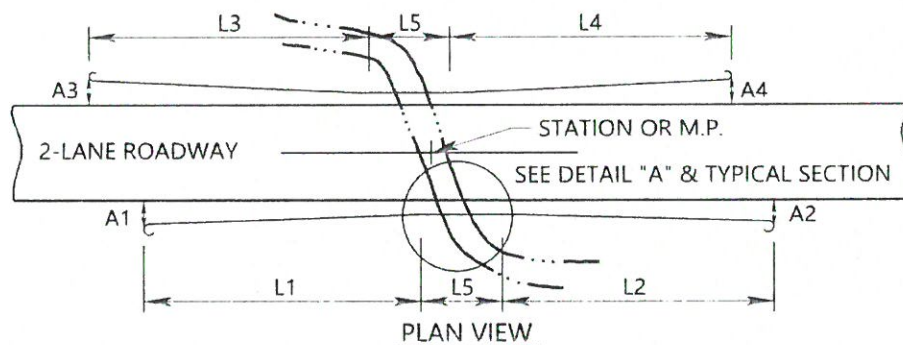
SECTION C-C
(at parapet opening)

GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

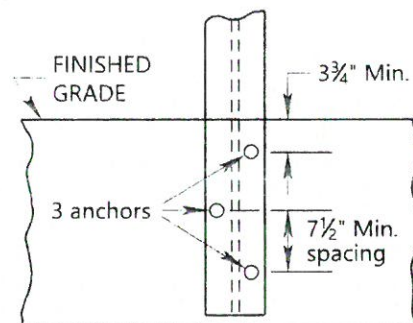
Guardrail to be attached to the structure at a maximum of 3'-1 1/2" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GUARDRAIL INSTALLATION ON BRIDGE PARAPETS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.

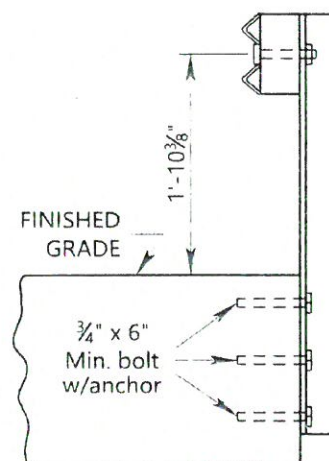


DETAIL "A"

NOTES :

Anchors are to be expanding steel type as manufactured by Phillips Red Head, Hilti Fastening Systems, Molly Parabol or equal as approved by the Engineer.

Testing requirements for the bolts and steel angels are waived.



TYPICAL SECTION ON STRUCTURE

Guardrail posts to be bolted to outside face of structure.

See Detail A

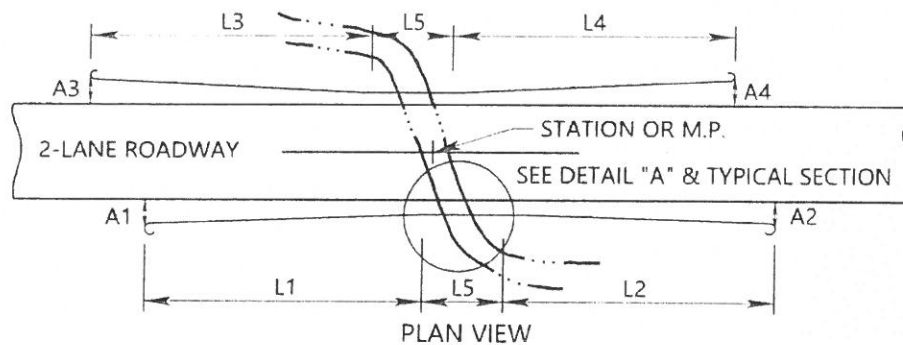
GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

Guardrail to be attached to the structure at a maximum of 3'-1 1/2" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

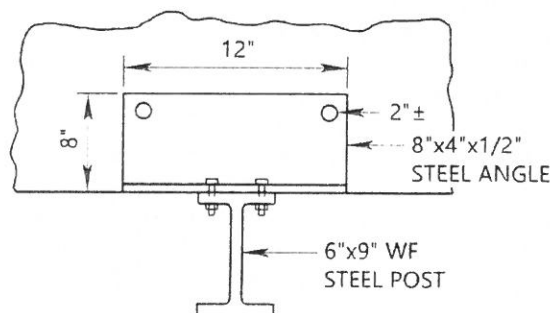
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL INSTALLATION ON BOX CULVERTS & BRIDGES

Public Roads D.v.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

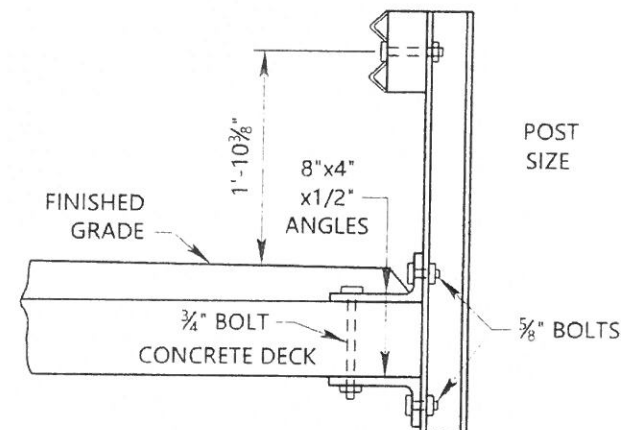


Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



DETAIL "A"

Testing requirements for the bolts and steel angels are waived.



TYPICAL SECTION ON STRUCTURE

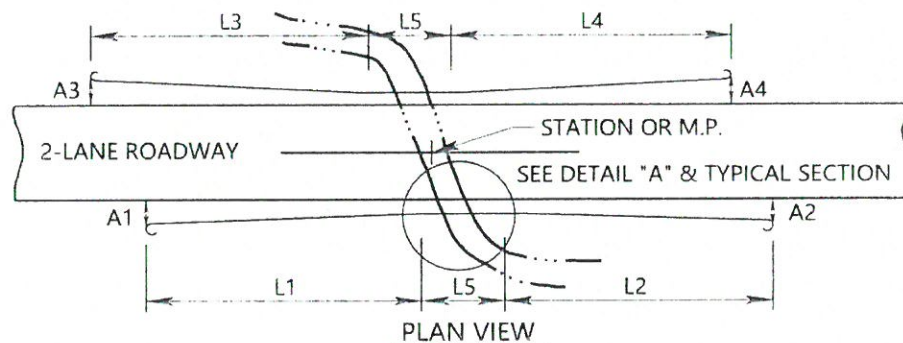
GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

Guardrail to be attached to the structure at a maximum of 3'-1½" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

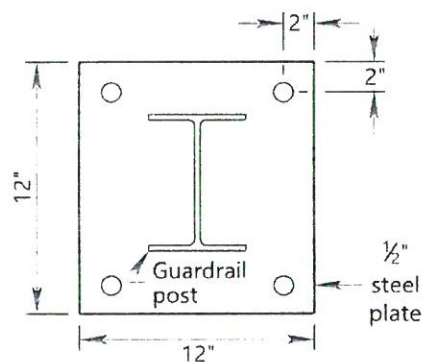
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL INSTALLATION ON BOX CULVERTS & BRIDGES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



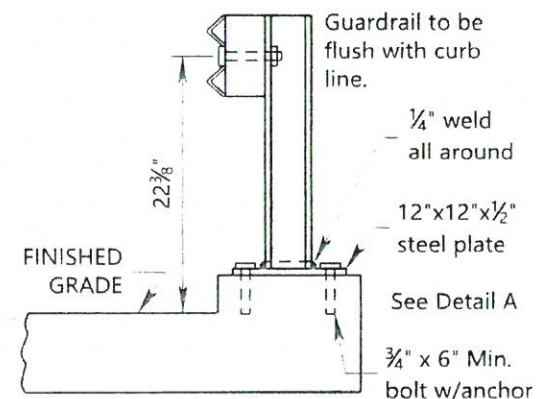
NOTES :

Anchors are to be expanding steel type as manufactured by Phillips Red Head, Hilti Fastening Systems, Molly Parabol or equal as approved by the Engineer.

Testing requirements for the bolts and steel angels are waived.

DETAIL "A"

Guardrail to be attached to the structure at a maximum of 3'-1½" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.



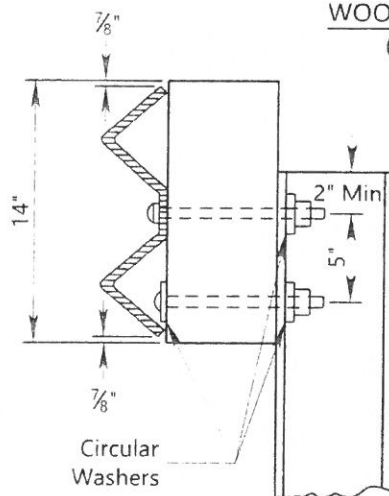
TYPICAL SECTION ON STRUCTURE

GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2			

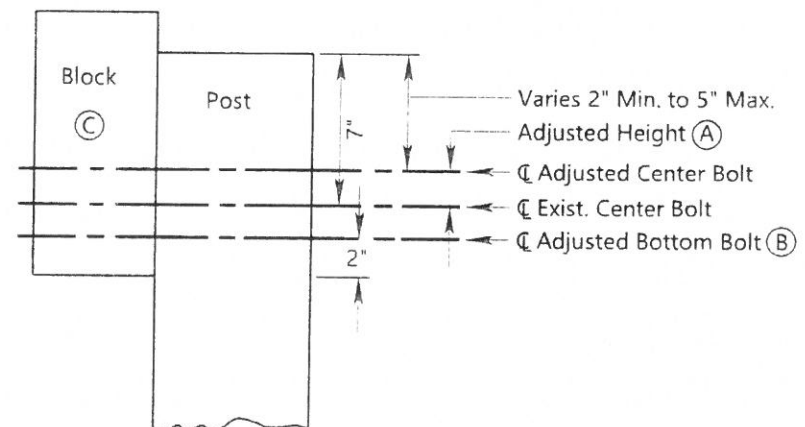
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL INSTALLATION ON BOX CULVERTS & BRIDGES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



STEEL GUARDRAIL POST
(WOOD BLOCK)



- (A) Adjustment height as specified in the plans varies from 2" Min. to 5" Max. When adjustments are to be made in a portion of an existing guardrail string, transitions from existing height to specified height shall be :

