Rough Stone Masonry Guardwall

PLAN VIEW

Impact Line

25°

64'-5 1/4" [19641]

144'-7 1/4" [44075]

2" [51] Thick Simulated Wearing Surface

Ramp

Ground

2" [51]

20'-0" [6096]

20'-0" [6096]

2"[51] Thick Simulated Wearing Surface

20'-0" [6096]

Ramp Detail

Scale 1:40

ELEVATION VIEW

150'-0 11/16" [45737]

20'-0" [6096]

19641

15'-0" [4572]

3'-8 3/16" [1122]

Midwest Roadside Safety Facility

Test Level 2 Rough Stone Masonry Guardwall

(Test No. RSMG-2)

System Layout with Asphalt/Concrete/Wood Pad and Ramp

DWG. NAME: RSMG-2v1

SCALE: 1:300

UNITS: In.[mm]

REV. BY: RKF/KAL

REV. BY: RKF/KAL

DRAWN BY: CDB/RJT/EAJ

DRAWN BY: CDB/RJT/EAJ

DATE: 1/29/2009

DATE: 1/29/2009

SHEET: 1 of 16

SHEET: 1 of 16
Notes: (1) Use a minimum of 1 ft [305] between the front edge of the foundation and the concrete cutout at the MwRSF test site.
(2) Internal steel reinforcement not shown for clarity.
Notes: (1) The capstones placed on the top of the barrier shall be kerfed to allow for their placement over the steel angle. The kerf width shall be approximately 1 to 1 1/2 in. [25 to 38] wide. The maximum kerf depth shall be 2 1/2 in. [64] although thinner kerf depths are allowed as long as all other geometries are met.

(2) The top mortar bed thickness shall range between 1/2 and 2 in. [13 and 51] for rubble stone masonry. The top capstone thickness shall range between 5 to 6 1/2 in. [127 to 165].

(3) Mortar shall fill the void region surrounding the angle’s vertical leg when the capstones are set in place.

(4) The first 36 to 38 ft [10.9 to 11.6m] of barrier shall be constructed with capstones covering the entire barrier width of 24 in. [51], thus revealing a mortar joint on the front face.

(5) The remaining barrier length shall be constructed using alternating face and top stones to meet up at the top–front corner of the barrier.

(6) For top capstone thicknesses greater than 5 7/8 in. [149], it will be necessary to chisel the bottom of the stone to form a dish to allow its placement over the heads of the Wedge–Bolt anchors.

(7) Two types of steel anchors were used to provide vertical attachment of the stone masonry to the top of the inner core wall. Type 106 corrugated Dovetail Anchor Ties (16 gauge [1.5] by 5 1/2” [140] long) were wedged under the top–mounting angles and bent upward to engage the mortar. The Type 106 Ties were spaced approximately on 2 ft [610] centers, alternating sides of the steel angles. Stainless steel (SS 304) Z–clips were also used to anchor the stone using 1/4” [6.4] diameter by 2 3/4” [70] long, heavy–weight, stainless steel Tapcon masonry anchors. The Z–clips were spaced approximately on 2 ft [610] centers, alternating sides of the steel angles, and used to engage a recess cut in the stone.

(8) Dovetail Anchor Ties shall be mill galvanized steel ASTM A653 or hot dip galvanized ASTM A153.
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Test Level 2 Rough Stone Masonry Guardwall
(Test No. RSMG-2)
Rebar Placement

ELEVATION VIEW

PLAN VIEW
Note: (1) Vertical stirrup locations shown on elevation view only.
Notes: (1) The open channels in the Dovetail Anchor Slots are 1"x1"x5/8" [25x25x16] and are foam filled to protect slot during concrete forming and placement.

(2) Two Type 106 Dovetail Anchor Ties shall be placed in each Dovetail Anchor Slot to attach the rubble stone masonry to the front face of the inner core wall.

(3) Bend at least 25 percent of Dovetail Anchor Ties at a short right angle to engage a recess cut in the stone. Extend the anchors to within 3 in. [76] of the exposed face of the stone work.
Note: (1) Vertical stirrup locations shown on elevation view only.
Note: (1) Vertical stirrup locations shown on elevation view only.
Test Level 2 Rough Stone Masonry Guardwall
(Test No. RSMG-2)

Rebar Details

Midwest Roadside Safety Facility

#5 Straight Rebar
Part a1

3'-0"
[914]

#5 Straight Rebar
Part a2
SCALE 1 : 30

20'-0"
[6096]

R2"
[91]

2'-0 7/8"
[632]

#5 Bent Rebar
Part a3

9 3/4"
[248]

9 3/4"
[248]

R2"
[91]

12 1/2"
[318]

R2"
[91]

R2"
[91]

5/8"
[16]

5/8"
[16]
Notes:

1. The finish for the Dovetail Anchor Slots shall be mill galvanized steel ASTM A653, hot dip galvanized steel ASTM A153, or Class B2 depending upon the material selected.

