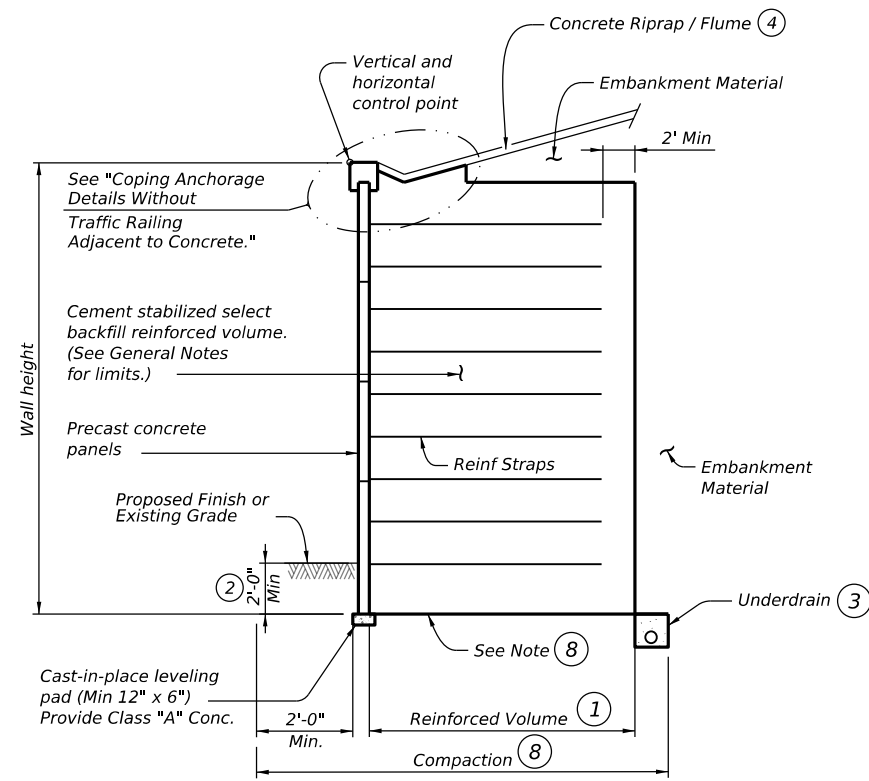


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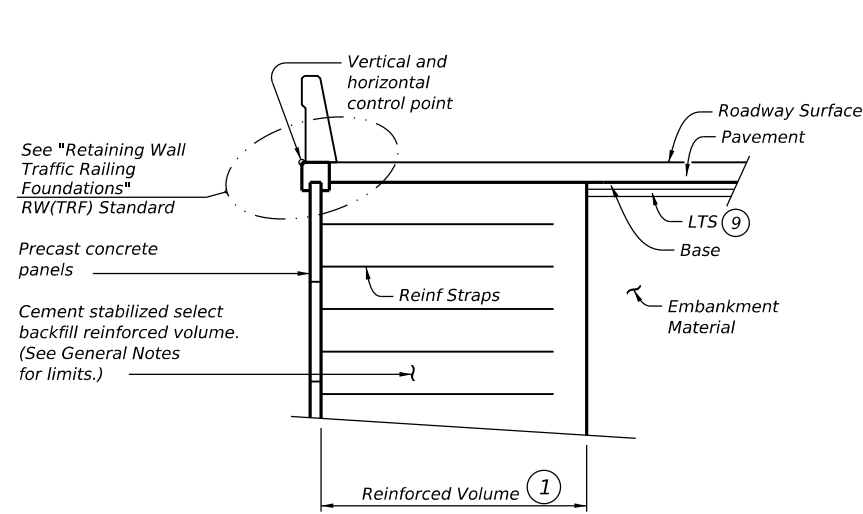


TYPICAL SECTION "A" ⑤

Section showing typical wall and top of wall at bottom of slope.