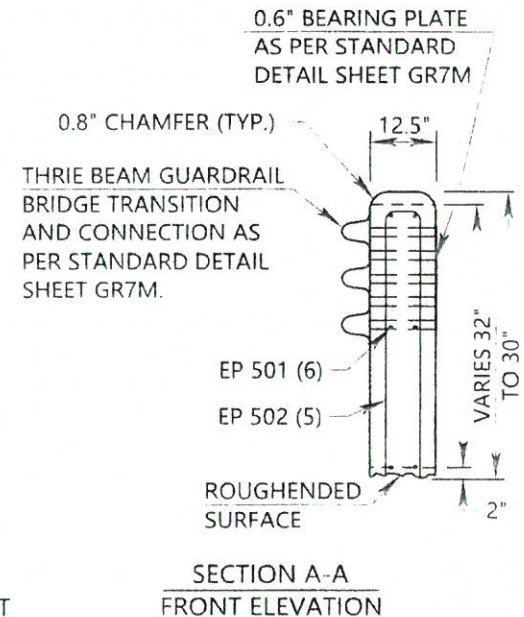
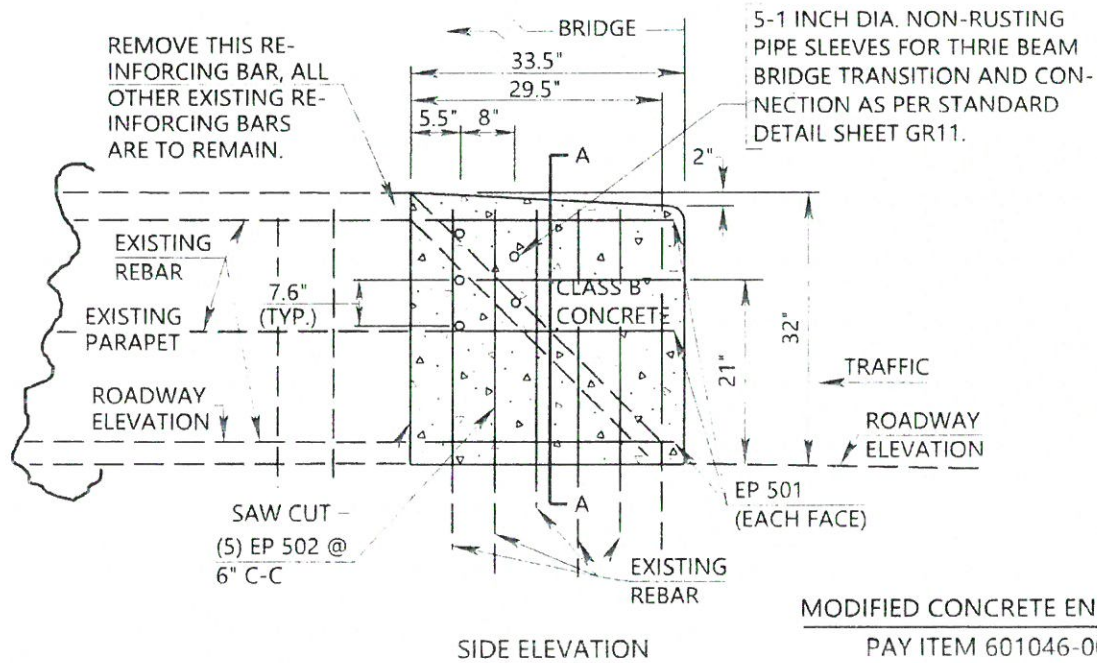
Adjustment Height :	2'	3"	4"	5"
No. of post spacings :	1	2	3	4

- ⓑ Bottom bolt not required with wood blocks for height adjustment of 3" or less.
- ⓒ Existing blocks may be redrilled and reinstalled. Existing hardware may be reinstalled as approved by the Engineer.

NOTE :

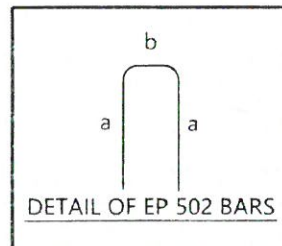
All materials are to conform to the Specifications and Standard Details. All work will be paid for as Item 607009-001, Type I Guardrail, Removed and Reset, per L.F.

Public Roads Div.	State Dist. No.	State Project No	Federal Project No.	County
W.V.				



MODIFIED CONCRETE END POST
PAY ITEM 601046-001

REINFORCING STEEL BARS		NO. OF BARS	LENGTH (INCH)			TYPE
MARK	SIZE		a	b	TOTAL	
EP 501	NO. 15	6		32	32	STRAIGHT
EP 502	NO. 15	5	30	8	68	BENT



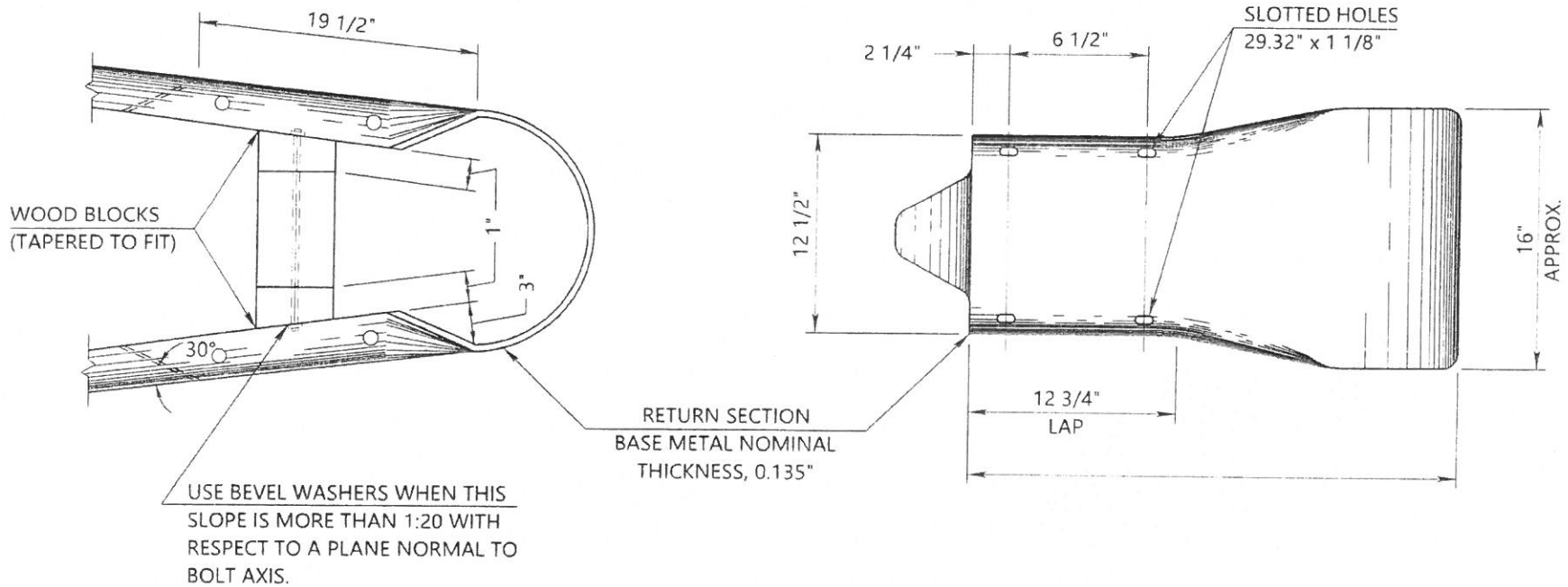
NOTES

1. EXISTING REINFORCING STEEL BARS AS SHOWN ON THIS SHEET ARE BASED ON ORIGINAL CONSTRUCTION PLAN SHEETS. FIELD MODIFICATIONS IN ORDER TO MEET EXISTING REINFORCING STEEL BARS SHOULD BE EXPECTED.
2. MAINTAIN 2 INCH MINIMUM CLEARANCE BETWEEN REINFORCEMENT AND FORMS.

NOT TO SCALE

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
MODIFIED CONCRETE END POST

Public Roads Div.	State Dist No.	State Project No.	Federal Project No.	County
W.V.				



DOUBLE FACE END TERMINAL

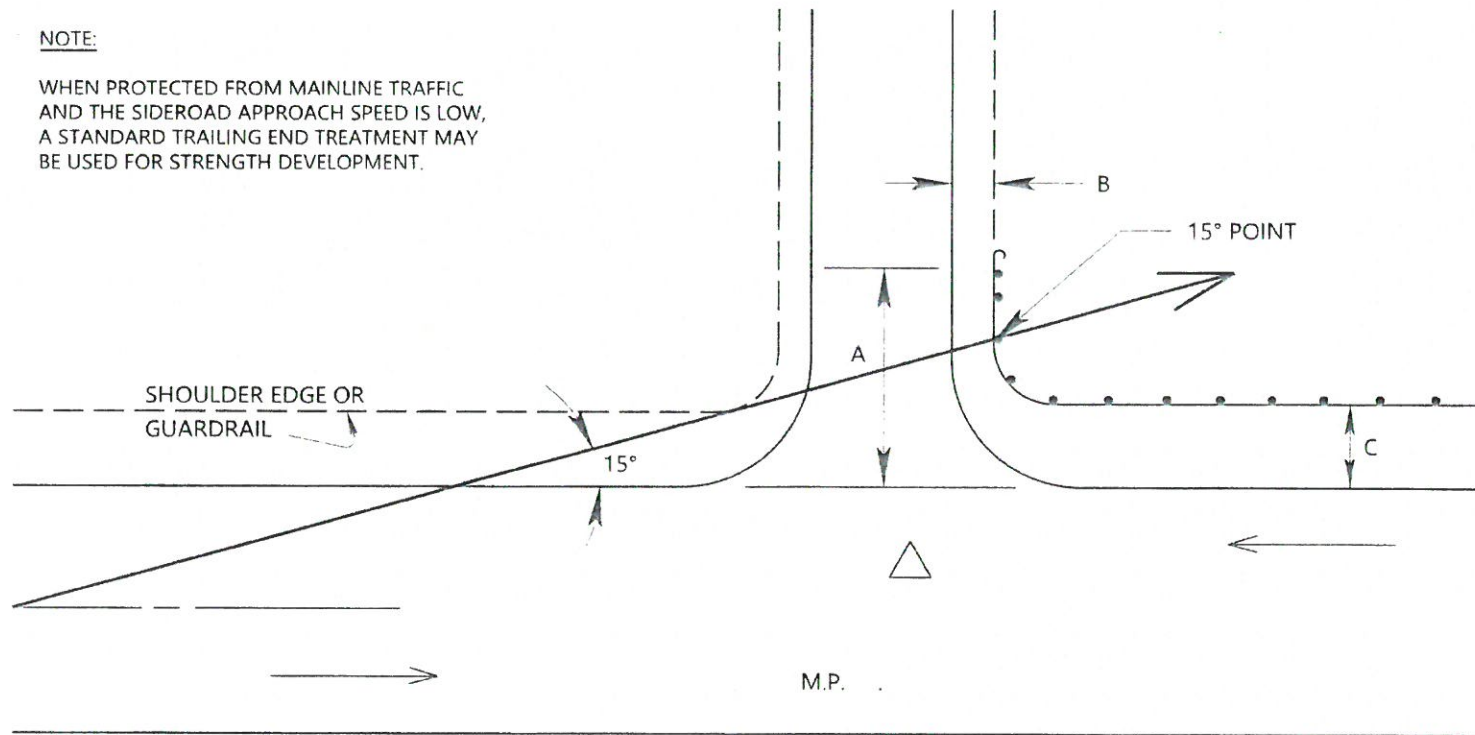
NOTE: TO BE ONLY USED WHEN LESS THAN 25 MPH.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
DOUBLE FACE END TERMINAL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC
AND THE SIDEROAD APPROACH SPEED IS LOW,
A STANDARD TRAILING END TREATMENT MAY
BE USED FOR STRENGTH DEVELOPMENT.

