Index of Foreslope Protection Standards

Standard	Description
1005	Bridge Wing Armoring for Slope Protection
1005A	Bridge Wing Armoring for Water Crossings
1006	Concrete Slope Protection - Stub Abutment
1006A	Concrete Slope Protection - Integral Abutment
1006B	Concrete Slope Protection - Integral Abutment
1006C	Macadam Stone Slope Protection - Stub Abutment
1006D	Macadam Stone Slope Protection - Integral Abutment
1006E	Macadam Stone Slope Protection - Integral Abutment - 2 Span
1007	Subdrain Details for Concrete Slope Protection
1007A	Subdrain Details for Macadam Stone Slope Protection
1007B	Subdrain Details for 2 Span Bridges
1007C	Subdrain Details for Water Crossings
1007D	Granular Backfill Details for Non-Wing Extension Bridges
1007E	Granular Backfill Details for Wing Extension Bridges

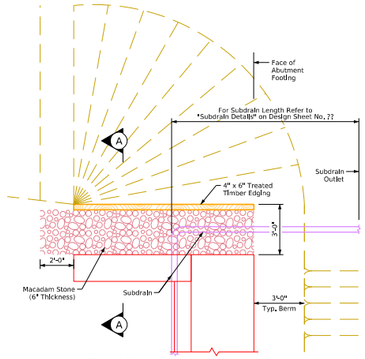
ForeSlopeProtectionBridges.dgn - 100-FS - This Sheet Issued 02-10.
ForeSlopeProtectionBridges.dgn - 100-FS - This Sheet Re-issued 07-23.

Index of Foreslope Standards

FILE NO.	ENGLISH	DESIGN TEAM	Index of Foreslope Protection Bridge Standards	Standard Sheet 100-FS	COUNTY	PROJECT NUMBER	SHEET NUMBER	

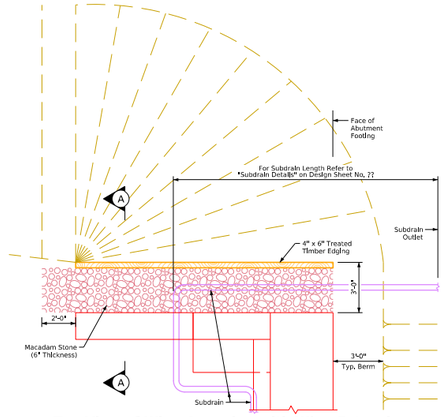
7:21:03 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

A Check Shall be Made at the Subdrain Outlet to Insure that it is Draining Properly During the Backfill Flooding Process.



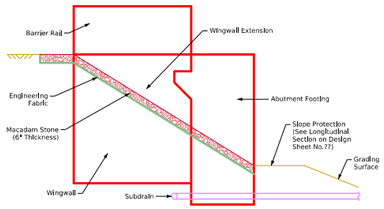
Top View of Wing Armoring

Note to Designer: This Standard Is Used Only for Grade Separation (Road Over Road or Road Over RR).

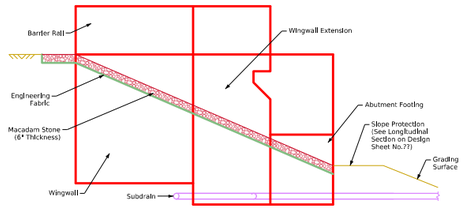


Top View of Wing Armoring with Wing Extension

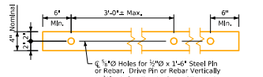
Note to Designer: Stub Abutment Drawing Model Is Referenced Outside of Border. Either Move In Place or Modify "Orientation" in Reference Dialog.



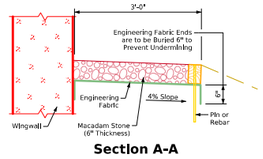
Profile View of Wing Armoring
(Shown for Integral Abutment)



Profile View of Wing Armoring with Wing Extension
(Shown for Integral Abutment with Wing Extensions)



4"x6" Treated Timber Edging Details



Section A-A

General Notes:

Macadam stone shall be placed along the sides of the wing and abutment footing as shown in Section A-A. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlayed with engineering fabric in accordance with Article 4196.01, B, 3, of the Standard Specifications.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform 6 inch depth and density and provide uniform surface appearance.

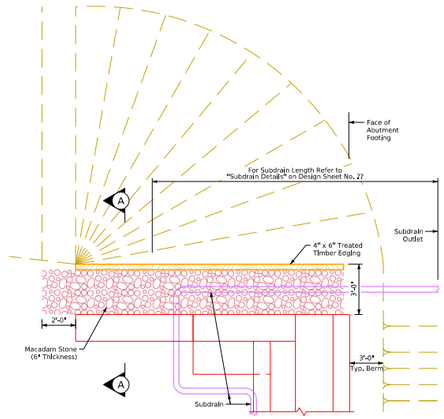
Payment for the bridge wing armoring will be bid per square yard. Cost will include engineering fabric, macadam stone, treated timber edging, excavation, shaping, and compaction to dimensions shown in these plans. Bid Item shall be "Bridge Wing Armoring - Macadam Stone".

Bridge Wing Armoring

Revised 06-14 - Added 2 Feet Of Length Of Macadam Stone In Front Of The Bridge Wing.
ForeSlopeProtectionBridges.dgn - 1005 - This Sheet Issued 06-02.
ForeSlopeProtectionBridges.dgn - 1005 - This Sheet Issued 07-23.

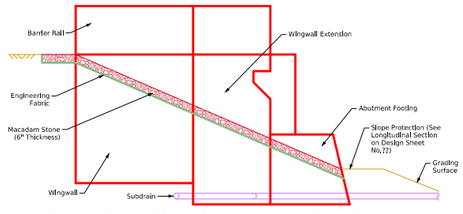
FILE NO.	ENGLISH	DESIGN TEAM	Bridge Wing Armoring for Slope Protection	Standard Sheet 1005	COUNTY	PROJECT NUMBER	SHEET NUMBER	
7:21:03 PM 6/12/2024	bldoss	pw:\\NTPwInt1.dot.lnt.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn						

Note to Designer: For Top of Revetment Elevation See Longitudinal Section on Design Sheet No. ??



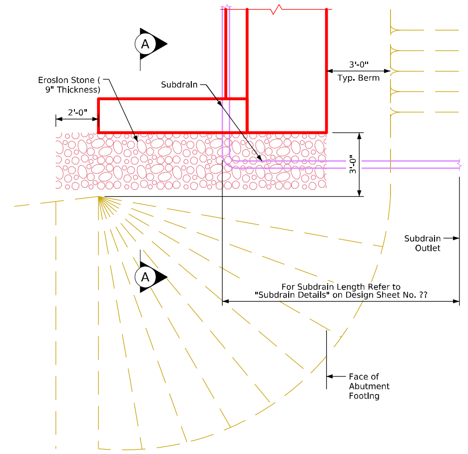
Top View of Wing Armoring with Wing Extension

STUB ABUTMENT



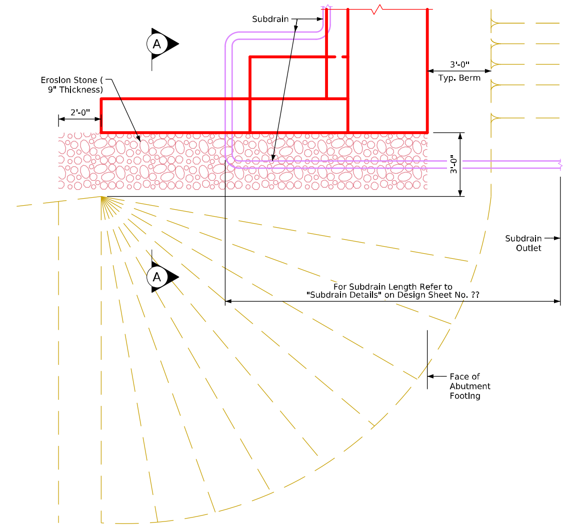
Profile View of Wing Armoring with Wing Extension
(Stub Abutment with Wing Extensions)

Revised 06-14 - Added 2 Feet of Length of Erosion Stone in Front of the Bridge Wing.
Revised 09-2023: Changed direction of Section Director Arrows "A-A" to match what section view "Section A-A" is showing.
ForeSlopeProtectionBridges.dgn - 1005A - This Sheet Issued 06-02.
ForeSlopeProtectionBridges.dgn - 1005A - This Sheet Issued 07-23.



Top View of Wing Armoring

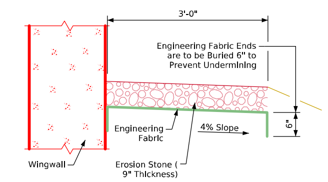
Note to Designer: This Standard is Used Only for Grade Separation (Road Over Road or Road Over RR).



Top View of Wing Armoring with Wing Extension

Note to Designer: Stub Abutment Drawing Model is Referenced Outside of Border. Either Move in Place or Modify "Orientation" in Reference Dialog.

A Check Shall be Made at the Subdrain Outlet to Insure that it is Draining Properly During the Backfill Flooding Process.



Section A-A

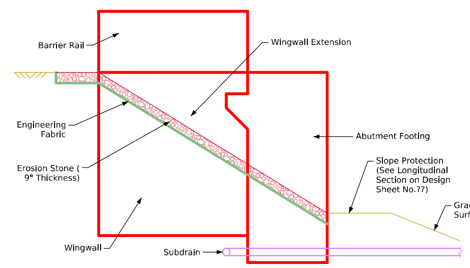
General Notes:

Erosion stone shall be placed along the sides of the wings and abutment footing as shown in Section A-A. This is typical at each corner of the bridge unless otherwise noted in the plans. The erosion stone at these locations shall be underlayed with engineering fabric in accordance with Article 4196.01, B, 3, of the Standard Specifications.

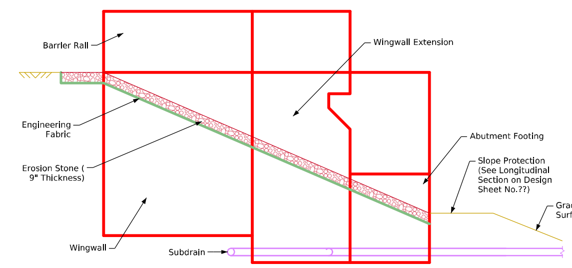
The erosion stone shall be in accordance with Section 4130, of the Standard Specifications. Material passing the 3 inch screen but 100% retained on a 1 inch screen may be used as choke stone.

The erosion stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform 9 inch depth and density and provide uniform surface appearance.

Payment for the bridge wing armoring will be bid per square yard. Cost will include engineering fabric, erosion stone, excavation, shaping, and compaction to dimensions shown in these plans. Bid item shall be "Bridge Wing Armoring - Erosion Stone".



Profile View of Wing Armoring
(Shown for Integral Abutment)



Profile View of Wing Armoring with Wing Extension
(Integral Abutment with Wing Extensions)

Bridge Wing Armoring

FILE NO.	ENGLISH	DESIGN TEAM	Bridge Wing Armoring for Water Crossings	Standard Sheet 1005A	COUNTY	PROJECT NUMBER	SHEET NUMBER	

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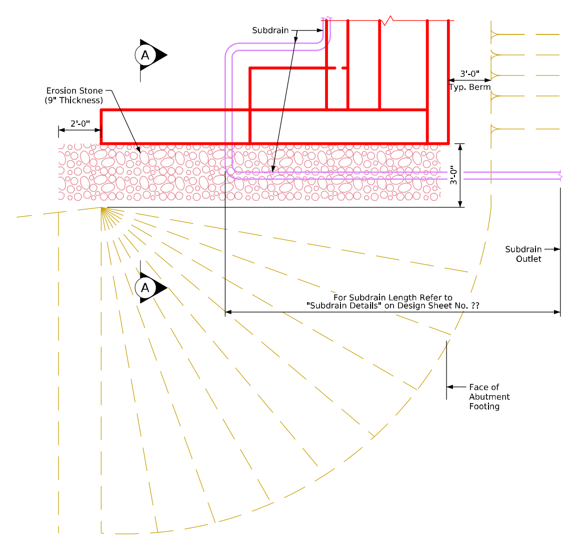
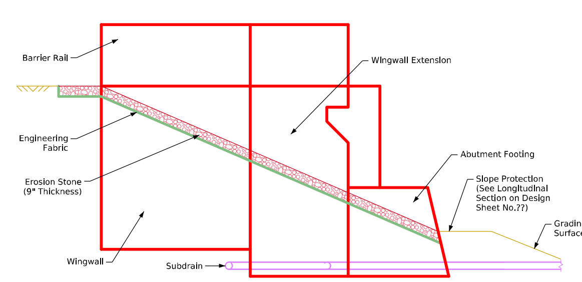


Top View of Wing Armoring with Wing Extension

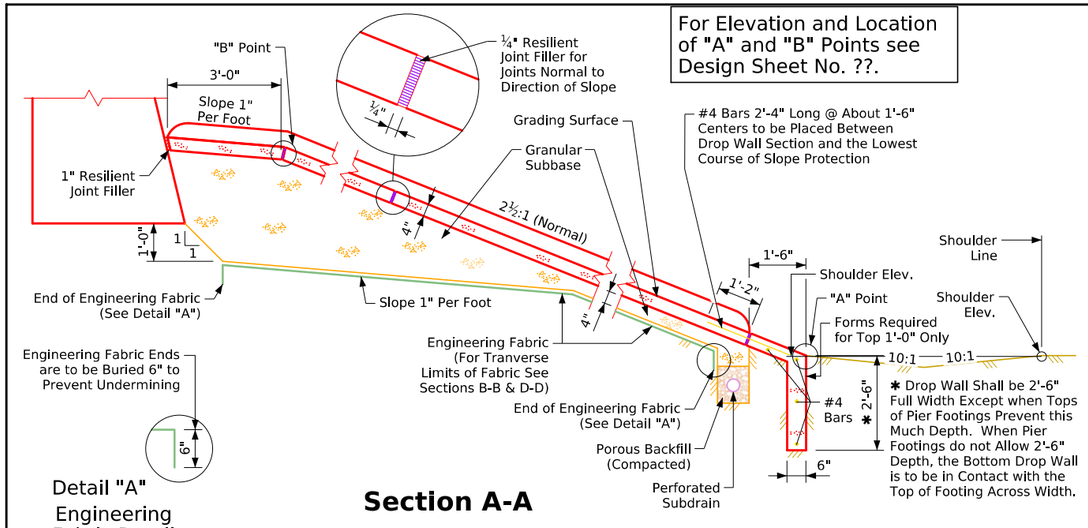
STUB ABUTMENT



Profile View of Wing Armoring with Wing Extension
(Stub Abutment with Wing Extensions)

Bridge Wing Armoring for Water Crossings Standard Sheet 1005A

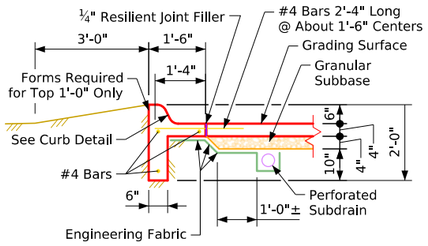
For Elevation and Location of "A" and "B" Points see Design Sheet No. ??.