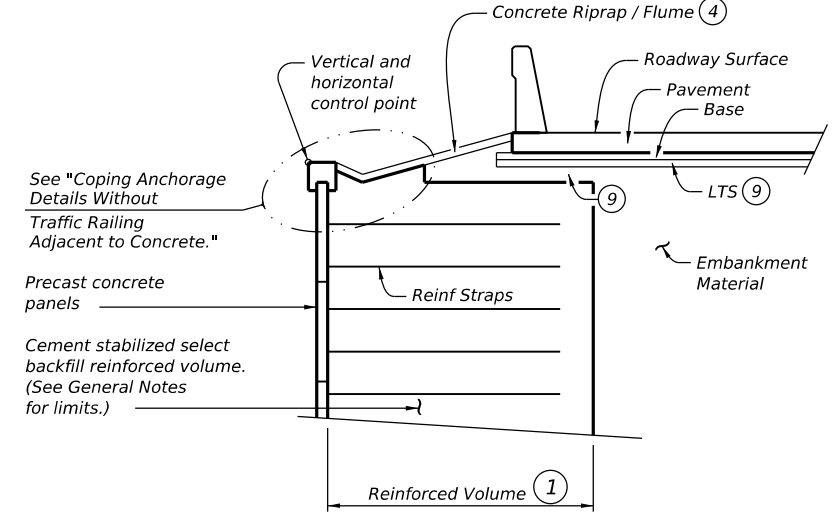
Reinforced volume consists of Cement Stabilized Backfill in accordance with Item 132 and Houston District Special Provision (132-001). Payment for this volume in excavation regions is subsidiary to Item 423 "Retaining Wall". Refer to Item 132 "Embankment" and standard RW(EM) "Earthwork Measurement at Retaining Wall" for Embankment limits to be directly paid.

Reinforced embankment volume is paid for via Item 132-7006 "EMBANKMENT (FNL)(DC)(TY C)"



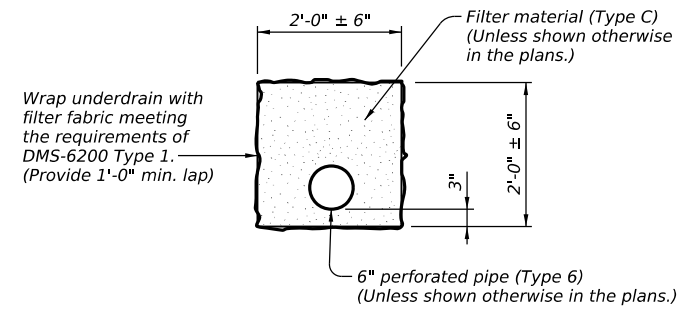
TYPICAL SECTION "B" ⑤

Section showing top of wall at pavement edge. Traffic rail may differ than shown. Refer to Typical Section "A" for details at bottom of wall.



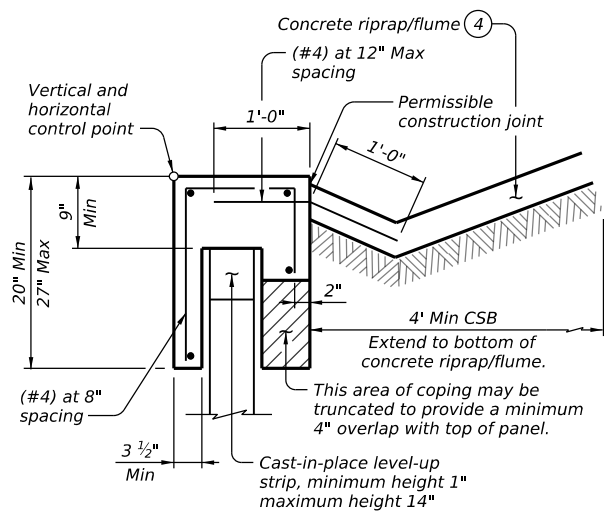
TYPICAL SECTION "C" ⑤

Section showing top of wall at bottom of slope adjacent to pavement. Traffic rail may differ than shown. Refer to Typical Section "A" for details at bottom of wall.