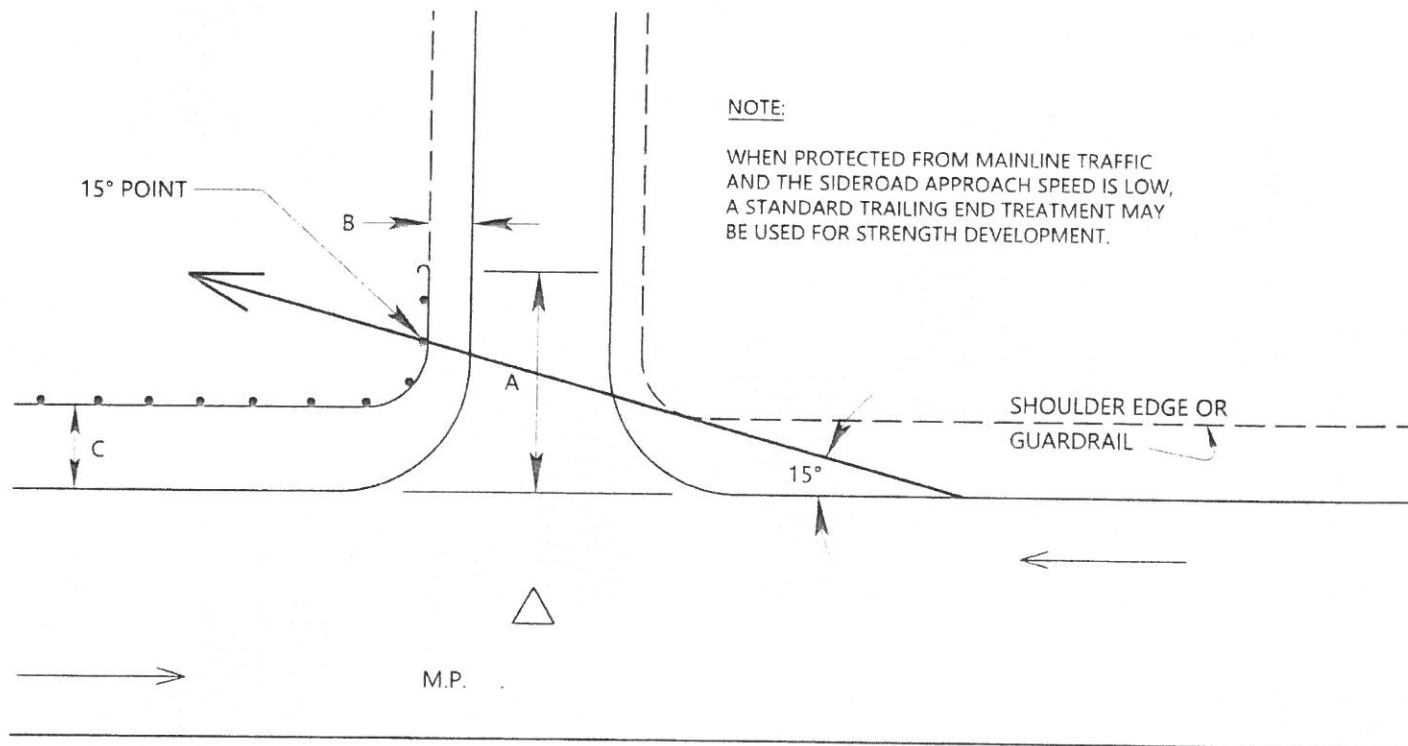


A	
B	
C	
END TREATMENT	

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL PLACEMENT AT INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



A	
B	
C	
END TREATMENT	

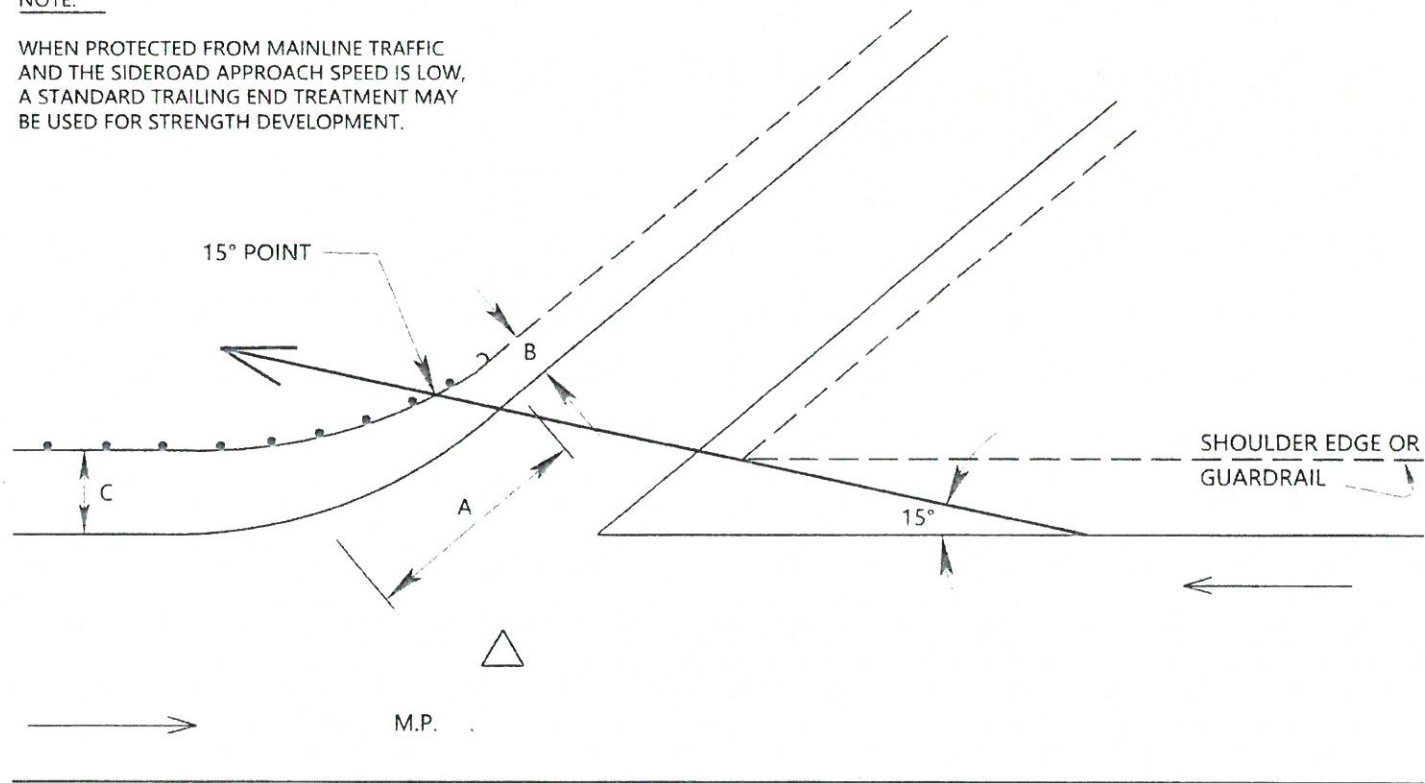
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL PLACEMENT AT INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC
AND THE SIDEROAD APPROACH SPEED IS LOW,
A STANDARD TRAILING END TREATMENT MAY
BE USED FOR STRENGTH DEVELOPMENT.



A	
B	
C	
END TREATMENT	

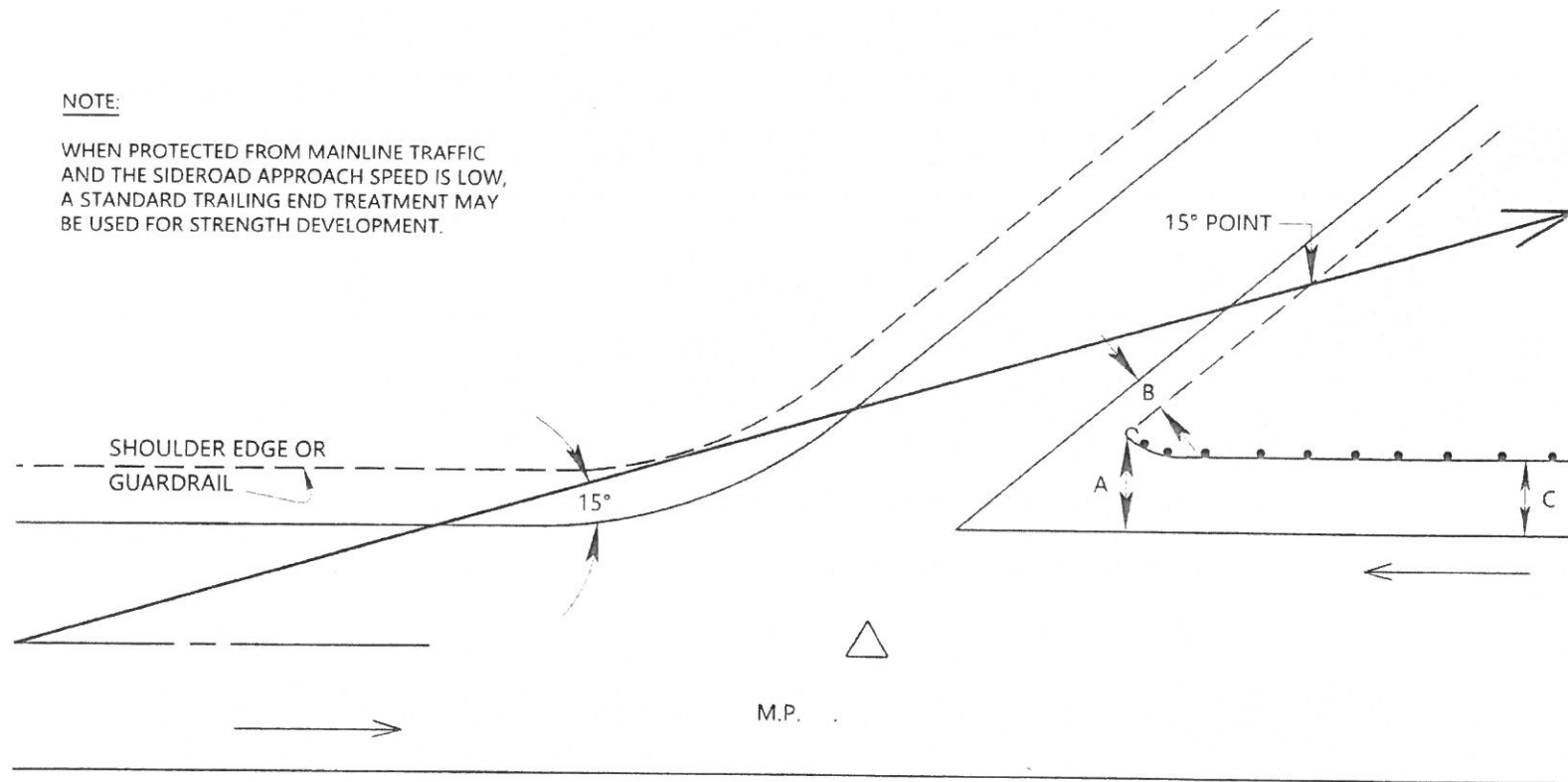
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC
AND THE SIDEROAD APPROACH SPEED IS LOW,
A STANDARD TRAILING END TREATMENT MAY
BE USED FOR STRENGTH DEVELOPMENT.