Detail "A"
Engineering Fabric Detail

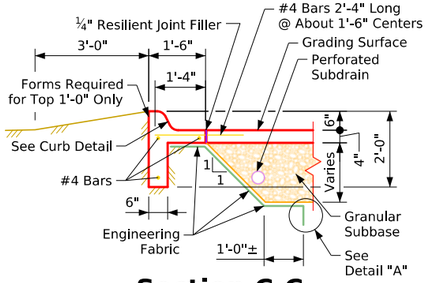
Section A-A

* Drop Wall Shall be 2'-6" Full Width Except when Tops of Pier Footings Prevent this Much Depth. When Pier Footings do not Allow 2'-6" Depth, the Bottom Drop Wall is to be in Contact with the Top of Footing Across Width.



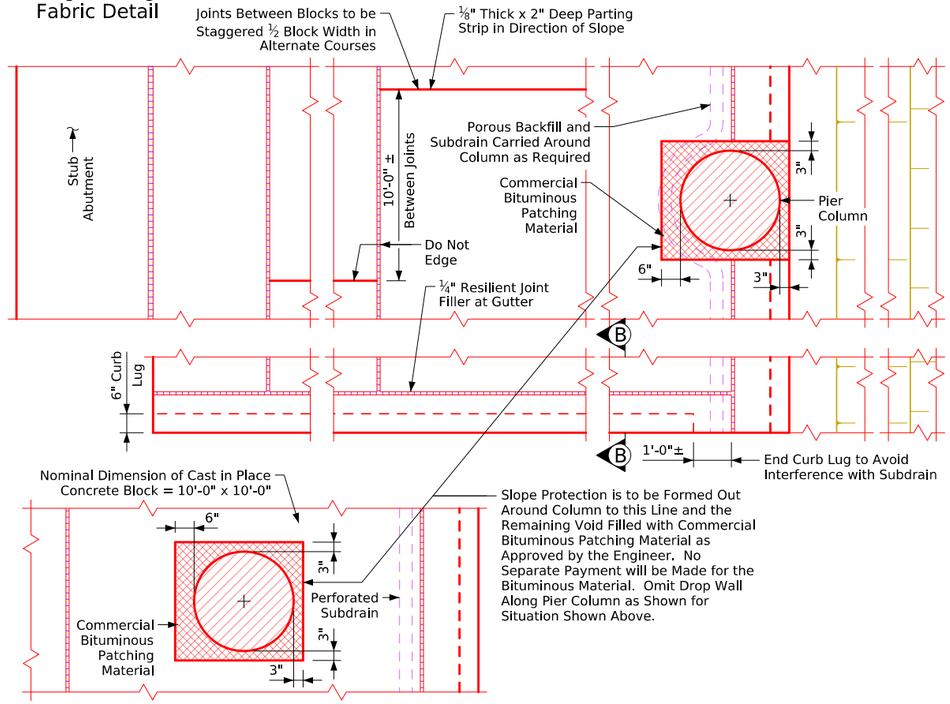
Section B-B

(Through 4" Thick Granular Subbase)

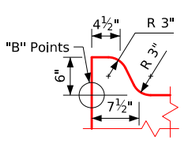


Section C-C

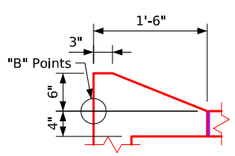
(Through Variable Thickness Granular Subbase)



Part Slope Protection Plan for Columns in Slope (0° Skew)



Curb Detail



Alternate Curb Detail

General Notes:

This plan sheet shows details for placing a portland cement concrete slope protection under overhead structures.

The current Specifications of the Iowa Department of Transportation shall apply with modifications or additions listed below:

-Finish - Class 1, floated surface finish.
-Cure - Cure as per current Specifications.
-Granular Subbase - This prewetted material shall be deposited by a method approved by the Engineer and be thoroughly tamped or vibrated to insure compaction. Finished shape shall be as shown in Section A-A.
-Foreslope Preparation - The bridge berm foreslope shall be compacted and shaped as shown in Section A-A. The berm foreslope shall be firm when the engineering fabric and granular subbase are placed. Engineering fabric shall be in accordance with Article 4196.01, B, 2, of the Standard Specifications.

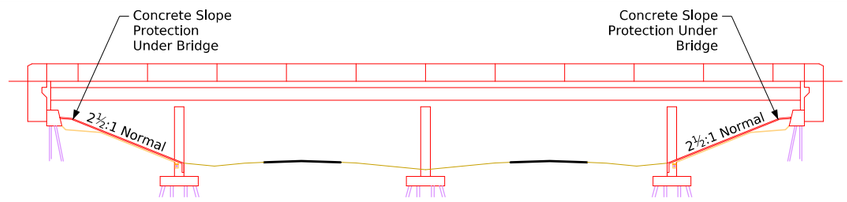
If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The cast in place concrete is to be poured in approximately 10 ft wide courses, but all courses on one slope should have approximately equal widths. Adjacent courses shall not be poured within 15 hours of one another. The joints in the direction of the slope are to be staggered about ½ block width.

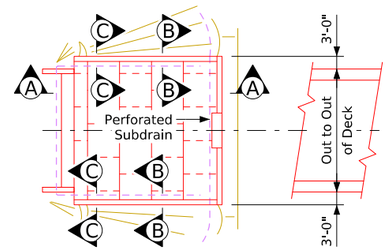
Payment for bid item "Concrete Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard is to include costs of all materials and labor required to construct the slope protection as shown on these plans. The disposal of excess soil from shaping or trenching, as directed by the Engineer, shall be considered incidental to placing the concrete slope protection. Shaping should include excavation from the grading surface shown.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

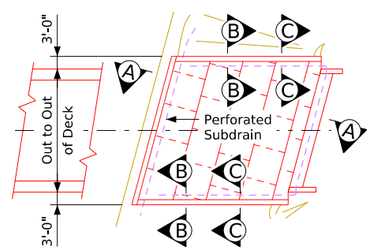
The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.



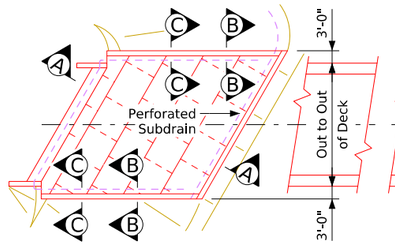
Longitudinal Section Along ¡ Roadway



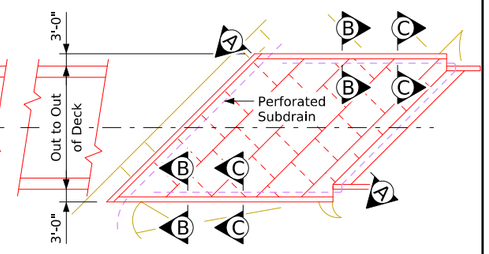
Slope Protection Layout 0° Skew



Slope Protection Layout 15° Skew



Slope Protection Layout 30° Skew



Slope Protection Layout 45° Skew

Estimated Quantities

Description	Location	Quantity
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

Items to be included in "Concrete Slope Protection":
- Engineering Fabric
- Granular Subbase
- Class "C" Structural Concrete
- #4 Reinforcing
- Resilient Joint Filler
- Excavating, Shaping and Compacting
- Commercial Bituminous Patching Material

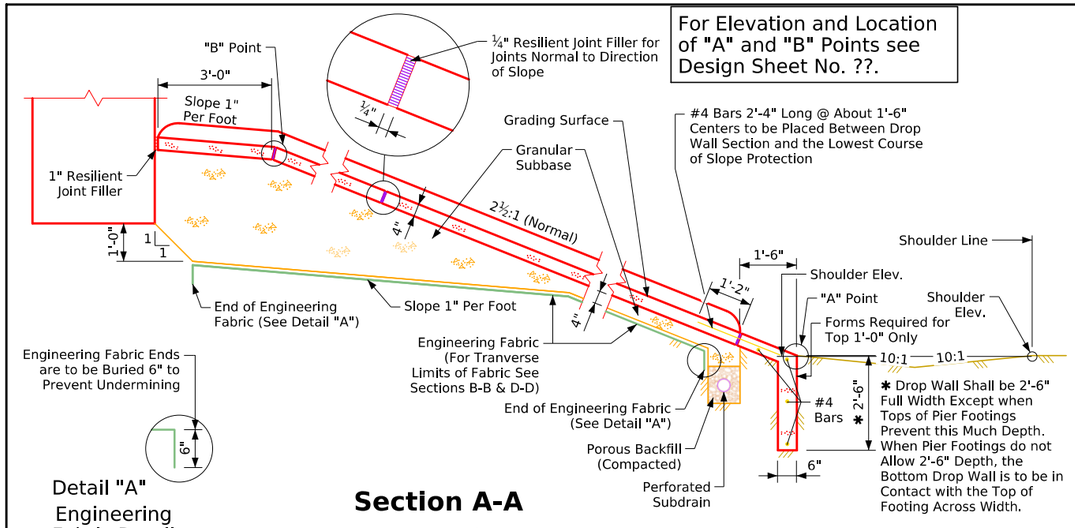
Concrete Slope Protection

Revised 10-12 - Located the "A" and "B" Points in Section A-A and Curb & Alternate Curb Detail.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
Revised 06-2024: Corrected leader line locations to Engineering Fabric in Section A-A.
ForeSlopeProtectionBridges.dgn - 1006 - This Sheet Redrawn 8-27-91.
ForeSlopeProtectionBridges.dgn - 1006 - This Sheet Redrawn 07-23.

FILE NO.	ENGLISH	DESIGN TEAM	Concrete Slope Protection - Stub Abutment	Standard Sheet 1006	COUNTY	PROJECT NUMBER	SHEET NUMBER	

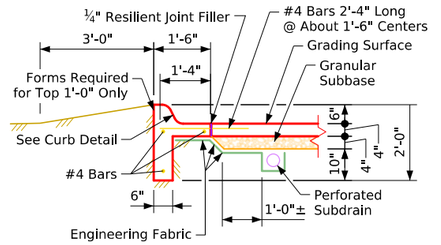
7:21:05 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

For Elevation and Location of "A" and "B" Points see Design Sheet No. ??.

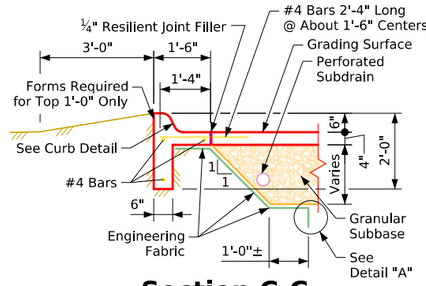


Detail "A"
Engineering Fabric Detail

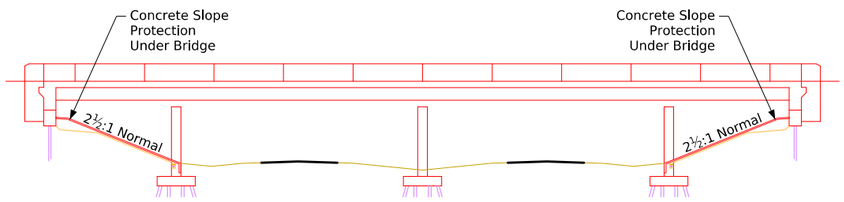
Section A-A



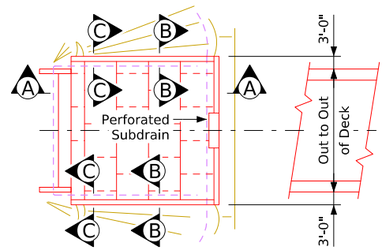
Section B-B
(Through 4" Thick Granular Subbase)



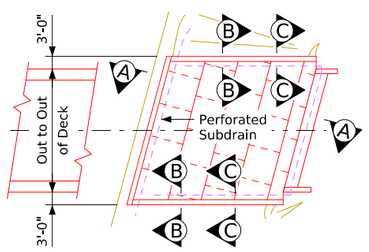
Section C-C
(Through Variable Thickness Granular Subbase)



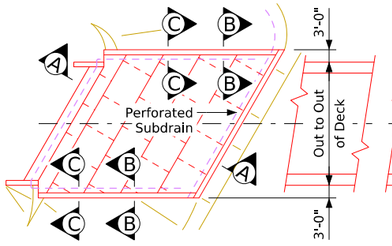
Longitudinal Section Along ℄ Roadway



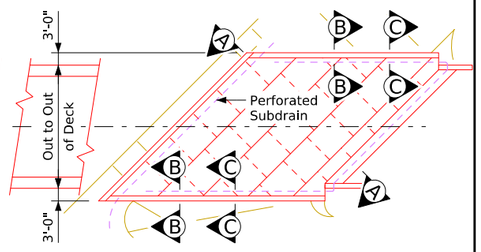
Slope Protection Layout 0° Skew



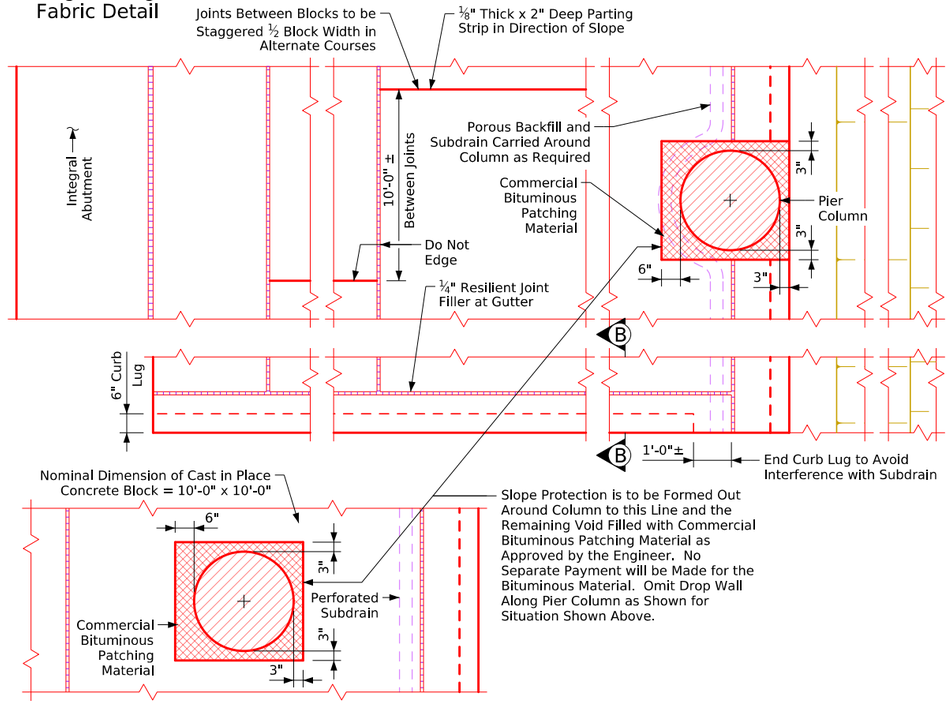
Slope Protection Layout 15° Skew



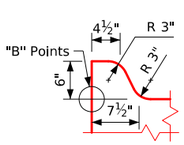
Slope Protection Layout 30° Skew



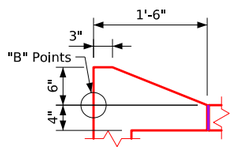
Slope Protection Layout 45° Skew



Part Slope Protection Plan for Columns in Slope (0° Skew)



Curb Detail



Alternate Curb Detail

General Notes:

This plan sheet shows details for placing a portland cement concrete slope protection under overhead structures.

