SECTION _____
Mechanically Stabilized Earth (MSE) Retaining Walls

1.1 **General** – The MSE wall design and submittals shall be in accordance with AASHTO LRFD Bridge Design Specifications 4th Edition 2007 (2009 Interim), AASHTO LRFD Bridge Construction Specifications 2nd Edition 2004 (2007 Interim), or as noted in this specification. Only inextensible reinforced systems shall be used for this project.

1.2 **Systems** - The approved MSE retaining wall system for the project is KeySystem™ I by Keystone Retaining Wall Systems, Inc.

2.1 **Components** - MSE segmental retaining wall (SRW) units shall conform to ASTM C1372 with a minimum 28-day compressive strength of 4000 psi (28 MPa). The color shall be concrete gray and the face finish shall be a sculptured rock finish in an angular tri-planar configuration with a minimum 1-1/2" (35 mm) relief on each face unit unless otherwise shown on the plans.

3.1 **Design** - To further clarify the Owner's intent, the following additions and/or clarifications of AASHTO shall apply:

1. The minimum reinforcement shall length shall be the greater of 8 feet (2.4 m) or 0.7H. All reinforcement shall be the same length in a single section (no short intermediate reinforcement).
2. The minimum wall embedment at the toe shall be in accordance with FHWA NHI-00-043 with an absolute minimum of 2.0 feet (600 mm) measured from the top of the leveling pad to finished grade at the toe.
3. The Meyerhof Coherent Gravity Method or Simplified Method, using K/Ka factors based on the system's stiffness at the end of the service life of the wall, shall be used for internal design.
4. The tensile stress resistance factor shall be 0.75.
5. The reinforced backfill shall comply with AASHTO Bridge Construction Specifications, Section 7.3.6.3 and the maximum particle size shall be 4.0 inches (100 mm).

3.2 **Design Parameters** – Unless otherwise shown on the plans the following design parameters shall be used:

1. The following load factors shall be used:
   i. For Strength I and Extreme I load combinations.

Designation	Maximum	Minimum
EH (Horizontal Earth)	1.50	0.90
EV (Vertical Earth and Slope Wt.)	1.35	1.00
ES (Dead Load)	1.50	0.75

   ii. The load factors for live loads shall be 1.75 and 0.50 for Strength I and Extreme I load combinations respectively.
2. The following resistance factors shall be used:
   i. For Strength I and Extreme I load combinations, 1.0 shall be used for sliding, soil to soil and soil to reinforcement.
   ii. For tensile and pullout resistance, 0.90 and 1.20 shall be used for Strength I and Extreme I load combinations respectively.
3. Eccentricity, e shall be < B/4
4. Design life ≥ 75 years
5. The design shall be based on:

Soil Zone	∅'	c'	Unit weight
Reinforced	34°	0	125 pcf (19.6 kN/m3)
Retained	30°	0	120 pcf (18.8 kN/m3)

Foundation	30°	0	120 pcf (18.7 kN/m3)

6. Seismic acceleration, a_{max} = 0.00g
7. Uniform surcharge live load, q = 250 psf (12 kPa)
8. Barrier impact load, if applicable, = 500 plf (7.3 kN/m)
9. Global stability, settlement & bearing capacity are the responsibility of the Owner or the Owner's geotechnical engineer.

3.3 Submittals – Design submittals shall be made a minimum of 60 days prior to commencing construction. All design related submittals shall be signed and sealed by a professional engineer registered in the state of the project. Submittals shall include:

3. Shop drawings showing all information needed to fabricate and construct the retaining walls including:
   i. An elevation or profile view showing top and bottom of wall, finished grade and reinforcement elevations and type and length of reinforcement.
   ii. Typical cross sections for each design condition.
   iii. A plan view with each wall labeled and the beginning and end of each wall shown with ties into project stationing.
   iv. Standard and project specific details.
   v. Wall system specifications.
4. Calculations including but not limited to:
   i. Calculations for each wall section.
   ii. Calculations for determination of the allowable design strength of the reinforcement and the facing connection strength for each reinforcement used.
5. Engineer's certification that the retaining wall plans are prepared in accordance with this specification and the bid drawings.
6. Manufacturer's certifications that the components used in the wall system meet the material requirements of this specification.
7. Results of testing of the proposed backfill source documenting compliance with this specification.
8. An installation manual for the retaining wall system.

4.1 Measurement – MSE wall measurement shall be the number of square feet of wall face surface area measured from the minimum embedment line below finished grade (2.0' feet (600 mm) minimum) or the minimum grade shown on the bid plans to the top of the coping or gutter line if a traffic barrier is placed directly on the wall.

4.2 Payment – MSE wall shall be paid at the contract unit price, which shall be full compensation for furnishing and installing all materials, including face units leveling pad, excavation, reinforced backfill, soil reinforcement, coping, moment slab (if applicable), any incidentals necessary to complete the work and MSE wall design.