A	
B	
C	
END TREATMENT	

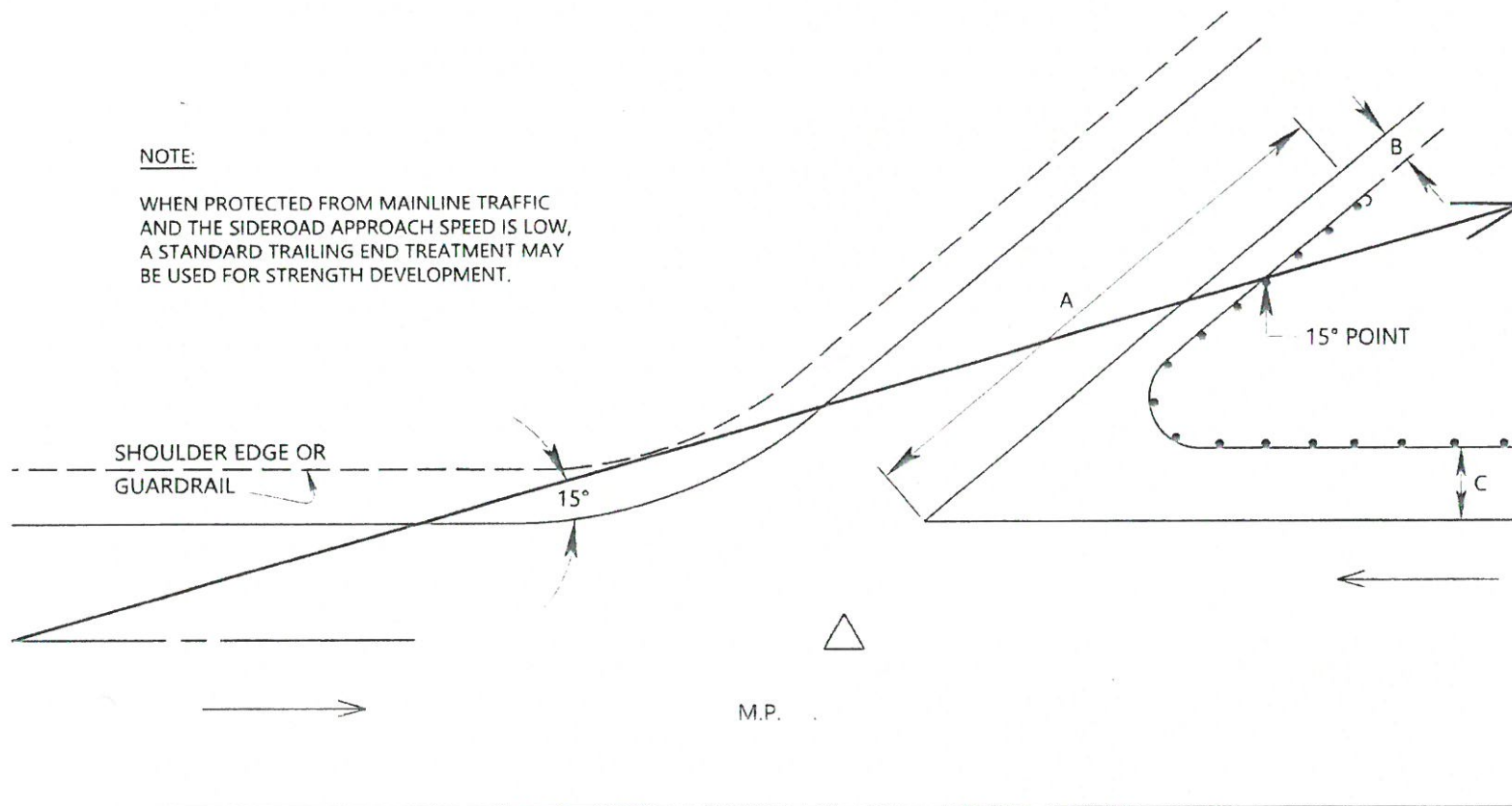
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC
AND THE SIDEROAD APPROACH SPEED IS LOW,
A STANDARD TRAILING END TREATMENT MAY
BE USED FOR STRENGTH DEVELOPMENT.

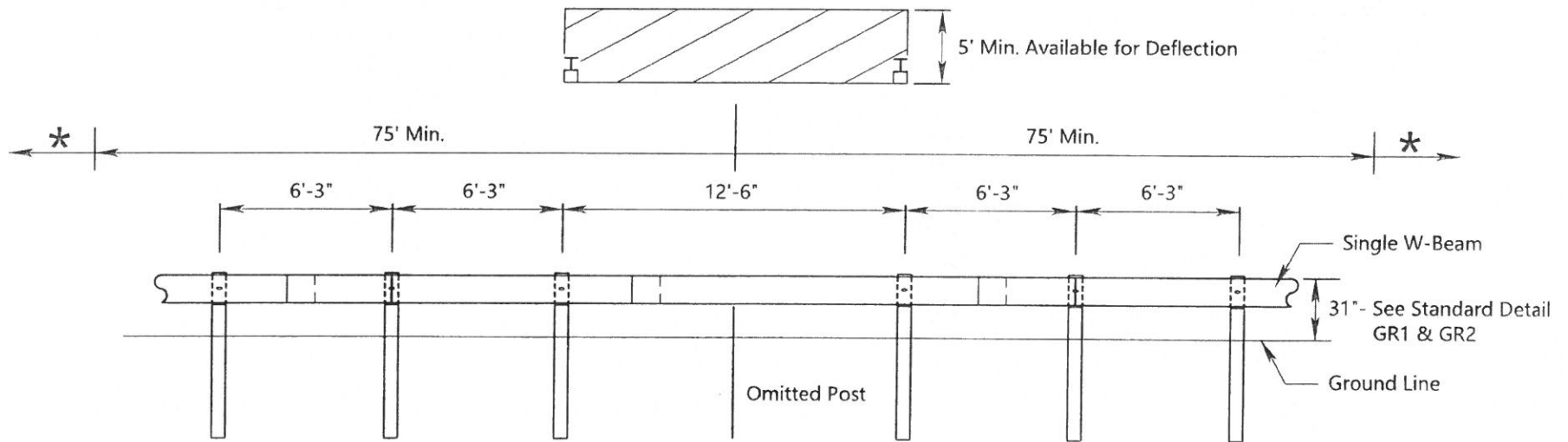


A	
B	
C	
END TREATMENT	

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



* - Anchor Terminal Required
TET, FET, or STET as appropriate

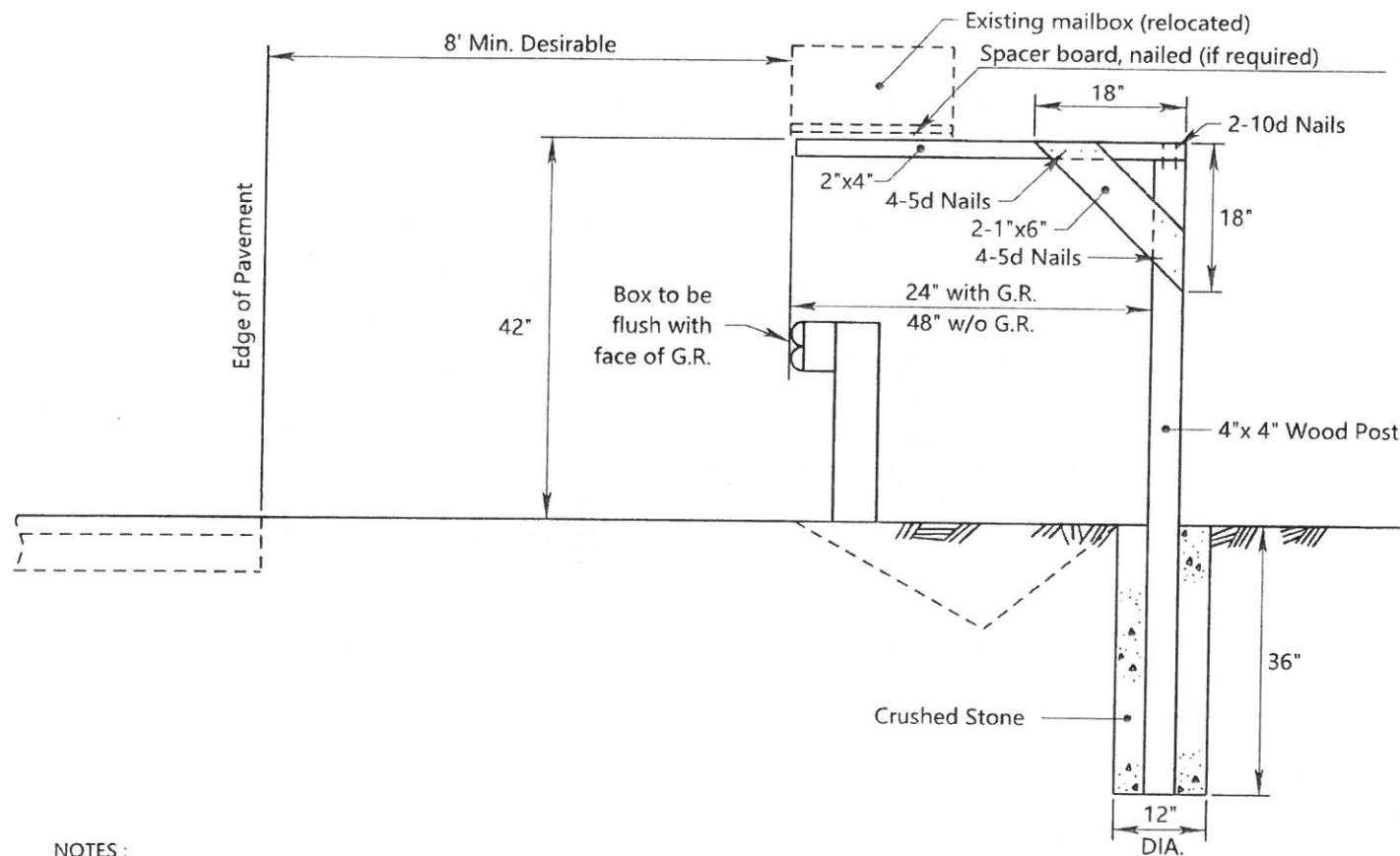
NOTES

1. A single element of W-Beam is used across the omitted post.
2. If a second obstruction requires an omitted post, the omitted posts shall be separated by a minimum distance of 56.25 ft or an equivalent of "every 9th post".
3. An omitted post shall be separated a minimum of 75 ft from the anchorage post or the 11th post from the anchorage post of the terminal.
4. An omitted post shall be separated 34.5 ft from the W-Beam section of a W-to-Thrie Beam Transition.
5. Standard 8-inch Blockouts shall be required as typical with Class I Guardrail. This detail shall not be used with guardrail not using blockouts, i.e., guardrail release bolts.
6. The minimum available distance for deflection shall be 5 ft, measured from the face of rail for each side of the omitted post or 12.5 ft.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CLASS I GARDRAIL SPANNING UNDERGROUND OBJECT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