The current Specifications of the Iowa Department of Transportation shall apply with modifications or additions listed below:

-Finish - Class 1, floated surface finish.

-Cure - Cure as per current Specifications.

-Granular Subbase - This prewetted material shall be deposited by a method approved by the Engineer and be thoroughly tamped or vibrated to insure compaction. Finished shape shall be as shown in Section A-A.

-Foreslope Preparation - The bridge berm foreslope shall be compacted and shaped as shown in Section A-A. The berm foreslope shall be firm when the engineering fabric and granular subbase are placed. Engineering fabric shall be in accordance with Article 4196.01, B, 2, of the Standard Specifications.

If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The cast in place concrete is to be poured in approximately 10 ft wide courses, but all courses on one slope should have approximately equal widths. Adjacent courses shall not be poured within 15 hours of one another. The joints in the direction of the slope are to be staggered about ½ block width.

Payment for bid item "Concrete Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard is to include costs of all materials and labor required to construct the slope protection as shown on these plans. The disposal of excess soil from shaping or trenching, as directed by the Engineer, shall be considered incidental to placing the concrete slope protection. Shaping should include excavation from the grading surface shown.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.

Estimated Quantities

Description	Location	Quantity
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

Items to be included in "Concrete Slope Protection":
- Engineering Fabric
- Granular Subbase
- Class "C" Structural Concrete
- #4 Reinforcing
- Resilient Joint Filler
- Excavating, Shaping and Compacting
- Commercial Bituminous Patching Material

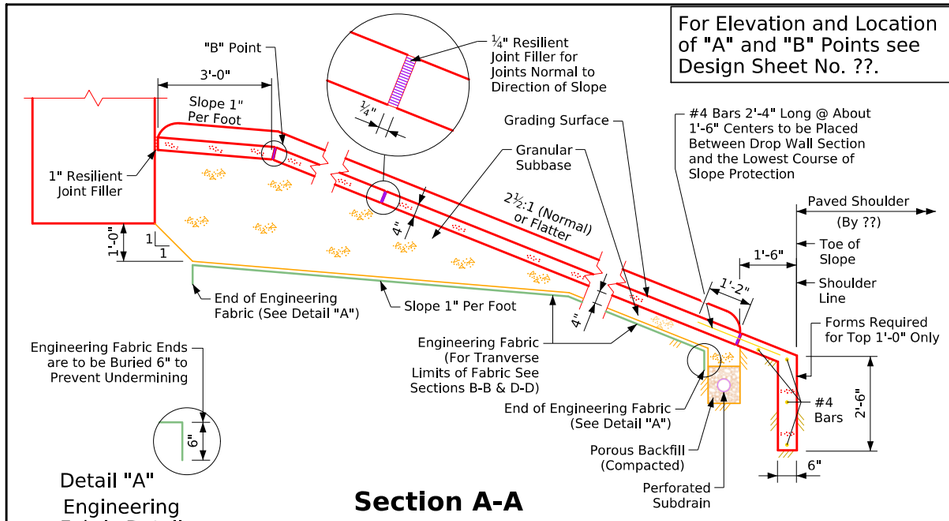
Concrete Slope Protection

Revised 10-12 - Located the "A" and "B" Points in Section A-A and Curb & Alternate Curb Details.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
ForeSlopeProtectionBridges.dgn - 1006A - This Sheet Redrawn 8-27-91.
ForeSlopeProtectionBridges.dgn - 1006A - This Sheet Redrawn 07-23.

FILE NO.	ENGLISH	DESIGN TEAM	Concrete Slope Protection - Integral Abutment	Standard Sheet 1006A	COUNTY	PROJECT NUMBER	SHEET NUMBER	

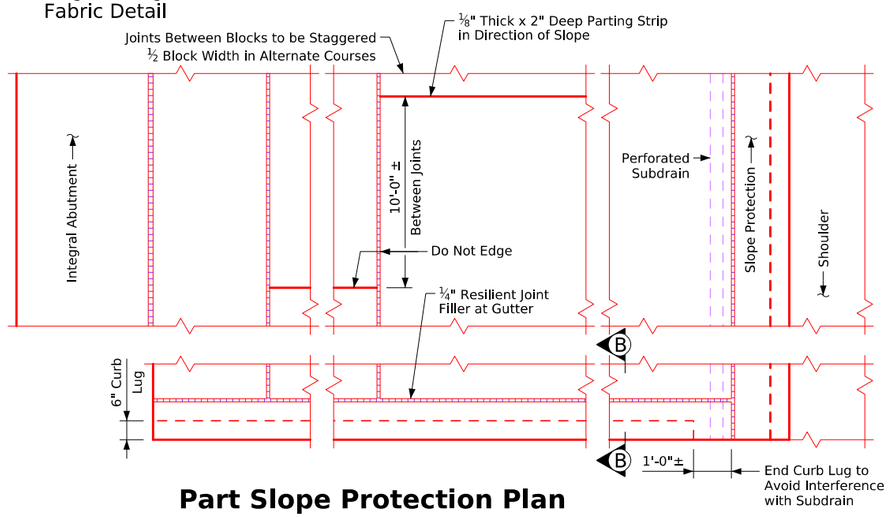
7:21:06 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

For Elevation and Location of "A" and "B" Points see Design Sheet No. ??.

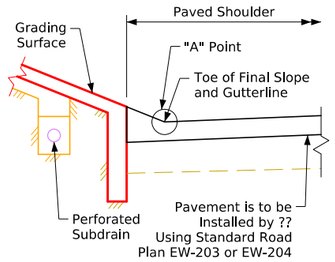


Detail "A"
Engineering Fabric Detail

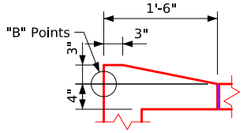
Section A-A



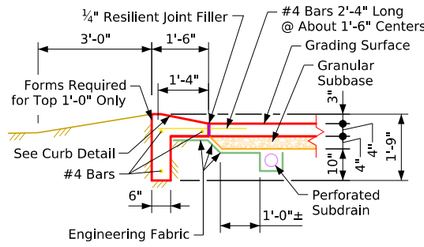
Part Slope Protection Plan



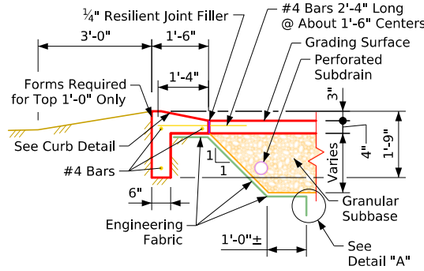
Final Construction Section A-A



Curb Detail



Section B-B
(Through 4" Thick Granular Subbase)



Section C-C
(Through Variable Thickness Granular Subbase)

General Notes:

This plan sheet shows details for placing a portland cement concrete slope protection under overhead structures.

The current Specifications of the Iowa Department of Transportation shall apply with modifications or additions listed below:

-Finish - Class 1, floated surface finish.
-Cure - Cure as per current Specifications.
-Granular Subbase - This prewetted material shall be deposited by a method approved by the Engineer and be thoroughly tamped or vibrated to insure compaction. Finished shape shall be as shown in Section A-A.
-Foreslope Preparation - The bridge berm foreslope shall be compacted and shaped as shown in Section A-A. The berm foreslope shall be firm when the engineering fabric and granular subbase are placed. Engineering fabric shall be in accordance with Article 4196.01, B, 2, of the Standard Specifications.

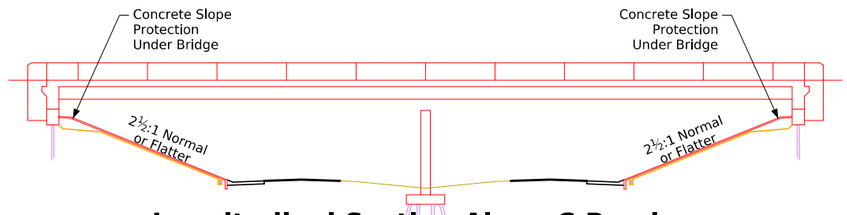
If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The cast in place concrete is to be poured in approximately 10 ft wide courses, but all courses on one slope should have approximately equal widths. Adjacent courses shall not be poured within 15 hours of one another. The joints in the direction of the slope are to be staggered about ½ block width.

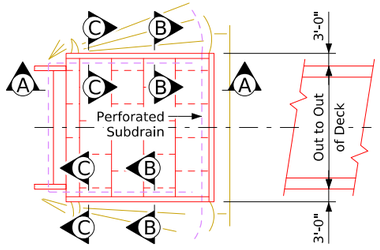
Payment for bid item "Concrete Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard is to include costs of all materials and labor required to construct the slope protection as shown on these plans. The disposal of excess soil from shaping or trenching, as directed by the Engineer, shall be considered incidental to placing the concrete slope protection. Shaping should include excavation from the grading surface shown.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

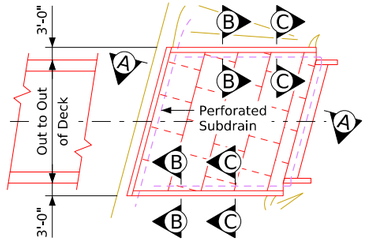
The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.



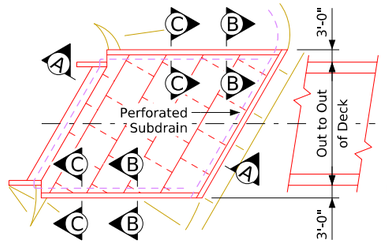
Longitudinal Section Along ℄ Roadway



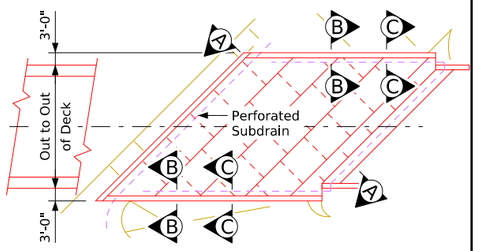
Slope Protection Layout 0° Skew



Slope Protection Layout 15° Skew



Slope Protection Layout 30° Skew



Slope Protection Layout 45° Skew

Estimated Quantities

Description	Location	Quantity
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
Concrete Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

Items to be included in "Concrete Slope Protection":
- Engineering Fabric
- Granular Subbase
- Class "C" Structural Concrete
- #4 Reinforcing
- Resilient Joint Filler
- Excavating, Shaping and Compacting
- Commercial Bituminous Patching Material

Concrete Slope Protection

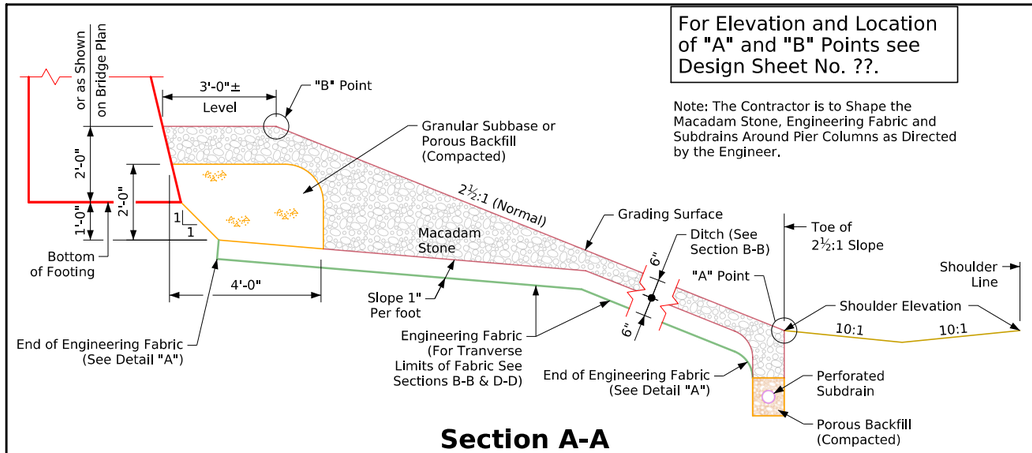
Revised 10-12 - Located the "A" and "B" Points in Section A-A and Curb & Alternate Curb Details. Added Final Construction Section A-A Detail.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
ForeSlopeProtectionBridges.dgn - 1006B - This Sheet issued 05-6-93.
ForeSlopeProtectionBridges.dgn - 1006B - This Sheet Redrawn 07-23.