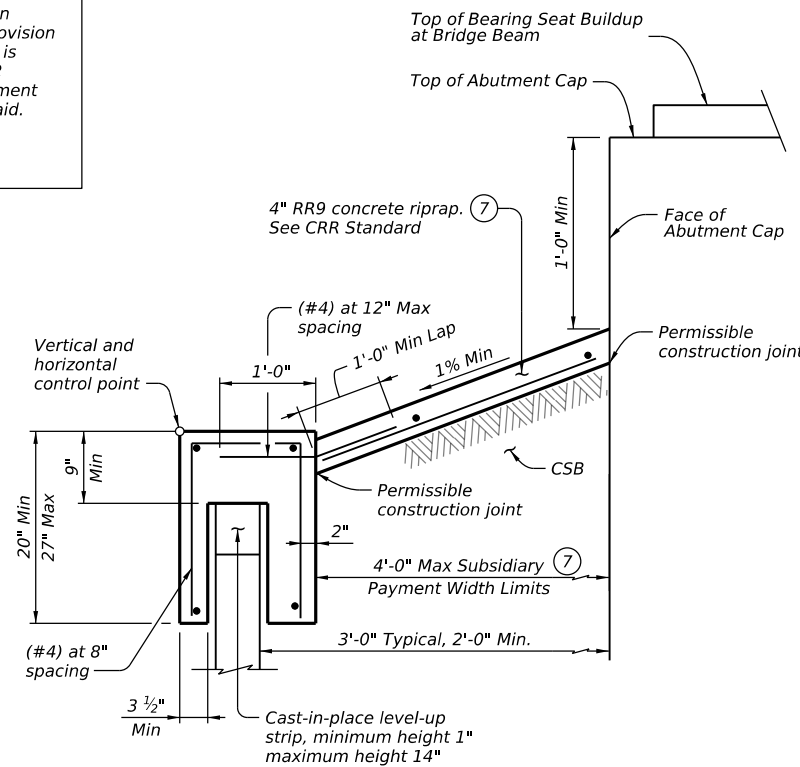
UNDERDRAIN DETAIL ③

- ① Reinforced volume dimension conforming to the designed values as shown on RW(MSE)DD standard. Dimension must not be less than the greater of 8 feet or 0.7H where "H" is the wall design height (ft) as shown.
- ② Minimum embedment conforming to values given on the RW(MSE)DD standard. Embedment must be at minimum 2 feet below finish or existing grade, whichever is lower.
- ③ Provide underdrain pipe and filter material in accordance with Item 556, "Pipe Underdrains". See drainage plans for proposed tie-in locations.
- ④ See elsewhere in the plans for the dimensions and details.
- ⑤ Typical section details as shown on this sheet supersede typical section as shown on RW-MSE(DD) standard.
- ⑥ Anchor precast coping to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Provide details that include coping reinforcement. Concrete flume (if required) is paid for separately from Item 423, "Retaining Walls."
- ⑦ Provide 4 inch thick riprap between face of abutment backwall and retaining wall coping. Refer to CRR Details. Payment for riprap flume is subsidiary to Item 423, "Retaining Walls" while beneath bridge, adjacent to abutment cap, and when design width dimension does not exceed 4 feet as shown on section. Bridges with sloped embankment dimensions exceeding limits shown are paid for completely via Item 432 "Riprap".
- ⑧ Compact soil beneath the leveling pad, reinforced volume, underdrain, and a minimum of 2 feet in front of the leveling pad to a minimum of 98% of the maximum dry density, as presented in test method TEX-114-E. The density testing of the soil is outlined in test method TEX-115-E. Payment for compaction is subsidiary to Item 423 "Retaining Wall."
- ⑨ Provide lime treatment if shown on roadway plans only over embankment fill. Do not provide lime treatment directly above reinforcement volume or cement stabilized embankment backfill.