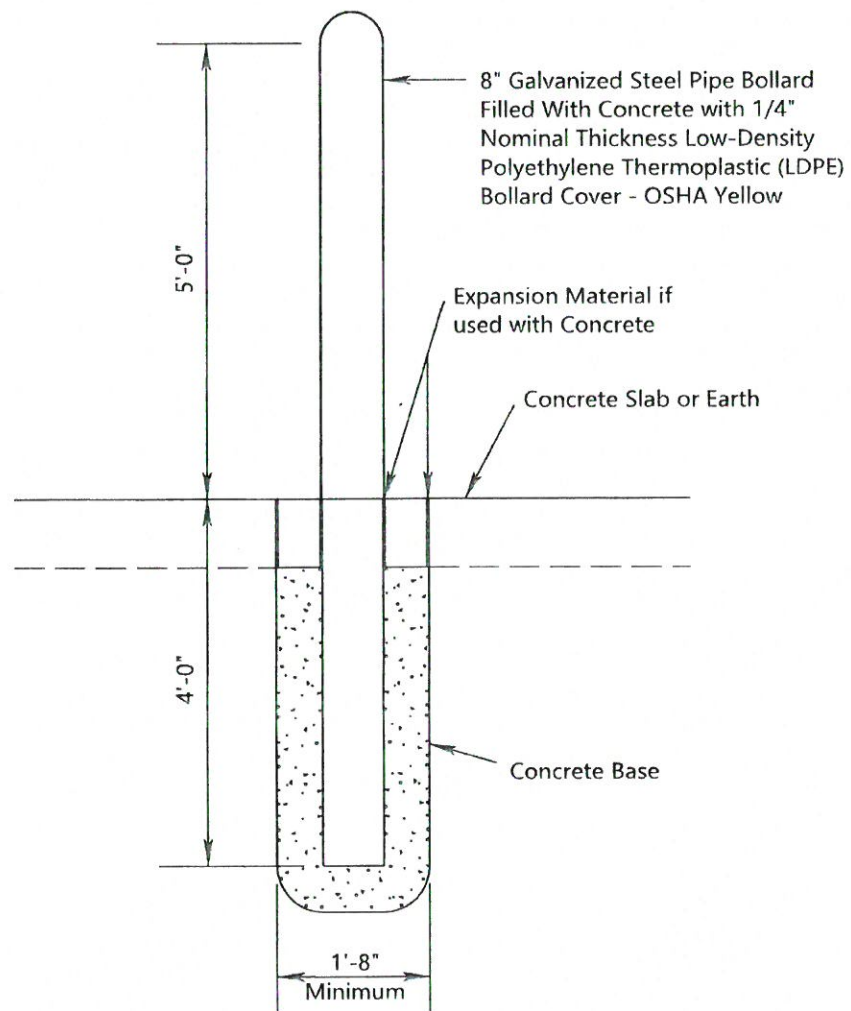


NOTES:

All wood is to be pressure treated pine. Testing of the materials will not be required. The cost of all work and materials to construct mailbox support, remove existing mailbox support, and relocate existing mailbox onto new support at locations as shown on the plans or as directed by the Engineer, is to be included in the unit price for Item 622003-001, Cantilever Mailbox Support, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
CANTILEVER MAILBOX SUPPORT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

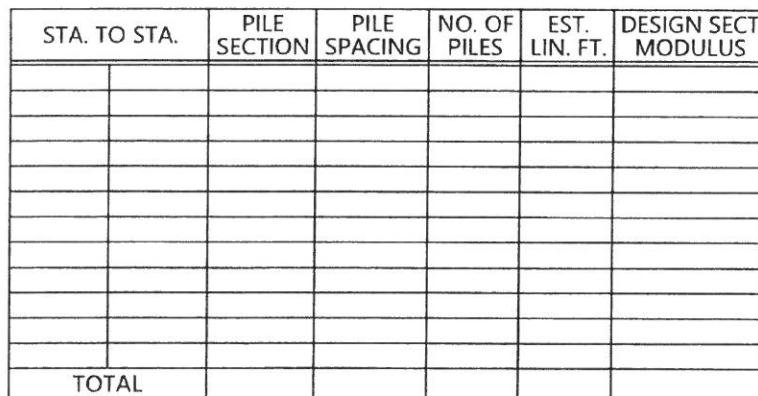


BOLLARD DETAIL

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

BOLLARD DETAIL

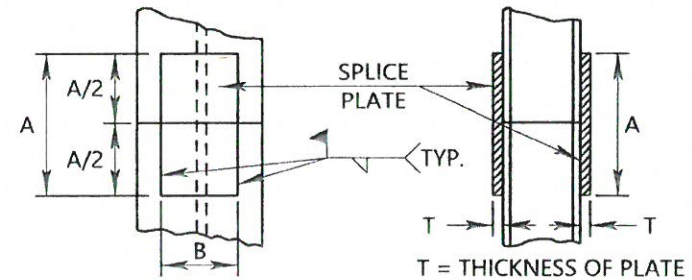
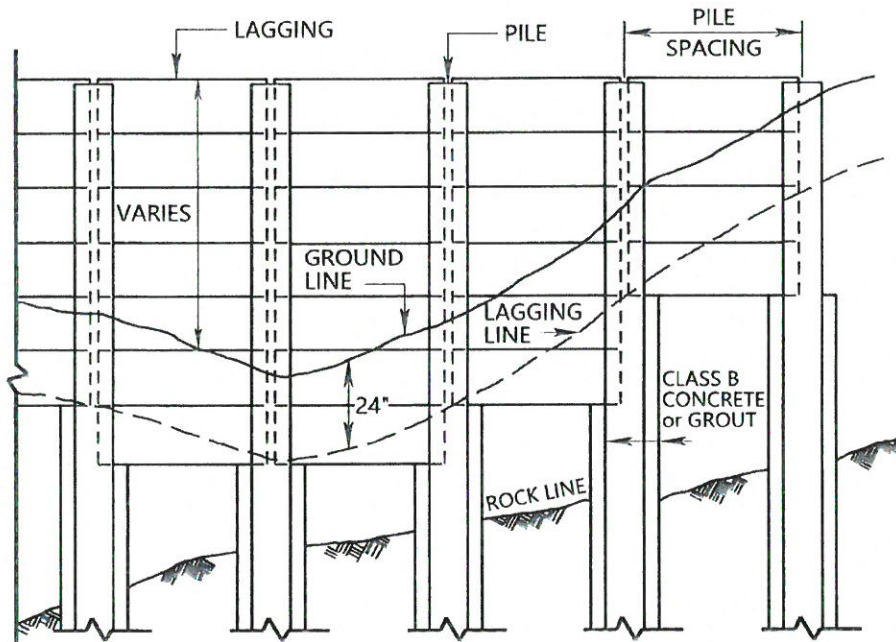
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



PILING DETAILS (1 OF 6)

PAGE 105

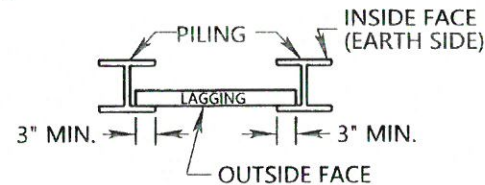
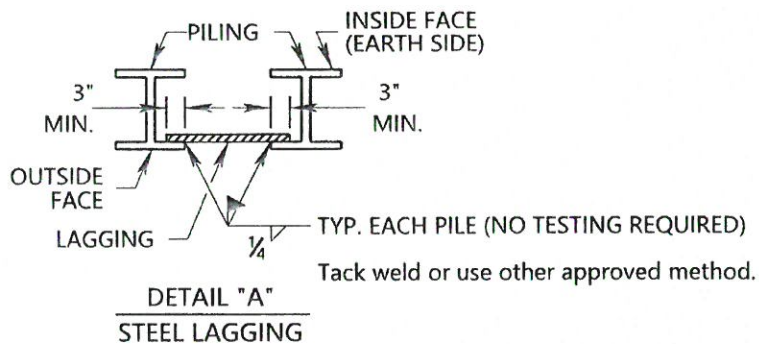
PILING TYPICAL FRONT ELEVATION VIEW



SPLICE DETAIL

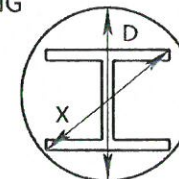
PILING SIZE	A (INCHES)	B (INCHES)	T (INCHES)	WELD SIZE

SEE PILING DETAILS (3 OF 6) FOR SPLICE DETAIL DIMENSIONS



DETAIL "A-A"
CONCRETE LAGGING

NOTE: Lagging shall be in contact with piling at all faces. Method shall be approved to hold lagging in place during backfill operation.



Diameter (D) of drilled hole shall be Min. 2 inches greater than diagonal (X) measurement of piling.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PILING DETAILS (2 OF 6)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

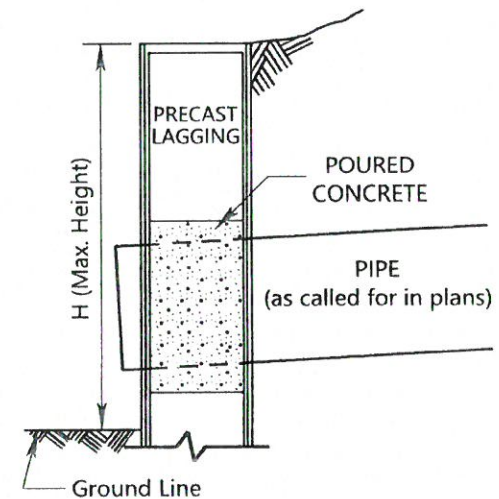
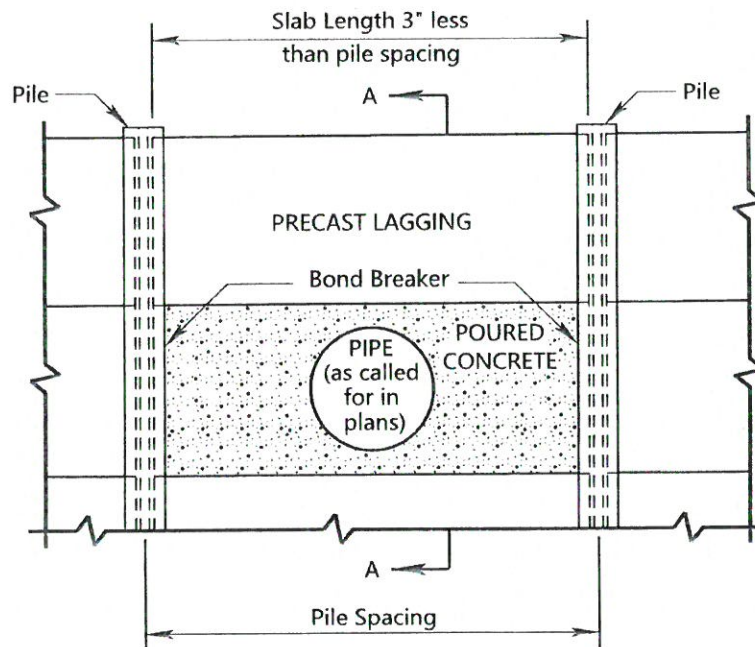
SPLICE DETAIL DIMENSIONS