FILE NO.	ENGLISH	DESIGN TEAM	Concrete Slope Protection - Integral Abutment	Standard Sheet 1006B	COUNTY	PROJECT NUMBER	SHEET NUMBER	

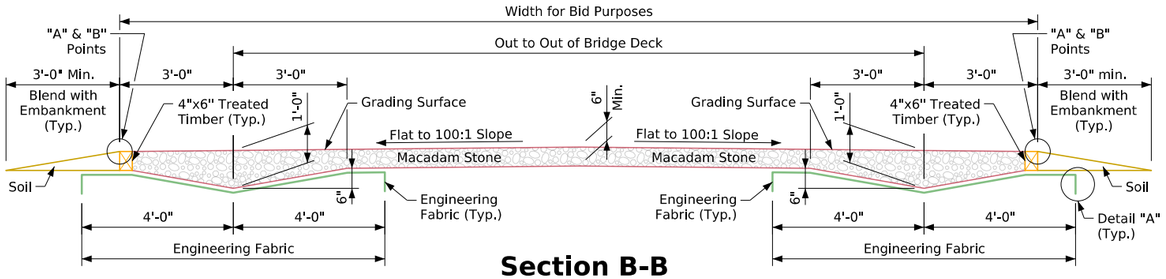
7:21:06 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

For Elevation and Location of "A" and "B" Points see Design Sheet No. ??.

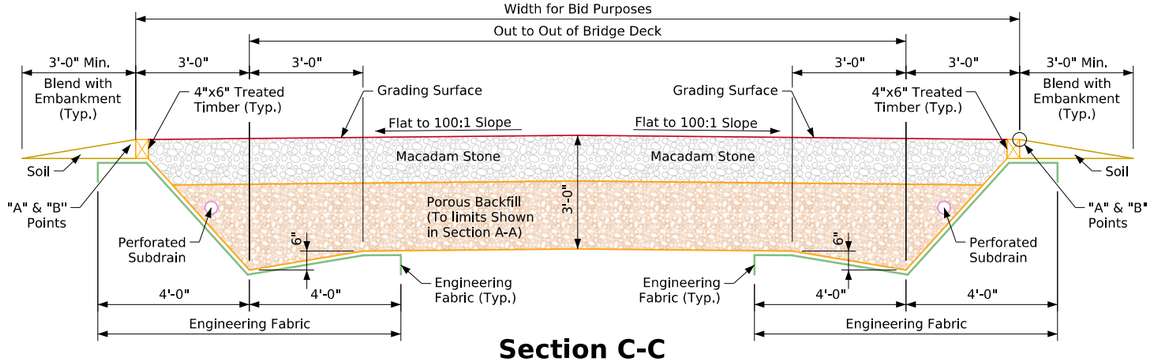
Note: The Contractor is to Shape the Macadam Stone, Engineering Fabric and Subdrains Around Pier Columns as Directed by the Engineer.



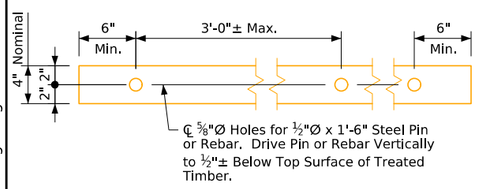
Section A-A



Section B-B



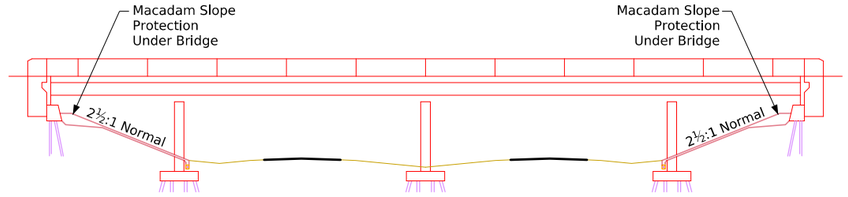
Section C-C



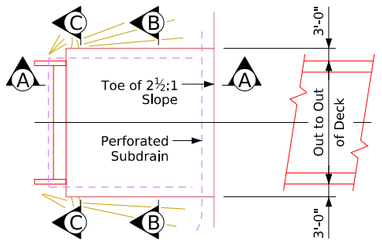
4"x6" Treated Timber Edging Details

Engineering Fabric Ends are to be Buried 6" to Prevent Undermining

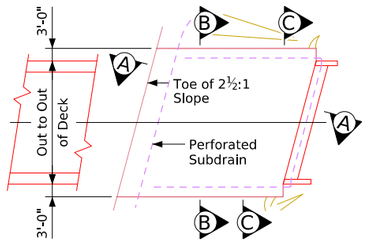
Detail "A"
Engineering Fabric Detail



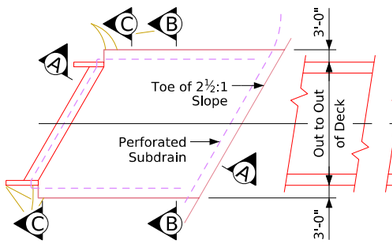
Longitudinal Section Along ℄ Roadway



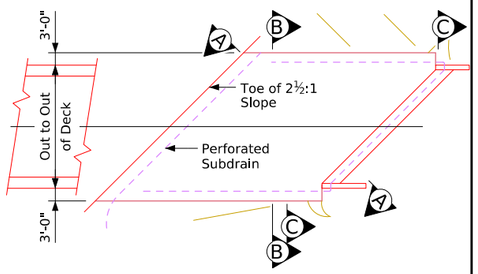
Slope Protection Layout 0° Skew



Slope Protection Layout 15° Skew



Slope Protection Layout 30° Skew



Slope Protection Layout 45° Skew

General Notes:

This plan sheet shows details for placing a macadam stone slope protection under overhead structures.

The bridge berm foreslope shall be compacted and shaped as shown on this sheet. Shaping will include excavation from the grading surface shown on the situation plan and as directed by the Engineer. The berm foreslope shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications. If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform depth and density and provide uniform surface appearance.

Payment for bid item "Macadam Stone Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard shall include all costs for material and labor required to construct the slope protection shown on these plans.

The berm foreslope shaping and compacting and the disposal of excess soil from shaping or trenching shall be considered incidental to placing the slope protection.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.

Estimated Quantities

Description	Location	Quantity
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

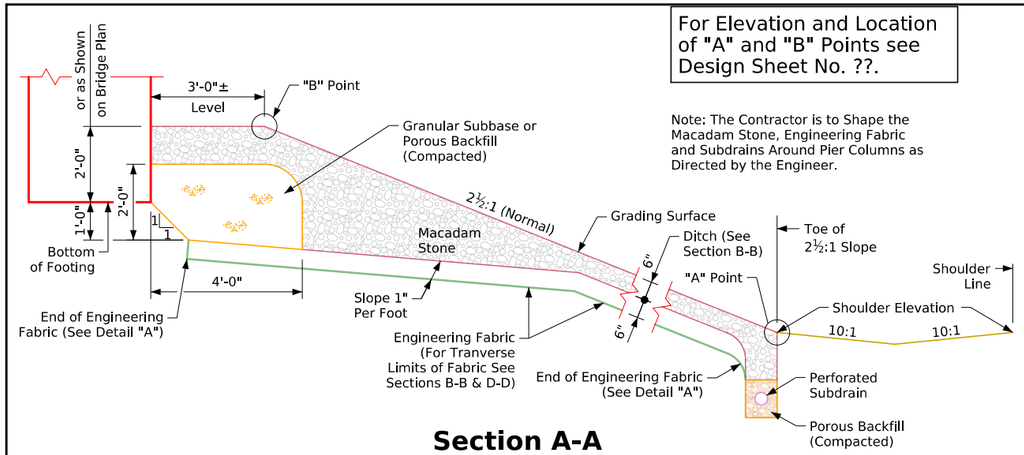
Items to be included in "Macadam Stone Slope Protection":
- Excavating, Shaping and Compacting
- Engineering Fabric
- Macadam Stone
- 4"x6" Treated Timber Edging
- ½"Ø Steel Pins (or Rebar)
- Porous Backfill or Granular Subbase Backfill at Front Face Abutment Footing

Macadam Stone Slope Protection

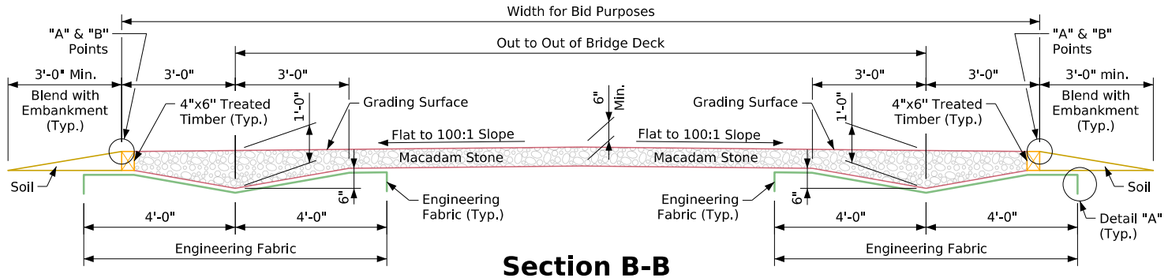
Revised 10-12 - Located the "A" and "B" Points in Section A-A.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
ForeSlopeProtectionBridges.dgn - 1006C - This Sheet Issued 09-16-92.
ForeSlopeProtectionBridges.dgn - 1006C - This Sheet Redrawn 07-23.

FILE NO.	ENGLISH	DESIGN TEAM	Macadam Stone Slope Protection - Stub Abutment	Standard Sheet 1006C	COUNTY	PROJECT NUMBER	SHEET NUMBER	

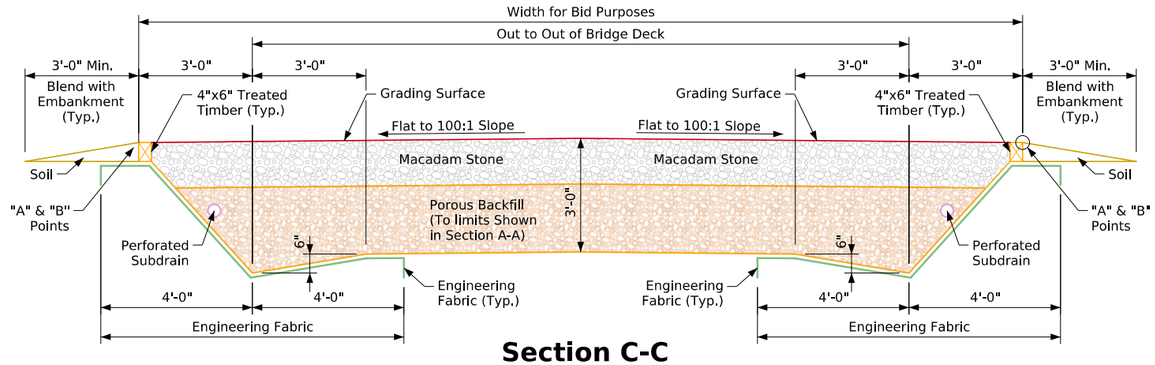
7:21:07 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn



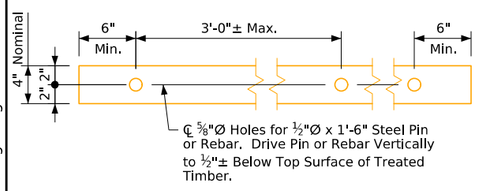
Section A-A



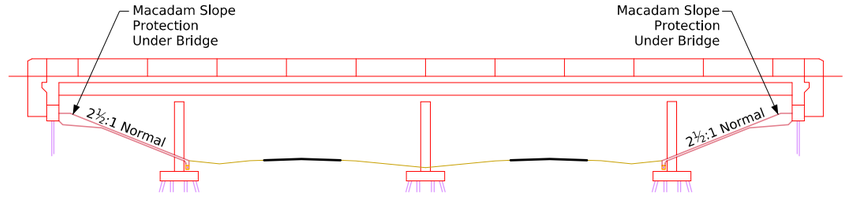
Section B-B



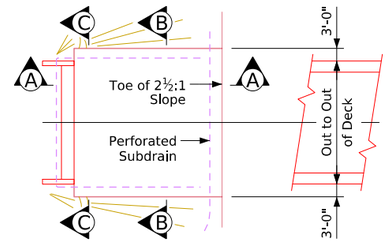
Section C-C



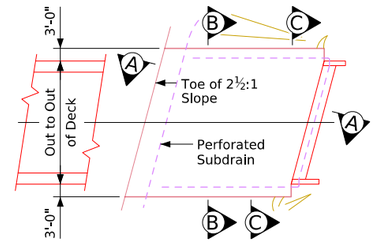
4"x6" Treated Timber Edging Details



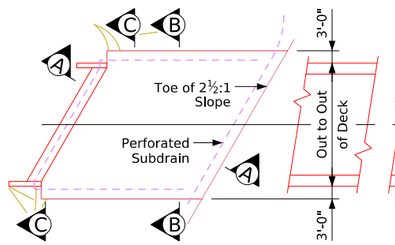
Longitudinal Section Along ℄ Roadway



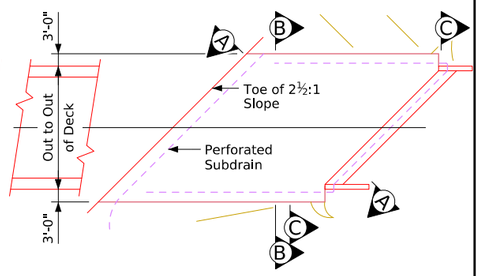
Slope Protection Layout 0° Skew



Slope Protection Layout 15° Skew



Slope Protection Layout 30° Skew



Slope Protection Layout 45° Skew

General Notes:

This plan sheet shows details for placing a macadam stone slope protection under overhead structures.

The bridge berm foreslope shall be compacted and shaped as shown on this sheet. Shaping will include excavation from the grading surface shown on the situation plan and as directed by the Engineer. The berm foreslope shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications. If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform depth and density and provide uniform surface appearance.

Payment for bid item "Macadam Stone Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard shall include all costs for material and labor required to construct the slope protection shown on these plans.

The berm foreslope shaping and compacting and the disposal of excess soil from shaping or trenching shall be considered incidental to placing the slope protection.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.