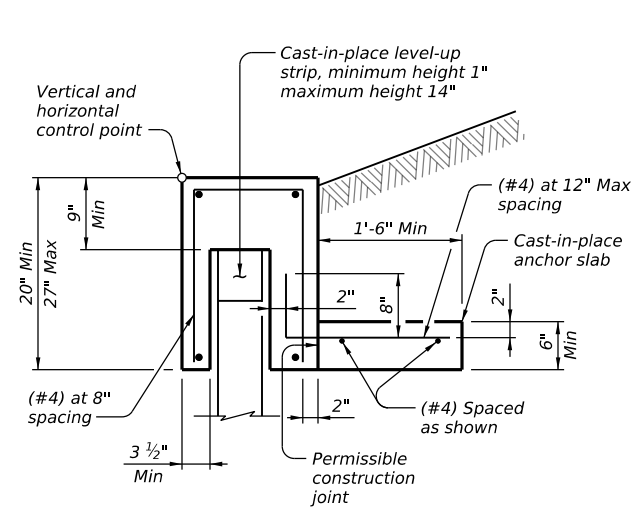
ADJACENT TO CONCRETE RIPRAP

Do not use with concrete pavement.



ADJACENT TO BRIDGE ABUTMENT

Showing section beneath bridge



ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING ⑥

Refer to "Retaining Wall Traffic Railing Foundation RW(TRF)" for locations requiring traffic rail as shown on Typical Section "B"

MECHANICALLY STABILIZED RETAINING WALL CEMENT STABILIZED BACKFILL

MSRW-CSB-25(HOU)

FILE: MSRW-CSB-25 (HOU).DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12/2025 - LRFD, Match BRG DIV Details	DIST	COUNTY		SHEET NO.

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DESIGN CRITERIA NOTES:

Design Soil Parameters:
 Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Foundation Soil	$\phi = 13$ C = 0 psf
Embankment Behind Cement Stabilized Select Backfill	Unit Weight = 125 pcf $\phi = 30^\circ$ C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf $\phi = 45^\circ$ C = 0 psf

Limit stress in steel and concrete in accordance with with AASHTO LRFD Bridge Design Specifications.
 The minimum length of earth reinforcement are as shown on the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard. This length must not be less than the greater of 8ft or 0.7H where "H" is the wall design height (ft) as shown.

Load Parameters:
 Base design of retaining walls on the following load combinations and load factors in accordance with AASHTO LRFD Bridge Design Specifications. All required checks should be complete as per the Strength Limit State.

LOAD TYPE	SYMBOL	STRENGTH I	
		MAX	MIN
Vertical Earth Load (EV)	Y_{EV}	1.35	1.00
Active Horizontal Earth Pressure (EH)	Y_{EH}	1.50	0.90
Earth Surcharge (ES)	Y_{ES}	1.50	0.75
Live Load Surcharge (LS)	Y_{LS}	1.75	

Stability Criteria:
 Stability criteria applies to both dry and drawdown analysis. Investigate MSE wall stability in accordance with AASHTO LRFD Bridge Design Specifications and the TxDOT Geotechnical Manual - LRFD.
 Perform external stability checks at the Strength Limit State.
 Perform internal stability including soil reinforcement pullout resistance, soil reinforcement tensile resistance, and face elements structural resistance at Strength Limit State.
 Base design on the following resistance factors.

STABILITY MODE	RESISTANCE FACTOR
Sliding	1.00
Bearing	0.65
Pullout Resistance (Steel reinforcement)	0.90
Tensile Resistance (Steel strips reinforcement)	0.75
Tensile Resistance (Steel grid reinforcement)	0.65

Check maximum, minimum, and total extremes for the walls to identify critical loading.
 Neglect soil passive resistance from in front of the wall for sliding stability.
 Determine Capacity / Demand (C/D) against sliding, limiting eccentricity, bearing, and internal stability.
 If C/D is not greater than 1, revise the reinforcement length or other design parameters and repeat the process.
 Design the wall such that the base pressure resultant falls within the middle half of the retaining wall where $e_{max} = L/4$.
 Determine pullout resistance from test data evaluated as per AASHTO LRFD Bridge Design Specifications.

Corrosion Criteria:
 Design the earth reinforcement elements to have a minimum design life of 75 years, using current AASHTO corrosion rates.
 Perform stress calculations (rupture) on the calculated earth reinforcement section remaining after 75 years.
 Pullout calculations may be based on non-corroded section.