2. Two Dovetail Anchor Ties shall be used with each Dovetail Anchor Slot in order to attach the rubble stone masonry to the face of the inner concrete core wall. Type 106 (16 gauge [1.5] by 5 1/2" [140] long) Dovetail Corrugated Anchors shall be mill galvanized steel ASTM A653 or hot dip galvanized ASTM A153.

3. Bend at least 25 percent of anchor ties at a short right angle to engage a recess cut in the stone. Extend the anchors to within 3 in. [76] of the exposed face of the stone work.
Angle Details

Notes:

1. Angles are used to provide lateral shear resistance for the rubble stone masonry placed on top of the inner core wall.

2. Spacing between all angles is approximately 1/2" [13].

3. Interior steel angles are attached with Wedge–Bolt anchors. Interior anchors are centered between stirrups. End anchors on interior angles are placed between stirrups, but not centered since an anchor from the adjacent angle must also be placed within the same stirrup span.

Test Level 2 Rough Stone Masonry Guardwall
(Test No. RSMG–2)

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RSMG–2v1

Notes:

1. Angles are used to provide lateral shear resistance for the rubble stone masonry placed on top of the inner core wall.

2. Spacing between all angles is approximately 1/2" [13].

3. Interior steel angles are attached with Wedge–Bolt anchors. Interior anchors are centered between stirrups. End anchors on interior angles are placed between stirrups, but not centered since an anchor from the adjacent angle must also be placed within the same stirrup span.
DETAIL M

304 Stainless Steel Z-Clip
Part a11
SCALE 2 : 3

Test Level 2 Rough
Stone Masonry Guardwall
(Test No. RSMG-2)
Hole and Wedge-Bolt
Dimensions

Wedge-Bolt Anchor
Part a10

Midwest Roadside
Safety Facility
Test Level 2 Rough Stone Masonry Guardwall
(Test No. RSMG-2)
System Isometric View
<table>
<thead>
<tr>
<th>Item No.</th>
<th>QTY.</th>
<th>Description</th>
<th>Material Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>a1</td>
<td>55</td>
<td>#5 Straight Rebar, 3' [914] long</td>
<td>Grade 60</td>
</tr>
<tr>
<td>a2</td>
<td>40</td>
<td>#5 Straight Rebar, 20' [6096] long</td>
<td>Grade 60</td>
</tr>
<tr>
<td>a3</td>
<td>55</td>
<td>#5 Bent Rebar</td>
<td>Grade 60</td>
</tr>
<tr>
<td>a4</td>
<td>35</td>
<td>Dovetail Anchor Slot 21&quot; [533] long (22 gauge [0.8])-Galvanized</td>
<td>ASTM A1008, A109, or A1011</td>
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<tr>
<td>a5</td>
<td>2</td>
<td>Dovetail Anchor Slot 11&quot; [279] long (22 gauge [0.8])-Galvanized</td>
<td>ASTM A1008, A109, or A1011</td>
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<tr>
<td>a6</td>
<td>11</td>
<td>5x3x1/2&quot; [127x76x13] Interior Angle</td>
<td>Galvanized, ASTM A36 Steel</td>
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<tr>
<td>a7</td>
<td>111</td>
<td>Dovetail Anchor Tie (16 gauge by 5 1/2&quot; long by 1&quot; wide)</td>
<td>Galvanized Steel</td>
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<tr>
<td>a8</td>
<td>1</td>
<td>5x3x1/2&quot; [127x76x13] Upstream End Angle</td>
<td>Galvanized, ASTM A36 Steel</td>
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<tr>
<td>a9</td>
<td>1</td>
<td>5x3x1/2&quot; [127x76x13] Downstream End Angle</td>
<td>Galvanized, ASTM A36 Steel</td>
</tr>
<tr>
<td>a11</td>
<td>37</td>
<td>Z-Clips</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>a12</td>
<td>37</td>
<td>Heavy-Weight, Tapcon Masonry Anchors – 1/4&quot; [6.4] Diam. x 2 3/4&quot; [70] long</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>b1</td>
<td>1</td>
<td>3'-6&quot; x 74'-4&quot; x 6&quot; [1.1mx22.7mx152mm] Aggregate Base</td>
<td>Aggregate</td>
</tr>
<tr>
<td>b2</td>
<td>1</td>
<td>Concrete Corewall Base</td>
<td>f'c = 3,500 psi [24.1 MPa]</td>
</tr>
<tr>
<td>b3</td>
<td>1</td>
<td>Concrete Corewall Top</td>
<td>f'c = 3,500 psi [24.1 MPa]</td>
</tr>
<tr>
<td>c1</td>
<td>1</td>
<td>Rough Stone Masonry Facade (Rubble Masonry)</td>
<td>Sound, Durable Rock with Mortar</td>
</tr>
<tr>
<td>c2</td>
<td>1</td>
<td>Mortar Bed – PROMIX Stone Veneer Mortar conforming to ASTM C-270 Type S Specifications</td>
<td>FHWA Section 712.05(a)</td>
</tr>
</tbody>
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