Estimated Quantities

Description	Location	Quantity
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

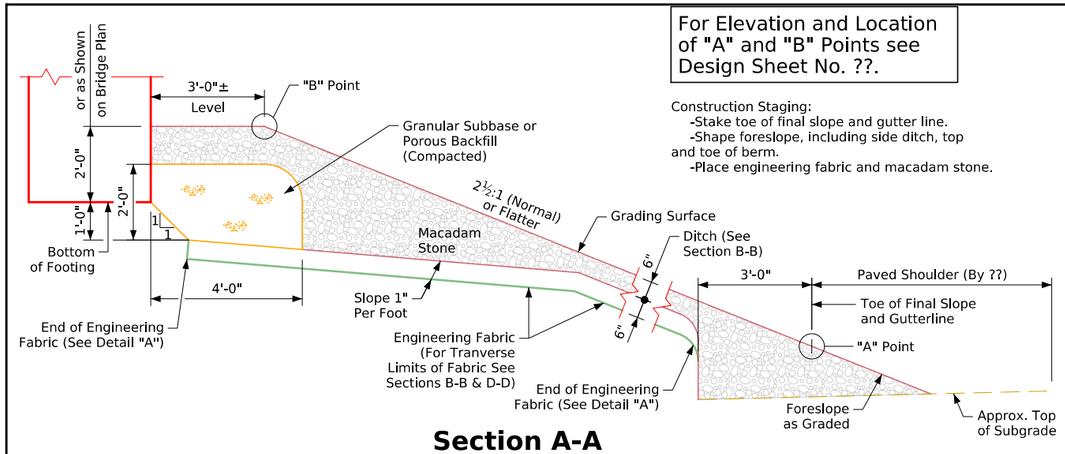
Items to be included in "Macadam Stone Slope Protection":
- Excavating, Shaping and Compacting
- Engineering Fabric
- Macadam Stone
- 4"x6" Treated Timber Edging
- ½"Ø Steel Pins (or Rebar)
- Porous Backfill or Granular Subbase Backfill at Front Face Abutment Footing

Macadam Stone Slope Protection

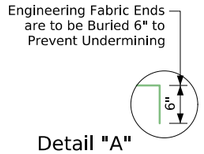
Revised 10-12 - Located the "A" AND "B" Points in Section A-A and Curb & Alternate Curb Details.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
Revised 06-2024: Corrected leader line locations to Engineering Fabric in Section A-A.
ForeSlopeProtectionBridges.dgn - 1006D - This Sheet Issued 09-16-92.
ForeSlopeProtectionBridges.dgn - 1006D - This Sheet Redrawn 07-23.

For Elevation and Location of "A" and "B" Points see Design Sheet No. ??.

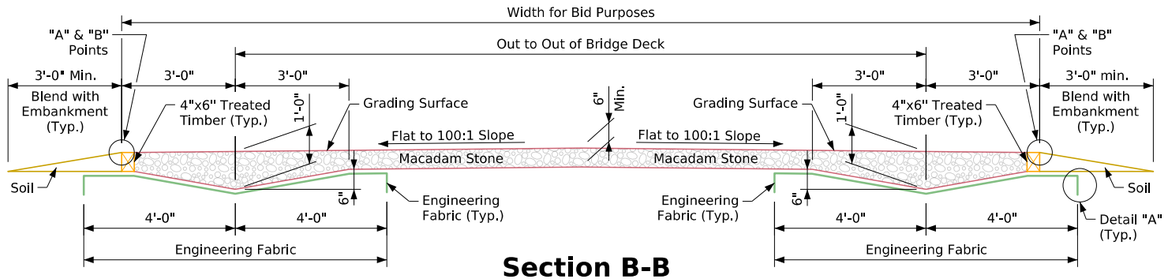
Construction Staging:
-Stake toe of final slope and gutter line.
-Shape foreslope, including side ditch, top and toe of berm.
-Place engineering fabric and macadam stone.



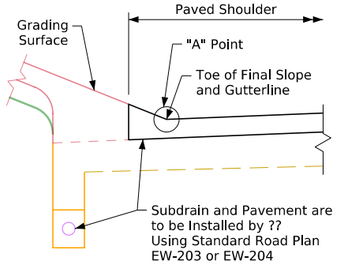
Section A-A



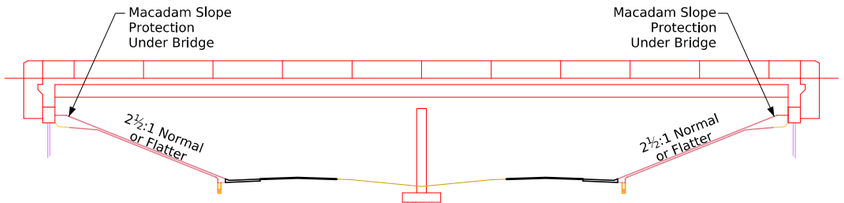
Detail "A"
Engineering Fabric Detail



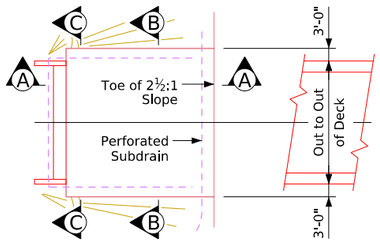
Section B-B



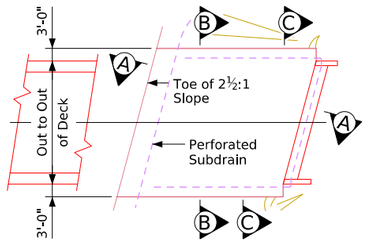
Final Construction Section A-A



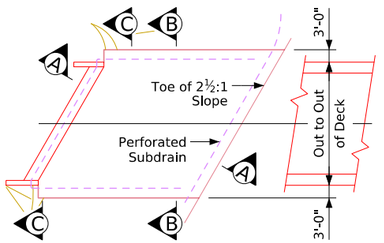
Longitudinal Section Along ℄ Roadway



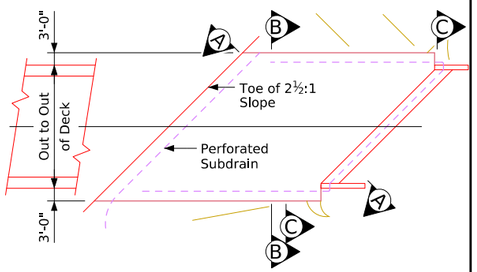
Slope Protection Layout 0° Skew



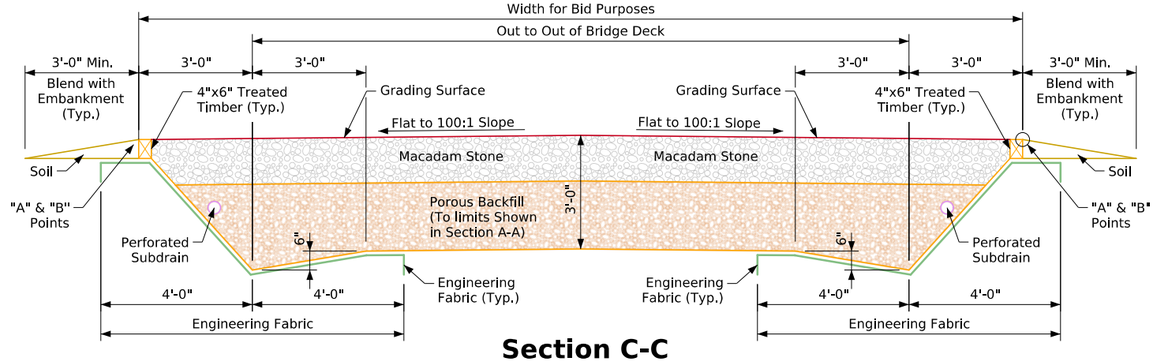
Slope Protection Layout 15° Skew



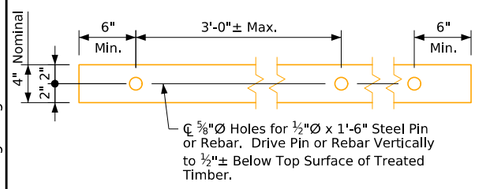
Slope Protection Layout 30° Skew



Slope Protection Layout 45° Skew



Section C-C



4"x6" Treated Timber Edging Details

General Notes:

This plan sheet shows details for placing a macadam stone slope protection under overhead structures.

The bridge berm foreslope shall be compacted and shaped as shown on this sheet. Shaping will include excavation from the grading surface shown on the situation plan and as directed by the Engineer. The berm foreslope shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications. If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform depth and density and provide uniform surface appearance.

Payment for bid item "Macadam Stone Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard shall include all costs for material and labor required to construct the slope protection shown on these plans.

The berm foreslope shaping and compacting and the disposal of excess soil from shaping or trenching shall be considered incidental to placing the slope protection.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. ??.

Estimated Quantities

Description	Location	Quantity
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
Macadam Slope Protection	?? Abut.	?.? Sq. Yds.
	Total	?.? Sq. Yds.

Items to be included in "Macadam Stone Slope Protection":
Excavating, Shaping and Compacting
Engineering Fabric
Macadam Stone
4"x6" Treated Timber Edging
½"Ø Steel Pins (or Rebar)
Porous Backfill or Granular Subbase Backfill at Front Face Abutment Footing

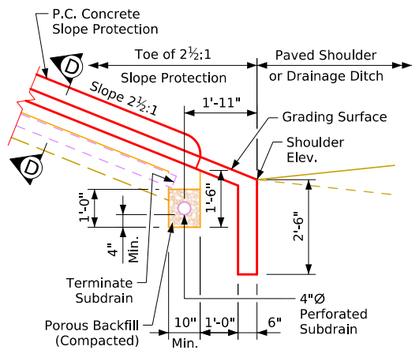
Macadam Stone Slope Protection

Revised 10-12 - Located the "A" and "B" Points in Section A-A & Final Construction Section A-A Details.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
ForeSlopeProtectionBridges.dgn - 1006E - This Sheet Issued 09-16-92.
ForeSlopeProtectionBridges.dgn - 1006E - This Sheet Redrawn 07-23.

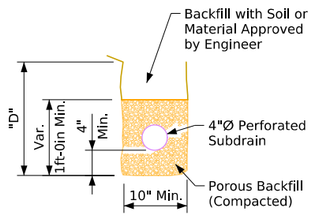
FILE NO.	ENGLISH	DESIGN TEAM	Macadam Stone Slope Protection - Integral Abutment - 2 Span	Standard Sheet 1006E	COUNTY	PROJECT NUMBER	SHEET NUMBER	

7:21:09 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

Control Point: ??

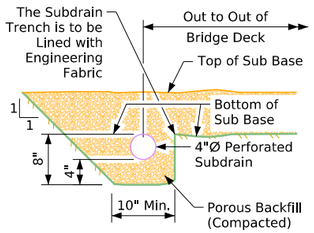


Section B-B

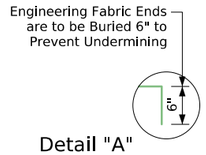


Section C-C (Typical)

"D" = Depth Required to Provide Proper Flow Line for Subdrain.



Section D-D (Typical)



Detail "A"
Engineering
Fabric Detail

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

The subdrain outlet shall consist of 6'-0" length of pipe with a removable rodent guard as detailed on this sheet.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

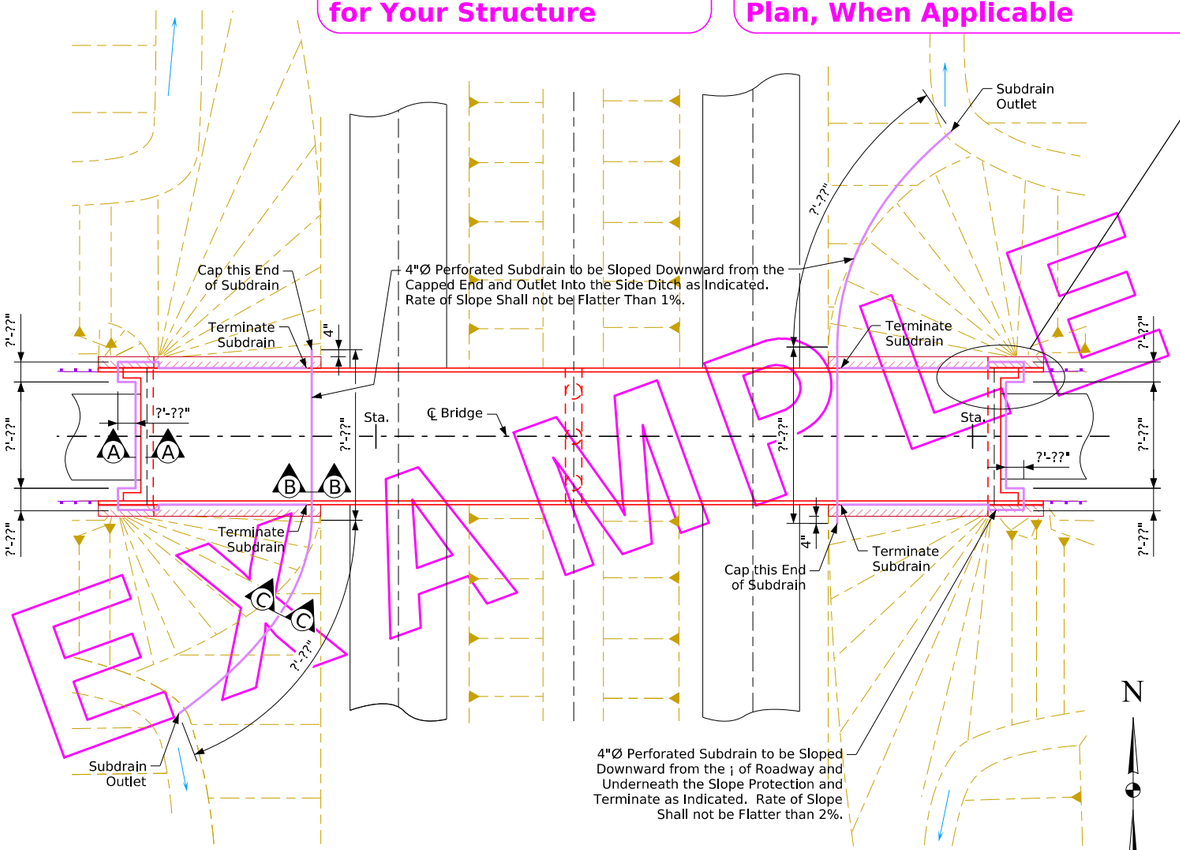
The uphill end of the perforated subdrain at the toe of slope protection shall be capped as approved by the Engineer.

The porous backfill and subdrain are to be carried around pier columns if the column placement interferes with alignment of subdrain as shown on this sheet.