PILING SIZE	A (INCHES)	B (INCHES)	T (INCHES)	WELD SIZE
HP 10x42	32.2	9.0	0.500	5/16
HP 10x57	42.0	9.5	0.625	5/16
HP 12x53	45.0	11.0	0.563	5/16
HP 12x63	50.0	11.25	0.625	5/16
HP 12x74	56.0	11.25	0.688	5/16
HP 12x84	61.0	11.4	0.750	5/16
HP 14x89	55.75	13.7	0.688	3/8
HP 14x117	65.5	14.0	0.875	3/8
HP 14x120	83.0	13.7	1.125	3/8
W 12x152	110.5	11.5	1.625	3/8
W 16x100	57.1	9.43	1.125	3/8
W 24x94	43.5	8.0	1.125	3/8
W 24x117	65.5	11.8	1.125	3/8
W 24x131	79.0	11.8	1.125	3/8
W 27x178	106.5	13.0	1.375	3/8

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PILING DETAILS (3 OF 6)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



SECTION A-A

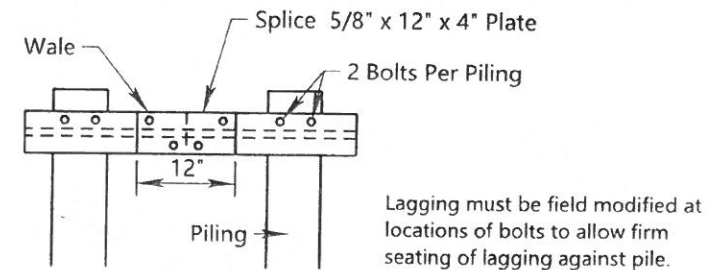
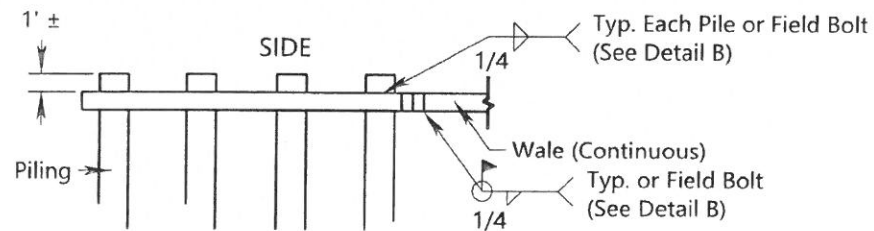
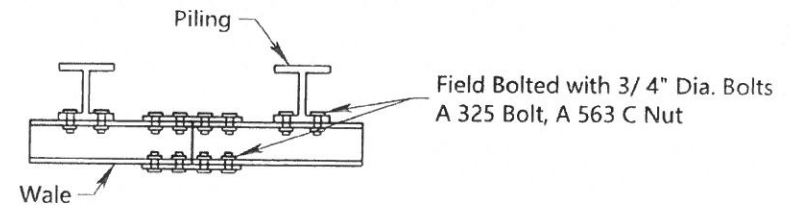
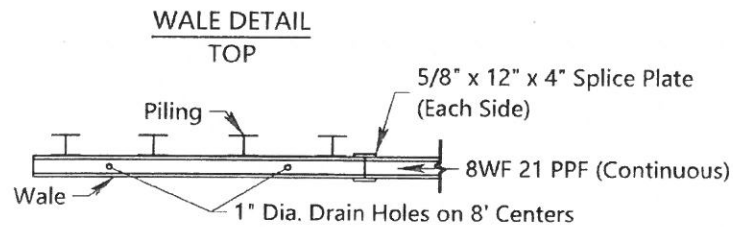
WHEN INSTALLING A PIPE THROUGH THE LAGGING, THE CONTRACTOR SHALL PLACE LAGGING UP TO NEAR THE FLOWLINE OF THE PIPE. ONCE THE PIPE IS INSTALLED, THE CONTRACTOR SHALL FORM AND POUR CLASS B CONCRETE BETWEEN THE PILES AND AROUND THE PIPE. AFTER THE CONCRETE CURES, THE CONTRACTOR SHALL RESUME PLACEMENT OF LAGGING ABOVE THE PIPE. COST FOR ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO PERFORM THIS OPERATION SHALL BE INCIDENTAL TO ITEM 604050.

PIPE INSTALLATION IN LAGGING

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PILING DETAILS (4 OF 6)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



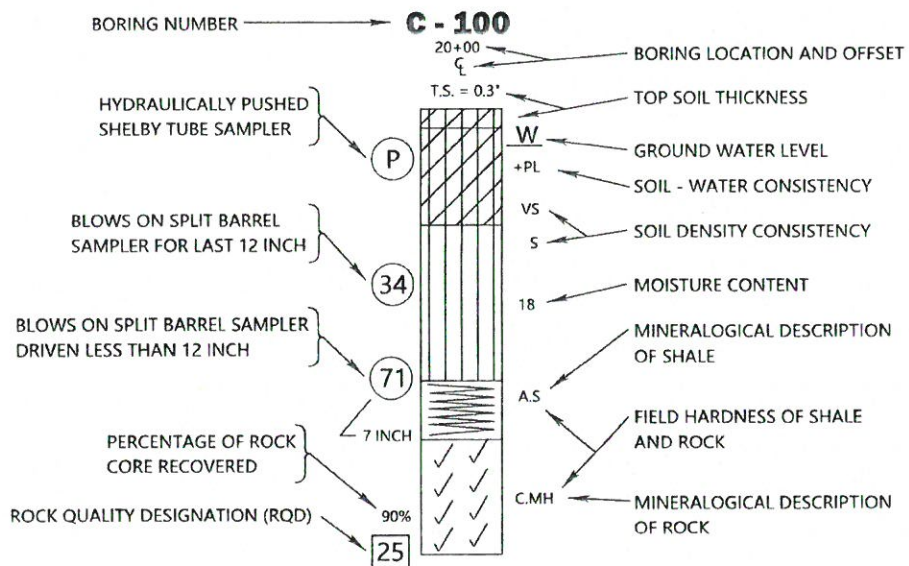
DETAIL 'B'

NOTE : Use 5/8" x 12" x 4" Splice Plate for Welding and
5/8" x 12" x 5" Splice Plate for Field Bolted

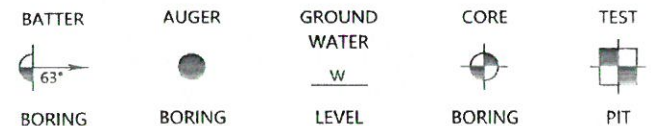
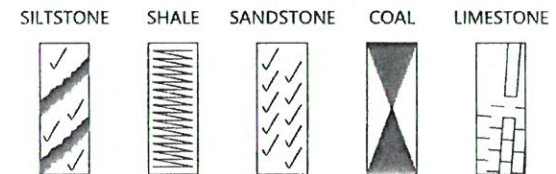
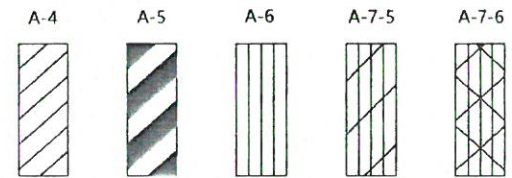
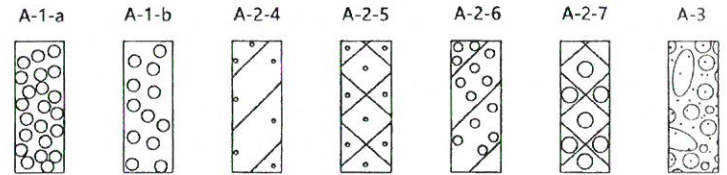
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PILING DETAILS (5 OF 6)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



LEGEND OF SYMBOLS USED ON SOIL PROFILE



MINERALOGICAL DESCRIPTION OF ROCK AND SHALE

A = ARENACEOUS (SANDY)
 L = CALCAREOUS (LIMEY)
 C = ARGILLACEOUS (CLAYEY)
 O = ORGANIC

HCSI ROCK FIELD HARDNESS

0	ES = EXTREMELY SOFT	28 - 100 PSI
1	VS = VERY SOFT	100 - 1,000 PSI
2	S = SOFT	1,000 - 4,000 PSI
3	A = AVERAGE	4,000 - 8,000 PSI
4	H = HARD	8,000 - 16,000 PSI
5	VH = VERY HARD	16,000 - 32,000 PSI
6	EH = EXTREMELY HARD	OVER 32,000 PSI

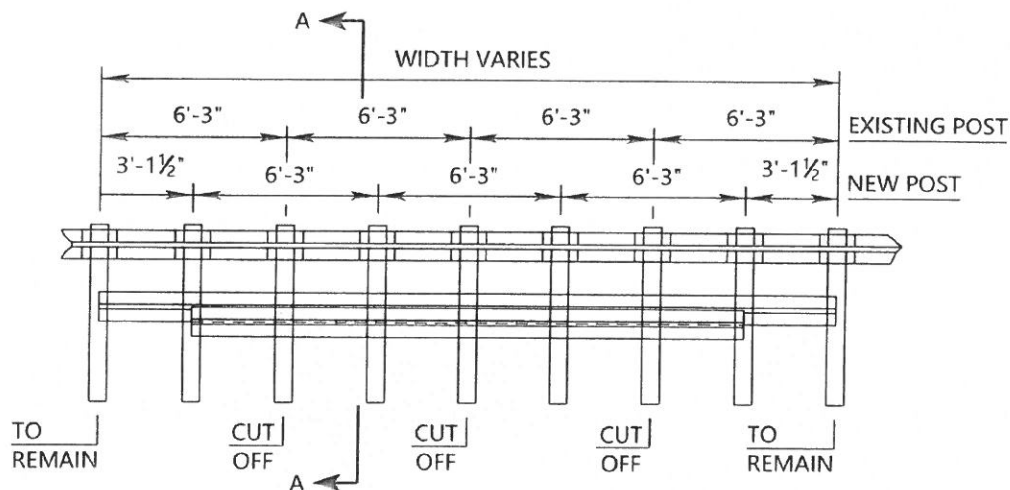
SOIL DENSITY / CONSISTENCY

GRANULAR	SPOON BLOWS	COHESIVE	SPOON BLOWS
VL = VERY LOOSE	0 - 4	VS = VERY SOFT	0 - 1
L = LOOSE	4 - 10	S = SOFT	2 - 4
MD = MEDIUM DENSE	10 - 30	MST = MEDIUM STIFF	4 - 8
D = DENSE	30 - 50	ST = STIFF	8 - 15
VD = VERY DENSE	50+	VST = VERY STIFF	15 - 30
		H = HARD	30+

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

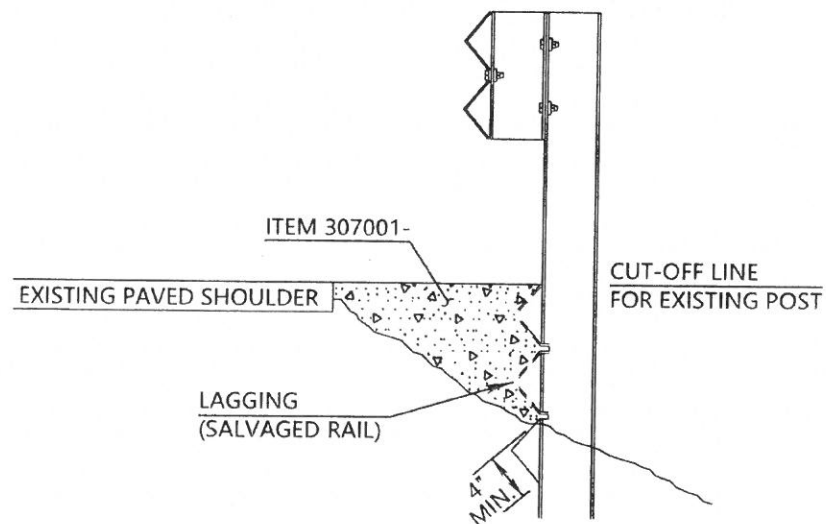
PILING DETAILS (6 OF 6)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



ELEVATION

NOTE: IF DEPTH REQUIRES MORE THAN ONE
RAIL FOR LAGGING, OVERLAP THE RAILS
AS SHOWN IN SECTION A-A.