13 Soil design parameters must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

LEGACY DESIGN METHODS (PRE LRFD):

Use the following external stability criteria only for projects which have been permitted to use the TxDOT Geotechnical Manual (Version 2020 and earlier)

STABILITY MODE	FACTOR OF SAFETY (LEGACY)
Sliding	1.50
Bearing	2.00
Overturning	2.00
Earth reinforcement (each level) 14	1.50

Ensure the base pressure resultant falls within the middle third of the wall.

14 Determine pullout resistance at 3/4 inch strain.

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Provide precast coping in 10 foot minimum lengths (typical.) To optimize coping lengths at radiuses, ends of runs, or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping. Attach compressible material to both sides of precast panel prior to casting the concrete coping.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

PANELS:

Fabricate standard precast concrete panels to a maximum height of 6 feet and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel must not exceed 7'-6". Provide a minimum panel thickness of 5 inches. Arrange panels to provide offset horizontal joints.
 Provide an open joint around the perimeter of the concrete panels. Configure joints such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between 3/8 inch and 3/4 inch.
 Provide a one-piece corner panel for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

MEASUREMENT & PAYMENT NOTES:

Railings, roadway pavement, and embankments are paid for under pertinent items. Additional modifications to the rail or roadway pavement to form coping are subsidiary to Item 423, "Retaining Wall".

Coping and anchor slabs are considered subsidiary to Item 423, "Retaining Walls."

Provide underdrains and sand chimneys only at locations shown on the plans. The cost of furnishing and installing underdrains is subsidiary to the the unit cost of Item 423, "Retaining Wall".

Reinforced volume consists of Cement Stabilized Backfill in accordance with Item 132 and Houston District Special Provision (132-001). Provide volume per the limits shown on these sheets as well as limits shown on RW(MSE)DD. Payment for this volume in excavation regions is subsidiary to Item 423 "Retaining Wall". Refer to Item 132 "Embankment" and standard RW(EM) "Earthwork Measurement at Retainingwall" for Embankment limits to be directly paid. Reinforced embankment volume is paid for via Item 132-7006 "EMBANKMENT (FNL)(DC)(TY C)"

Payment height shown in retaining wall layouts is considered the minimum height to be furnished. Additional wall furnished below payment line due to detailing or fabricator design requirements will not be paid for directly but is considered incidental.

EARTH REINFORCEMENT:

Provide earth reinforcement with a minimum wire size of W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire must be at least 50% of the cross sectional area of the larger wire.
 A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Provide unique transverse bar spacing for each mesh configuration, differing from other configurations by a minimum of 3 inches. Step earth reinforcement lengths in increments no finer than 12 inches.
 Place the uppermost reinforcement straps no more than 3'-6" inches below the top of the wall. Place the lowest level of reinforcement straps no more than 2 feet above the top of the leveling pad.

MATERIAL NOTES:



Provide Class C concrete for reinforced concrete and precast coping.
 Provide Class H concrete for precast concrete panels.
 Provide Class A concrete for unreinforced concrete.
 Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Determine specific geometry based on wall layouts and other plan information.
 Traffic railings shown on these details may differ. Refer elsewhere in plans for traffic rail types to be installed.
 Extend cement stabilized backfill specified for use within the mechanically stabilized earth volume horizontally from the back of the panels a minimum 2 feet beyond the end of the earth reinforcement.
 Extend cement stabilized backfill vertically to the top of the panels from either the top of the leveling pad, or from 4 inches below the lowest earth reinforcement, whichever is lower.
 Provide concrete coping along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall.
 Provide details and calculations that establish support for panels that are affected when obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcement in their normal locations. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcement, no adjustment in length is needed for skew angles less than or equal to 10 degrees. Adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall when skew angles are greater than 10 degrees. Provide calculations that justify any alterations made to the soil reinforcement or modifications to their normal placement. Do not use panels without any soil reinforcement connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting soil reinforcement attached to them and as approved by the Engineer.

Use these details in conjunction with the retaining wall layout, the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard and other applicable standards.

Cover dimensions are clear dimensions, unless noted otherwise.

			
<p>MECHANICALLY STABILIZED RETAINING WALL CEMENT STABILIZED BACKFILL</p>			
<p>MSRW-CSB-25(HOU)</p>			
FILE: MSRW-CSB-25 (HOU).DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT
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