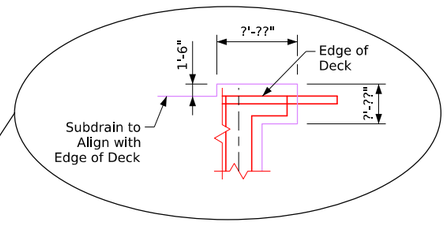
Note: Section A-A is shown on Abutment Backfill Details Sheet on Design Sheet No. ??.

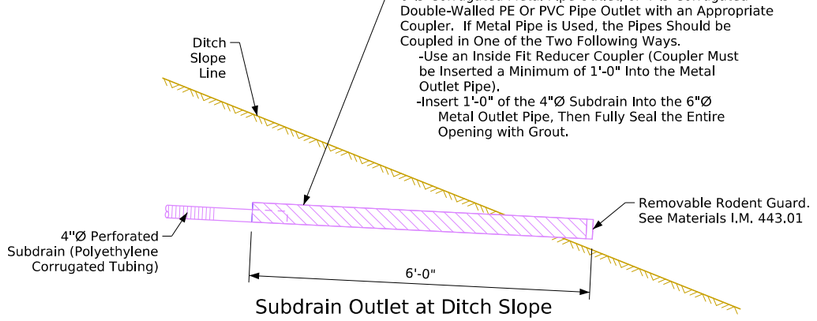
Note to Detailer: Provide Situation Plan and Specific Subdrain Length for Your Structure

Note to Detailer: Show Deck Drain Locations and Splash Basin Details on this Situation Plan, When Applicable

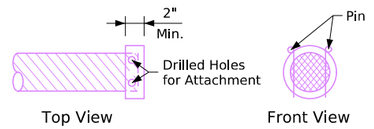


Situation Plan
Showing Subdrain Locations





Subdrain Outlet at Ditch Slope



Removable Rodent Guard Details

Outlet Details

Subdrain Outlet Elevations

Location	Elevation
Toe of ? Berm	???.?
Toe of ? Berm	???.?

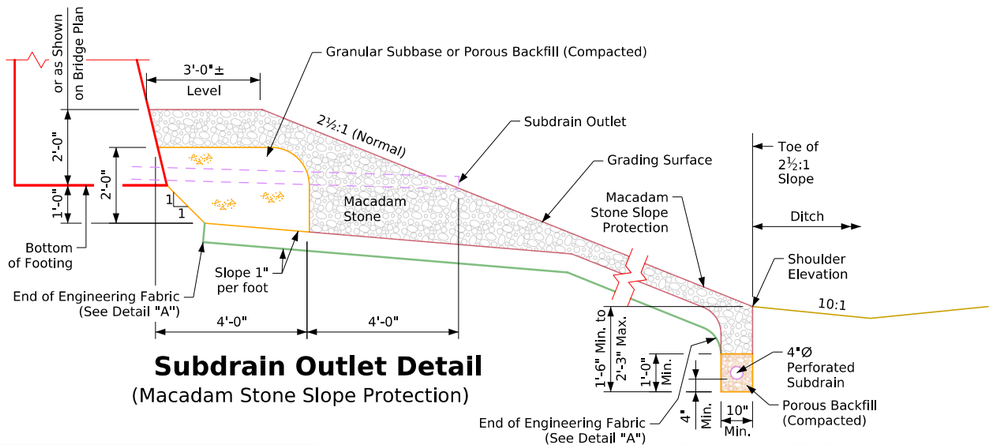
Subdrain Details

FILE NO.	ENGLISH	DESIGN TEAM	Subdrain Details for Concrete Slope Protection	Standard Sheet 1007	COUNTY	PROJECT NUMBER	SHEET NUMBER	

7:21:10 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

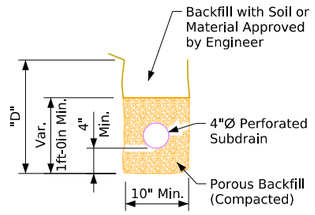
Revised 07-11 - The Berm Slope is identified as the Grading Surface in Section B-B.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
Revised 06-2024: Corrected the 1'-0" horizontal dimension to the Porous Backfill dimension in Section B-B (was showing a dual dimension of 12").
ForeSlopeProtectionBridges.dgn - 1007 - This Sheet Issued 12-07-98.
ForeSlopeProtectionBridges.dgn - 1007 - This Sheet Redrawn 07-23.
Changed Control Point text (was Bench Mark).

Control Point: ??



Subdrain Outlet Detail
(Macadam Stone Slope Protection)

Section B-B



Section C-C (Typical)

"D" = Depth Required to Provide Proper Flow Line for Subdrain.

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

The subdrain outlet shall consist of 6'-0" length of pipe with a removable rodent guard as detailed on this sheet.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

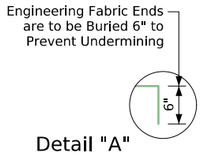
The uphill end of the perforated subdrain at the toe of slope protection shall be capped as approved by the Engineer.

The porous backfill and subdrain are to be carried around pier columns if the column placement interferes with alignment of subdrain as shown on this sheet.

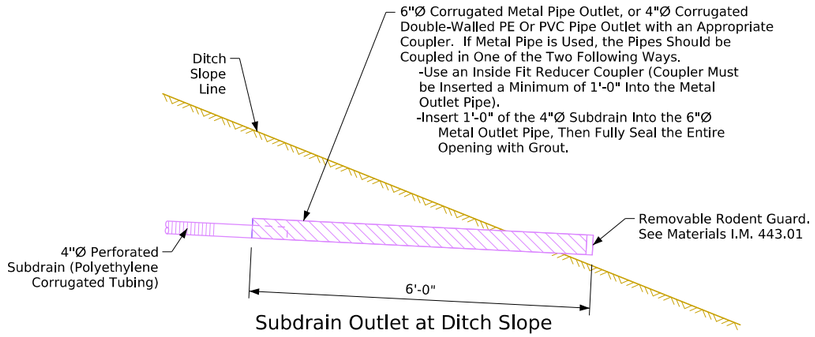
Note: Section A-A is shown on Abutment Backfill Details Sheet on Design Sheet No. ??.

Note to Detailer: Provide Situation Plan and Specific Subdrain Length for Your Structure

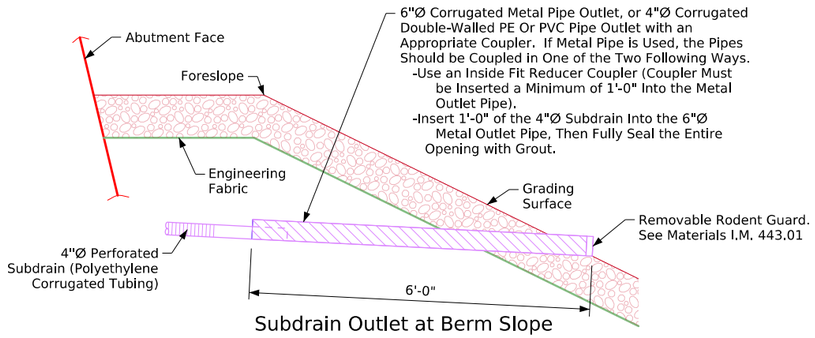
Note to Detailer: Show Deck Drain Locations and Splash Basin Details on this Situation Plan, When Applicable



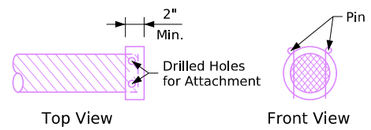
Detail "A"
Engineering Fabric Detail



Subdrain Outlet at Ditch Slope

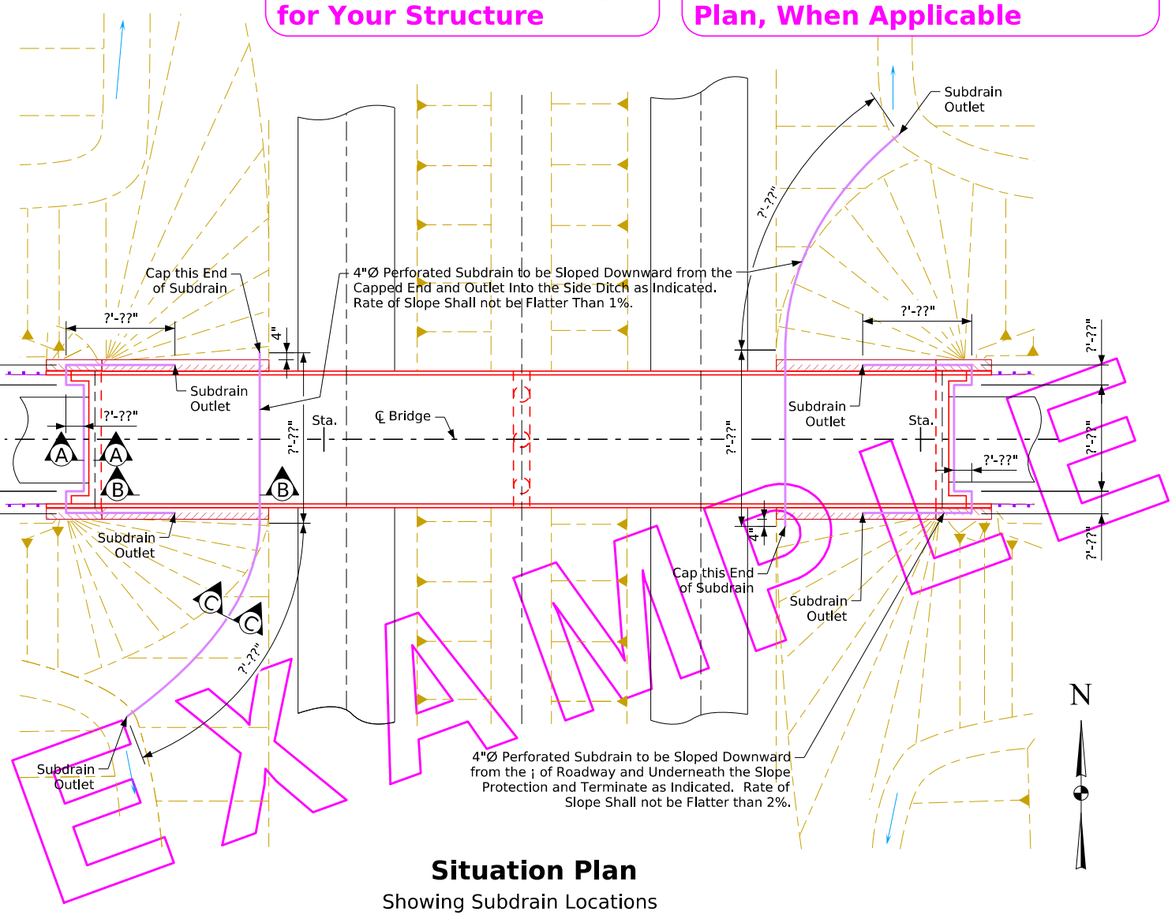


Subdrain Outlet at Berm Slope



Removable Rodent Guard Details

Outlet Details



Situation Plan
Showing Subdrain Locations

Subdrain Outlet Elevations

Location	Elevation
? Abutment	???.?
Toe of ? Berm	???.?
? Abutment	???.?
Toe of ? Berm	???.?

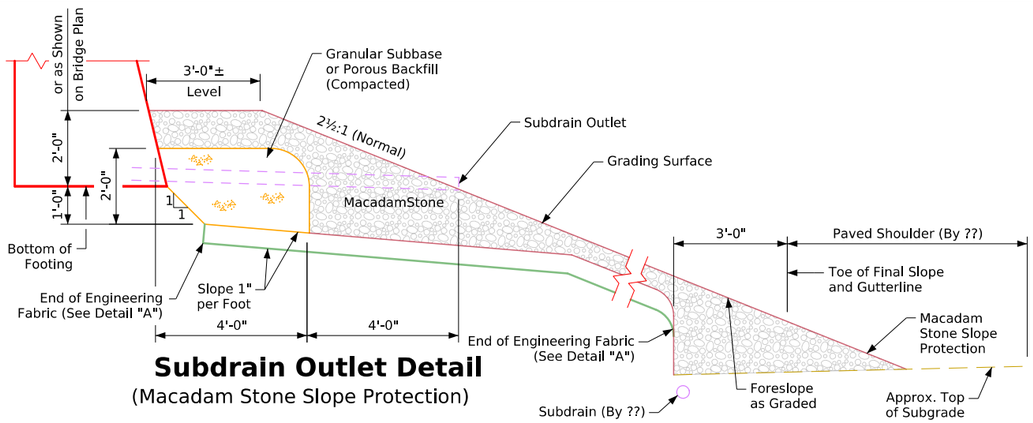
Subdrain Details

Revised 07-11 - The Berm Slope is Identified as the Grading Surface.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
Revised 06-2024: Added leader line locations to Engineering Fabric in Section B-B. Changed Control Point text (was Bench Mark).
ForeSlopeProtectionBridges.dgn - 1007A - This Sheet Issued 06-02.
ForeSlopeProtectionBridges.dgn - 1007A - This Sheet Redrawn 07-23.

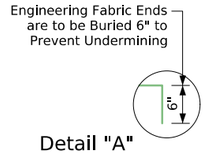
FILE NO.	ENGLISH	DESIGN TEAM	Subdrain Details for Macadam Stone Slope Protection	Standard Sheet 1007A	COUNTY	PROJECT NUMBER	SHEET NUMBER	

7:21:11 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn

Control Point: ??