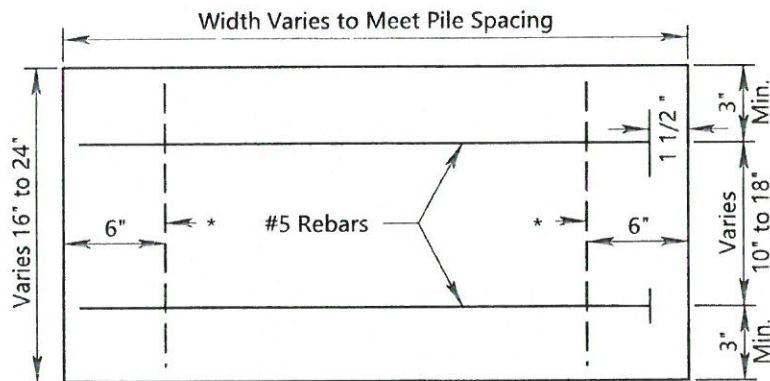


SECTION A-A

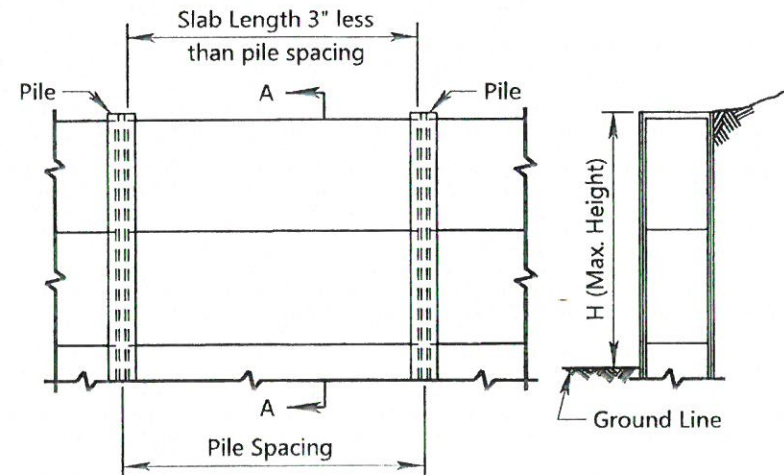
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

LAGGING USING RAIL ELEMENTS FOR SHOULDER DROP OFFS DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

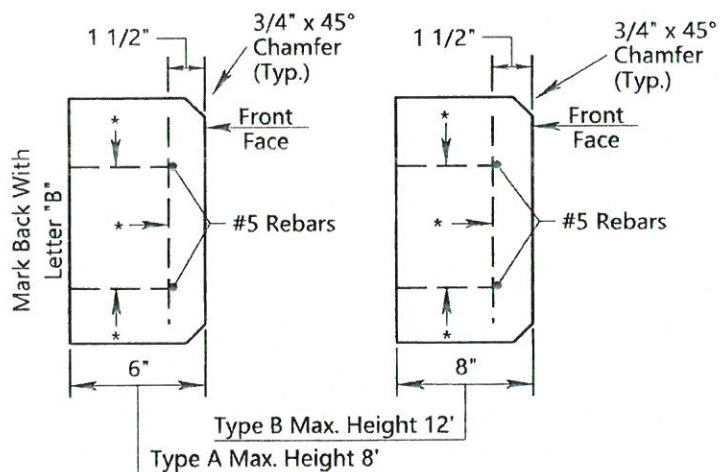


ELEVATION VIEW



ELEVATION OF WALL

SECTION A-A



END VIEW

TYPICAL DETAILS FOR CONCRETE LAGGING

NOTES:

All concrete shall be class B Compressive strength of concrete, at 28 days, (f'c) shall not be less than 3000 p.s.i.

All concrete is to be Air-entrained 7% not to exceed $\pm 2.5\%$.

Cure In Accordance To M-199.

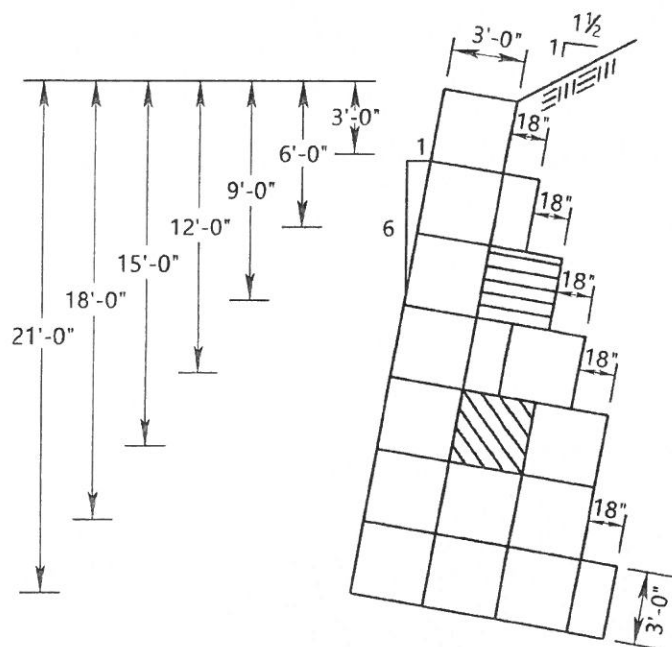
All reinforcing steel shall be grade 60 KSI

* Optional Rebars
For Use In Fabrication

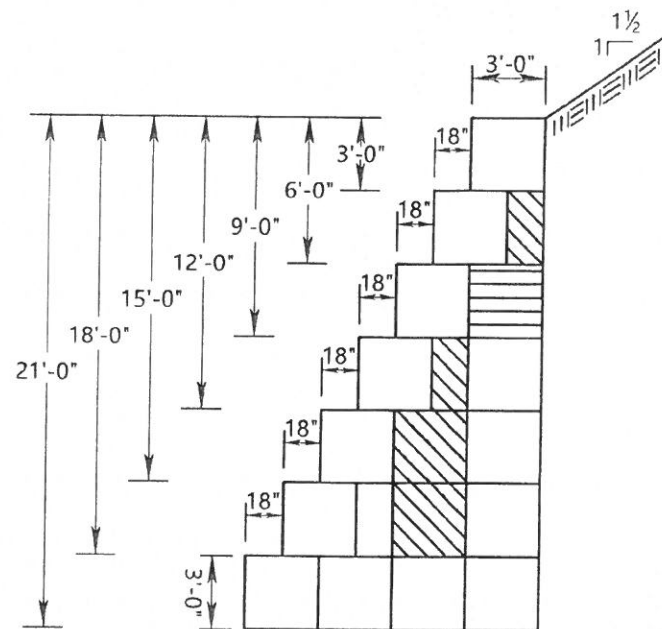
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PRECAST CONCRETE LAGGING

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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- 1.) SECTIONS SHOWN HATCHED DO NOT REQUIRE GABION MESH UNLESS THEY ARE IN THE BOTTOM COURSE OF THE WALL.
- 2.) SECTION SHOWN HATCHED MAY BE COUNTERFORTED BY USING CODE "A" GABIONS ALTERNATELY AS HEADERS AND STRETCHES.
- 3.) INTERMEDIATE HEIGHTS OF WALL MAY BE OBTAINED BY USING IN ONE OF THE COURSES 18" OR 12" HIGH GABIONS.

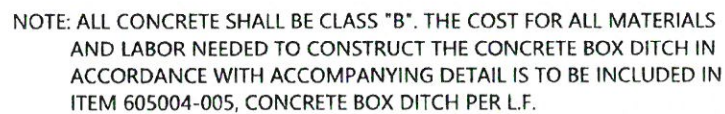


THE COST FOR ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO CONSTRUCT THE GABIONS IN ACCORDANCE WITH THE ATTACHED DETAIL SHALL BE INCLUDED IN THE UNIT BID PRICE OF ITEM 218003-000.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GABION RETAINING WALLS

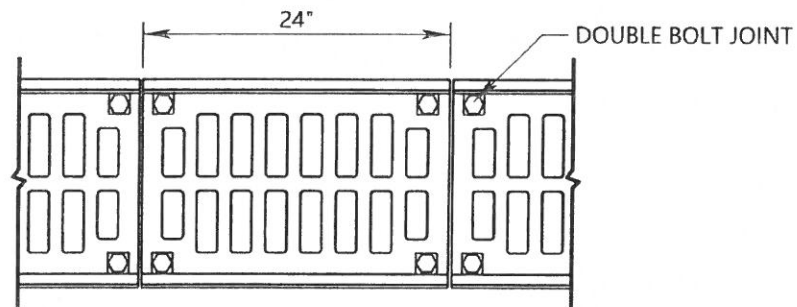
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



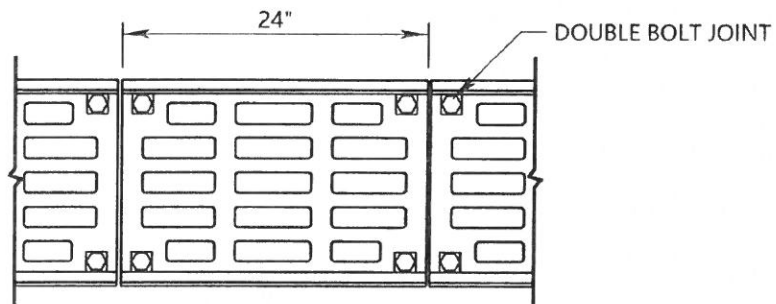
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE BOX & GRATE DETAIL (1 OF 2)