Subdrain Outlet Detail
(Macadam Stone Slope Protection)



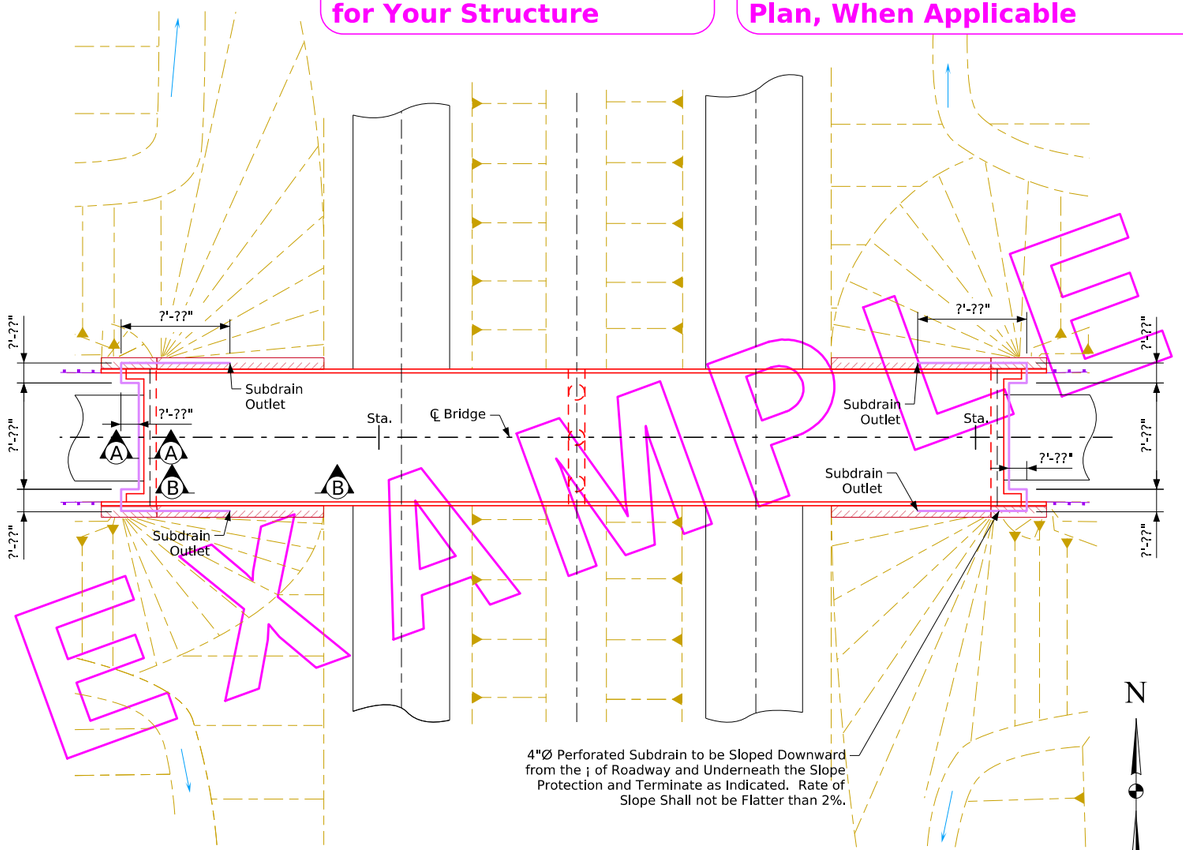
Detail "A"
Engineering Fabric Detail

Section B-B

Note: Section A-A is shown on Abutment Backfill Details Sheet on Design Sheet No. ??.

Note to Detailer: Provide Situation Plan and Specific Subdrain Length for Your Structure

Note to Detailer: Show Deck Drain Locations and Splash Basin Details on this Situation Plan, When Applicable



Situation Plan
Showing Subdrain Locations

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

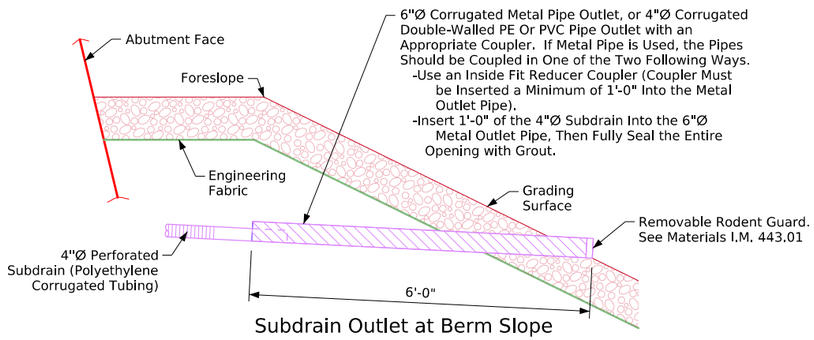
The subdrain outlet shall consist of 6'-0" length of pipe with a removable rodent guard as detailed on this sheet.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made.

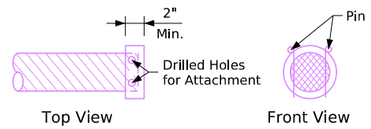
The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The uphill end of the perforated subdrain at the toe of slope protection shall be capped as approved by the Engineer.

The porous backfill and subdrain are to be carried around pier columns if the column placement interferes with alignment of subdrain as shown on this sheet.



Subdrain Outlet at Berm Slope



Removable Rodent Guard Details

Outlet Details

Subdrain Outlet Elevations

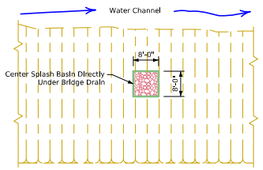
Location	Elevation
? Abutment	???.?
? Abutment	???.?

Subdrain Details

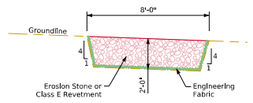
Revised 07-11 - The Berm Slope is identified as the Grading Surface.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
Revised 06-2024: Corrected leader line locations to Engineering Fabric in Section A-A. Changed Control Point text (was Bench Mark).
ForeSlopeProtectionBridges.dgn - 1007B - This Sheet Issued 06-02.
ForeSlopeProtectionBridges.dgn - 1007B - This Sheet Redrawn 07-23.

FILE NO.	ENGLISH	DESIGN TEAM	Subdrain Details for 2 Span Bridges	Standard Sheet 1007B	COUNTY	PROJECT NUMBER	SHEET NUMBER	

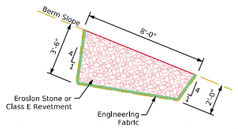
7:21:11 PM 6/12/2024 bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges.dgn



Splash Basin Under Bridge Drain Plan View



Splash Basin Under Bridge Drain Typical Section for Existing Grades



Splash Basin Under Bridge Drain Typical Section for Berm Slopes

Splash Basin Notes:

The cost of furnishing and placing splash basins (including excavation, erosion stone or Class E revetment, and engineering fabric) is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made. Total number of splash basins = ??.

Control Point: ??

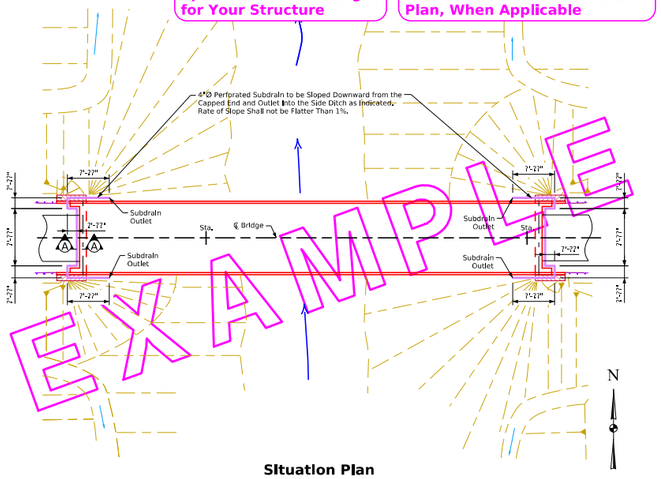
Note: Section A-A is shown on Abutment Backfill Details Sheet on Design Sheet No. ?.

Note to Detailer: Revetment Options Drawing Model is Referenced Outside of Border. Either Move Options in Place or Modify "Orientation" for Options in Reference Dialog.

Note to Detailer: For Splash Basin Details See Area Outside of Border

Note to Detailer: Provide Situation Plan and Specific Subdrain Length for Your Structure

Note to Detailer: Show Deck Drain Locations and Splash Basin Details on this Situation Plan, When Applicable



Situation Plan
Showing Subdrain Locations

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

The subdrain outlet shall consist of a length of pipe with a removable rodent guard as detailed on this sheet. The length of the outlet pipe shall be determined by the revetment and it's placement location. The Contractor is to insure the outlet pipe is adequately strong enough and will not be damaged when revetment is placed. A check will be made at the subdrain outlet to insure that the subdrain is not damaged and is draining properly during the backfill flooding process. If a metal outlet pipe is used, it shall be 6"Ø and coupled to the 4"Ø subdrain in one of the two following ways.

-Use an inside fit reducer coupler (coupler must be inserted a minimum of 1'-0" into the metal outlet pipe).

-Insert 1'-0" of the 4"Ø subdrain into the 6"Ø metal outlet pipe, then fully seal the entire opening with grout.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

Removable Rodent Guard Details

Erosion Stone (Embedded) Outlet Details

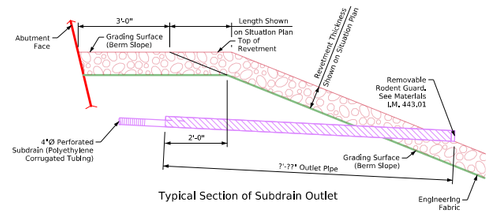
Subdrain Outlet Elevations

Location	Elevation
? Abutment	???.?
? Abutment	???.?

Subdrain Details

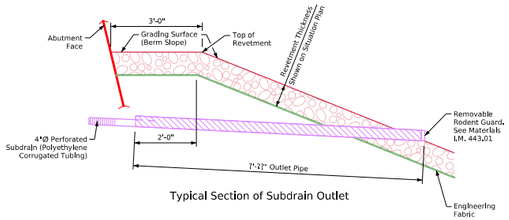
FILE NO.	ENGLISH	DESIGN TEAM	Subdrain Details for Water Crossings	Standard Sheet 1007C	COUNTY	PROJECT NUMBER	SHEET NUMBER
7:21:12 PM 6/12/2024	bkloss	pw:\\NTPwInt1_dot_Int_ian:PWMain\Documents\Highway\Bridge\Standards\Bridges\ForeSlopeProtectionBridges_d					

Revised 10-14 - Two Additional Foreslope Protection Details were Added Outside of the Border to Show Revetment up to Back of Abutment Footing.
Revised 06-2024: Changed Control Point text (was Bench Mark).
ForeSlopeProtectionBridges.dgn - 1007C - This Sheet Issued 06-02 for Water Crossings.
ForeSlopeProtectionBridges.dgn - 1007C - This Sheet Revised 07-22.



Typical Section of Subdrain Outlet

Revetment Stone (Non-Embedded) Outlet Details

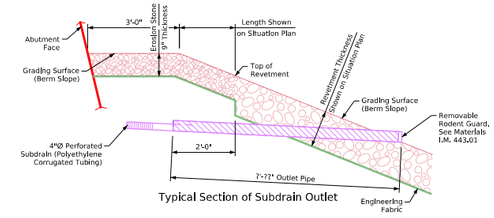


Typical Section of Subdrain Outlet

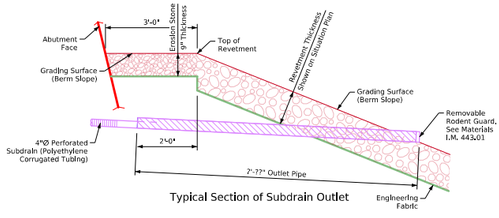
Revetment Stone (Embedded) Outlet Details

Subdrain Outlet Pipe Length		
Berm Slope	2.5:1	3:1
2" Thick Layer Class E	?.?	?.?
3" Thick Layer Class B	?.?	?.?

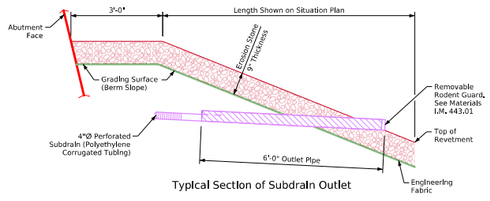
Note: When Outlet Conditions Warrant Showing 2 Subdrain Outlet Conditions Penetrating the Berm Slopes, Show Both Conditions on this Sheet, Then Show the Subdrain Location Situation Plan on a Separate Sheet.



Revetment Stone (Embedded) Outlet Details

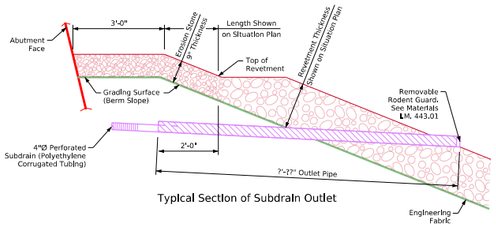


Revetment Stone (Embedded) Outlet Details



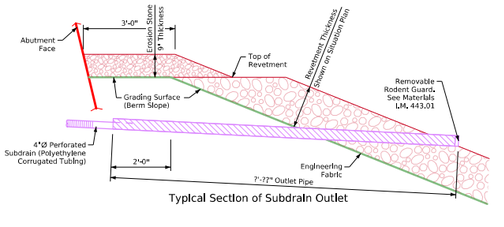
Typical Section of Subdrain Outlet

Erosion Stone (Non-Embedded) Outlet Details



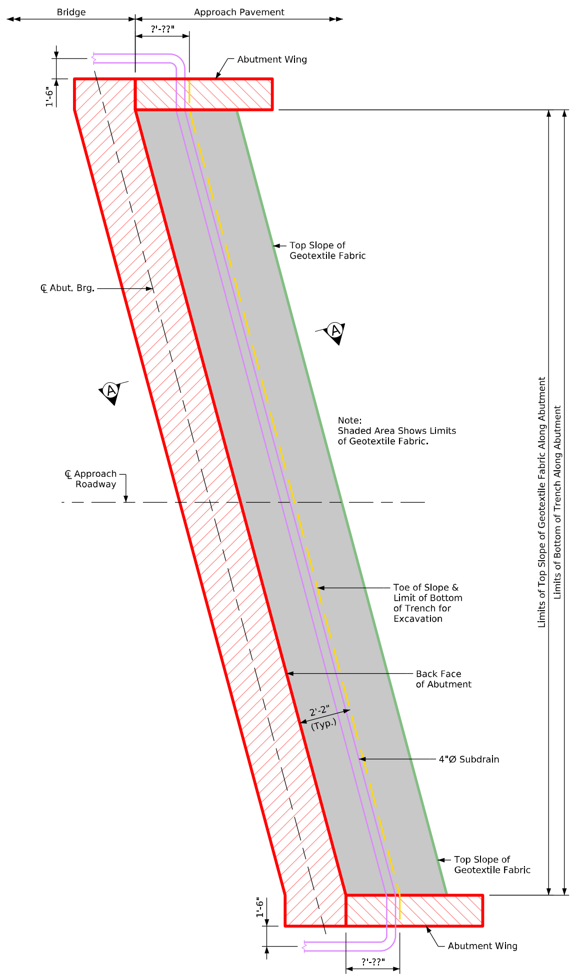
Typical Section of Subdrain Outlet

Revetment Stone (Non-Embedded) Outlet Details

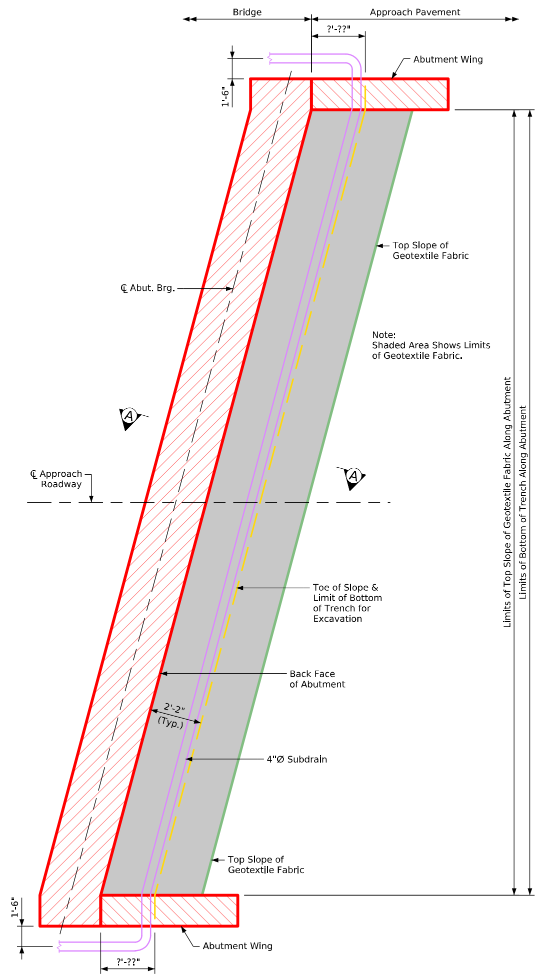


Typical Section of Subdrain Outlet

Revetment Stone (Non-Embedded) Outlet Details

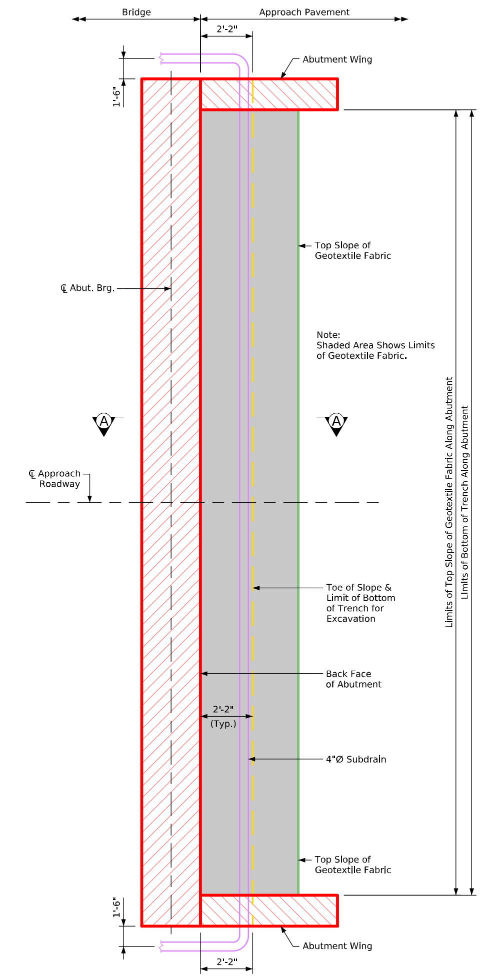


Abutment Plan without Wing Extensions



Abutment Plan without Wing Extensions

Revised 09-14 - The Technical Data Information Table was Removed and is Located in the Standard Specifications. Changed Surface Flooding Time to 5 Minute Increments.
Revised 09-16 - Changed the Bridge Approach Pavement Standard to "BR" (was "RK").
ForeSlopeProtectionBridges.dgn - 1007D - This Sheet Issued 08-07.
ForeSlopeProtectionBridges.dgn - 1007D - This Sheet Redrawn 07-23.



Abutment Plan without Wing Extensions

Note to Designer: Abutment Options Drawing Models are Referenced Outside of Border. Either Move Options in Place or Modify "Orientation" for Options in Reference Dialog.

Abutment Backfill Process:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlet. This excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been shaped, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extended vertically up the abutment backwall, abutment wing walls, and excavation face to a height that will be approximately 1 to 2 ft higher than the height of the porous backfill placement as shown in the "Backfill Details" on this sheet. The strips of the fabric placed shall overlap approximately 1 ft and shall be pinned in place. The fabric shall be attached to the abutment by using lath folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at the toe of the rear excavation slope. A slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be in accordance with the Standard Specifications. The floodable backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation. Limit the loose lifts to no more than 2 ft of thickness.

Start surface flooding for each floodable backfill lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2"Ø hose should be sprayed in successive 6 ft to 8 ft increments for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments will not be measured separately for payment.

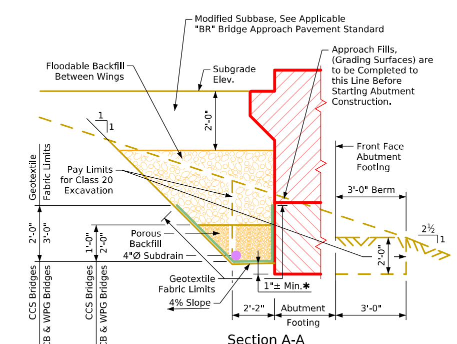
The cost of water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for "Structural Concrete".

Note:

Subdrain shall slope downward 2% from ℄ approach roadway when outletting both sides of the abutment.

Subdrain shall slope downward 2% from high end when outletting at one end of the abutment.

The geotextile fabric shall be in accordance with Article 4196.01, B, 6 of the Standard Specifications. If the engineering fabric is lapped the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.



Section A-A

Backfill Details

Note: Geotextile Fabric will be Attached to Face of Abutment Footing and Wings.

★ Dimension Varies Due to 2% Subdrain Slope.

Note:
For Details not Shown on this Sheet which are Pertinent to this Structure See Subdrain Details Sheet on Design Sheet No. ??.

Abutment Backfill Details

FILE NO.	ENGLISH	DESIGN TEAM	Granular Backfill Details for Non-wing Extension Bridges	STANDARD SHEET 1007D	COUNTY	PROJECT NUMBER	SHEET NUMBER

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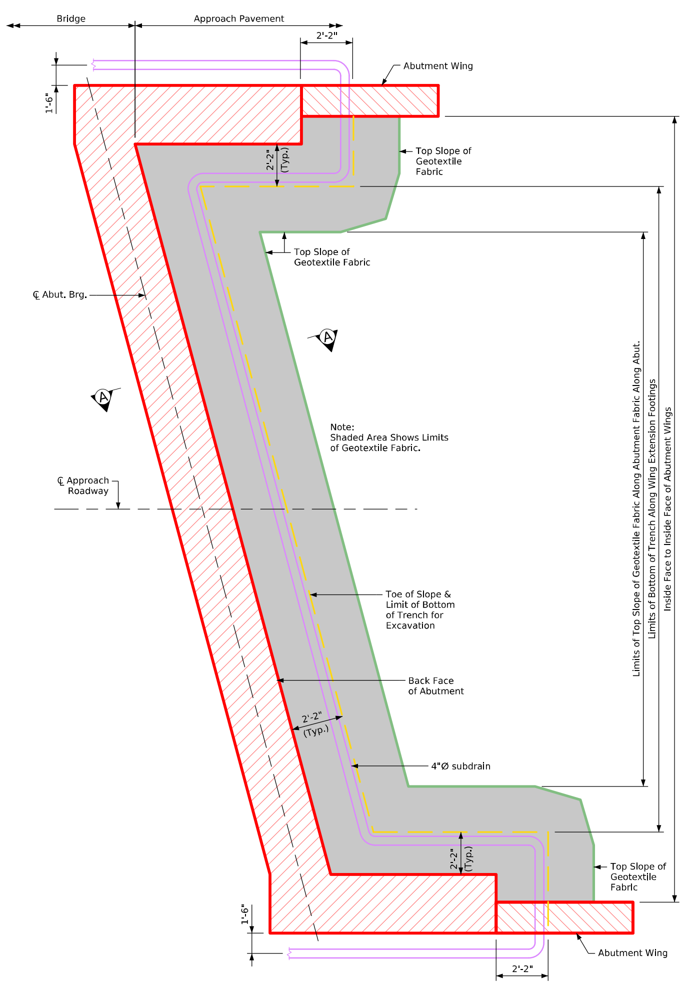
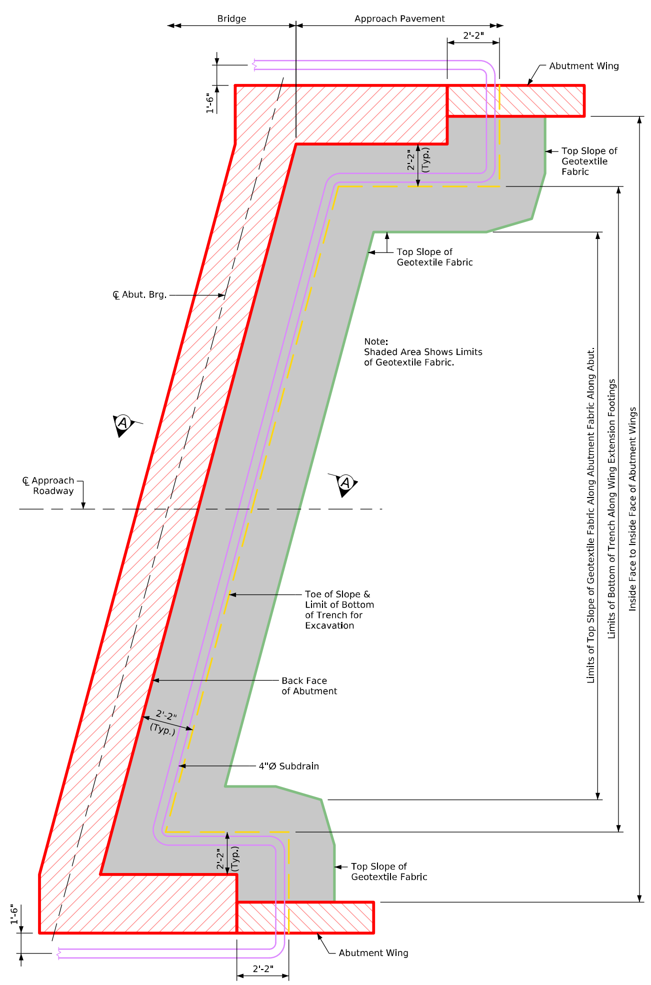
Granular Backfill Details for Non-wing Extension Bridges STANDARD SHEET 1007D

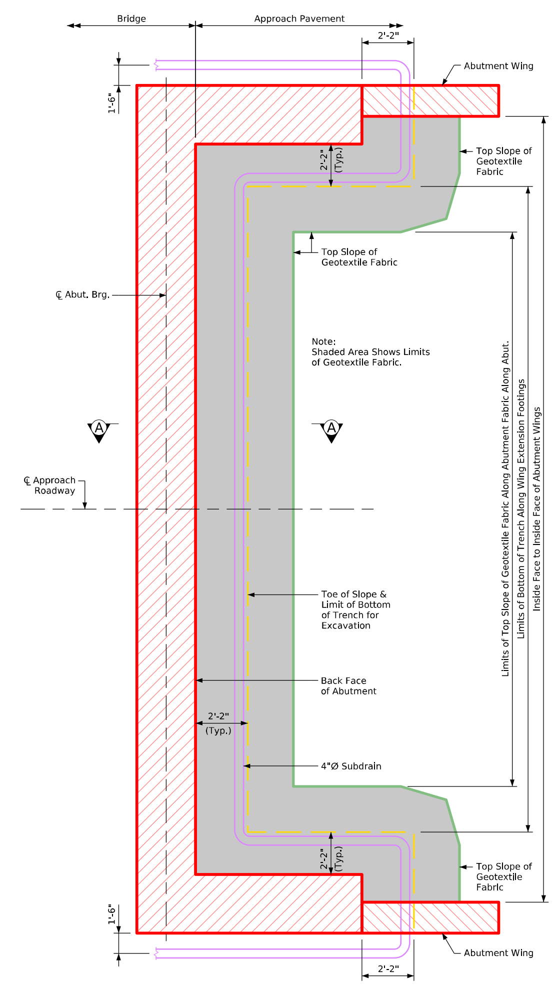


Abutment Plan with Wing Extensions



Abutment Plan with Wing Extensions

Revised 09-14 - The Technical Data Information Table was Removed and is Located in the Standard Specifications. Changed Surface Flooding Time to 5 Minute Increments.
Revised 09-2016 - Changed the Bridge Approach Pavement Standard to "BR" (WAS "RK").
ForeSlopeProtectionBridges.dgn - 1007E - This Sheet Issued 08-07.
ForeSlopeProtectionBridges.dgn - 1007E - This Sheet Redrawn 07-23.



Abutment Plan with Wing Extensions

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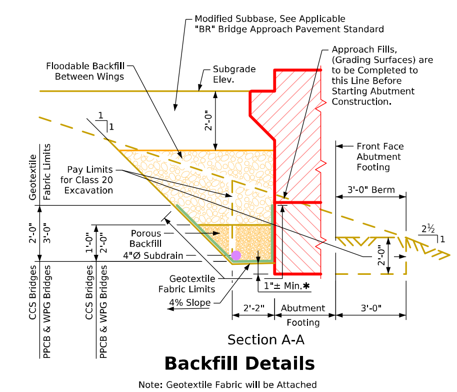

Section A-A

Backfill Details

Note: Geotextile Fabric will be Attached to Face of Abutment Footing and Wings.

★ Dimension Varies Due to 2% Subdrain Slope.

Note:
For Details not Shown on this Sheet which are Pertinent to this Structure See Subdrain Details Sheet on Design Sheet No. ??.

Abutment Backfill Details

FILE NO.	ENGLISH	DESIGN TEAM	Granular Backfill Details for Wing Extention Bridges	Standard Sheet 1007E	COUNTY	PROJECT NUMBER	SHEET NUMBER

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Granular Backfill Details for Wing Extention Bridges Standard Sheet 1007E