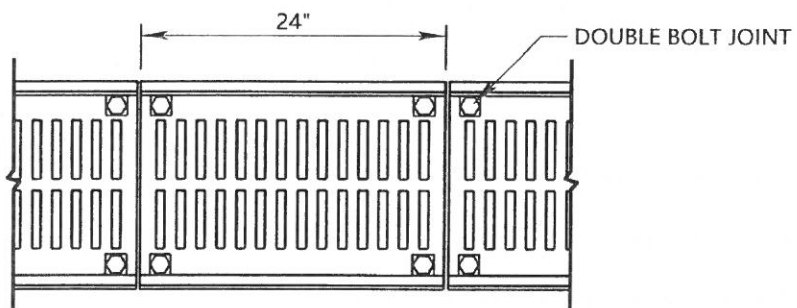
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



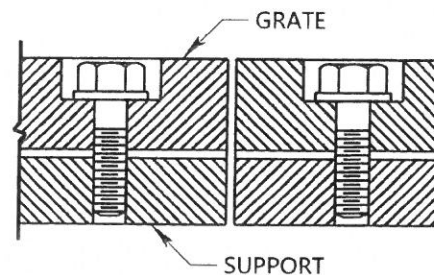
TYPE "A" GRATE



TYPE "C" GRATE



TYPE "P" GRATE



DIMENSIONS IN INCHES			WEIGHT PER LINEAL FOOT			
A	B	C	TYPE A	TYPE C	TYPE P	FRAME
8	1½	6	18	24	19	12
10	1½	8	24	30	22	12
12	1½	10	28	35	26	12
14	1½	12	35	45	31	12
17	1½	15	41	59	--	12
20	1½	18	57	67	--	12
23	1½	21	60	78	--	12
26	1½	24	68	110	--	12
30	2	27	100	130	--	17
33	2	30	120	150	--	17
36	2	33	115	140	--	17
39	2	36	130	210	--	17
45	2	42	150	260	--	17
51	2	48	175	--	--	17

WEIGHT PER FOOT-INCLUDES BOTH SIDES.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE BOX & GRATE DETAIL (2 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTES :

BITUMINOUS PAVER

THE BITUMINOUS PAVER WILL BE EQUIPPED WITH AND USE AN AUTOMATIC GRADE AND SLOPE CONTROL DEVICE. IN SUPERELEVATED SECTIONS, THE CONTRACTOR WILL DETERMINE THE EXISTING CROSS SLOPES PRIOR TO PAVING. THESE WILL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL AT LEAST 10 DAYS PRIOR TO PAVING. THESE CROSS SLOPES WILL BE USED TO CORRECT THE FINISHED PAVEMENT. THE AUTOMATIC GRADE CONTROL WILL UTILIZE A 9 METER SKI ON ALL COURSES. THE CROSS SLOPE CORRECTIONS WILL BE MADE IN THE BASE COURSES.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

BITUMINOUS PAVER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

NOTES

EXPANSION JOINTS SHALL BE PLACED IN THE MEDIAN AT STRUCTURES WHEN SO INDICATED, OPPOSITE EXPANSION JOINTS IN ABUTTING CONCRETE PAVEMENT, OVER EXISTING EXPANSION JOINTS IN UNDERLYING CONCRETE PAVEMENT, AND AT OTHER LOCATIONS AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER. AT EXPANSION JOINTS, MEDIAN SECTIONS SHALL BE 3/4" APART AND THE OPENING FILLED, FOR THE ENTIRE DEPTH OF THE MEDIAN, WITH 3/4" PREFORMED JOINT FILLER WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 610 OF THE SPECIFICATIONS. THE FILLER SHALL BE RECESSED 1/4" IN FROM THE SIDES AND THE TOP OF THE MEDIAN AND THE COMPLETED JOINT SHALL RECEIVE NO FURTHER TREATMENT; E.G., SEALING WITH WATERPROOF SEALER IS PROHIBITED.

THE FINISHED SURFACE OF THE MEDIAN SHALL BE SMOOTH, DENSE, UNPITTED AND FREE FROM AIR BUBBLE POCKETS, DEPRESSIONS, AND HONEY-COMB. IF DEEMED NECESSARY BY THE ENGINEER, THE ABOVE MENTIONED FINISHED SURFACE WILL BE OBTAINED BY THE USE OF WATER AND A WOOD BLOCK OR CARBORUNDUM BRICK.

UNLESS OTHERWISE SPECIFIED, BI-DIRECTIONAL DELINEATORS, MEETING THE REQUIREMENTS OF 661 OF THE SPECIFICATIONS AND MOUNTED ON SUITABLE SUPPORTS, SHALL BE SECURED TO, AND SPACED ALONG THE LENGTH OF THE BARRIER MEDIAN AS SHOWN AND SPECIFIED ON STANDARD SHEET TE 11-5 OF THE STANDARD DETAILS BOOK, VOLUME II, DATED JANUARY 1994. IF EXISTING DELINEATORS EXIST, THEY SHALL BE REMOVED AND BECOME THE PROPERTY OF THE CONTRACTOR.

THE COST OF CONCRETE, STEEL REINFORCING BARS, PREFORMED JOINT FILLER, NON-SHRINK GROUT, DELINEATORS AND DELINEATOR MOUNTINGS SHALL BE INCLUDED IN THE COST OF THE MEDIAN.

ALL REINFORCING BAR SPLICES TO BE MINIMUM 30 BAR DIAMETERS IN LENGTH.

COST OF MEDIAN OPENING AT INLET TO BE INCLUDED IN THE COST OF ADJUSTING INLETS.

WHEN MEDIAN TYPE V EXTENSION IS USED, THE CONTRACTOR SHALL BE REQUIRED TO REPAIR ANY DAMAGED MEDIAN BARRIER PRIOR TO CAPPING. COST TO BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 610-06(V)-2.

VERTICAL JOINTS IN THE MEDIAN EXTENSION ARE TO MATCH THE JOINTS IN THE EXISTING MEDIAN.

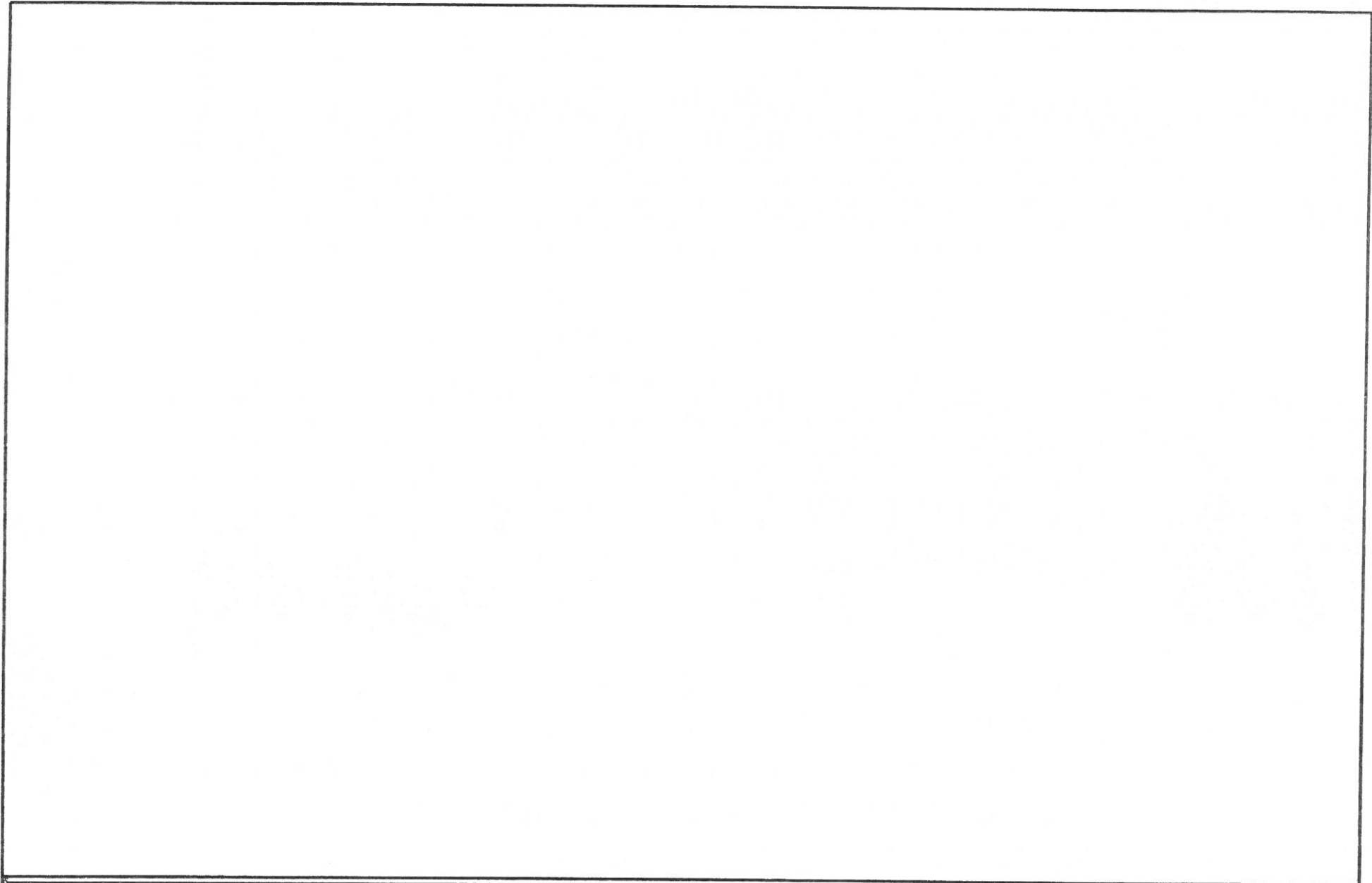
MEDIAN TYPE V EXTENSION TRANSITION SHALL BE ACCOMPLISHED IN 90 FT. MAX. FROM 24" TO 6".

CONCRETE SHALL MEET THE REQUIREMENTS OF 601, CLASS B CONCRETE OR SECTION 501. (SEE SEC. 610.2 OF SPECS.)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE MEDIAN BARRIER EXTENSION NOTES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W.V.				

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS					Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
					W.V.				

**W.V. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLAN OF PROPOSED IMPROVEMENTS OF
STATE HIGHWAY**

PROJECT NAME: _____ STATE PROJECT NO.: _____
FEDERAL PROJECT NO.: _____ COUNTY: _____
LENGTH (mi): _____ COORDINATES: X = _____ DEG. _____ MIN. Y = _____ DEG. _____ MIN.
BEGIN TERMINI: _____ END TERMINI: _____
TYPE OF IMPROVEMENT: _____ EXISTING ADT: _____

"TRAFFIC CONTROL FOR STREETS AND HIGHWAY CONSTRUCTION AND MAINTENANCE
OPERATIONS DATED _____ SHALL APPLY TO THIS PROJECT."

SIGNED: _____ DATE: _____	RESPONSIBLE CHARGE ENGINEER _____
RECOMMENDED: _____	PROJECT ENGINEER _____
RECOMMENDED FOR APPROVAL: _____	STATE HIGHWAY ENGINEER _____
APPROVED: _____	COMMISSIONER OF HIGHWAYS _____

I HEREBY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF
PROJECT _____

EXECUTIVE SECRETARY

DAY OF _____, 20__

