

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 K-8258-01	2007	168	556

**GENERAL NOTES:**

Stability of temporary construction shall be the responsibility of the Contractor. The minimum safety factor for temporary slope stability shall be 1.2.

Concrete coping at the top of all retaining walls shall be cast-in-place. Exposed surfaces of the coping shall be given a rubbed finish. There shall be a bond breaker between the cast-in-place coping and the retaining wall and concrete safety barrier. The coping shall be tied to the retaining wall following manufacturer's recommendations.

If computer programs are used to prepare the design, the output and an example of hand calculation of one of the submitted wall design sections shall be furnished.

Precast wall panels shall have a surface treatment as detailed or approved by the Engineer. The surface treatment shall be Subsidiary to the bid item "MSE-Retaining Wall".

Abutments supported by steel H-Piles will be located behind walls "B" and "E". Abutment piles shall be pre-drilled and driven by Bridge Contractor after excavating to the wall foundation elevation. Sleeves shall be installed by the wall Contractor at the abutment pile locations after the piles have been driven but prior to the construction of the Retaining wall system. The inside sleeve diameter shall be at least 450 mm but not more than 100 mm larger than the pile diagonal dimension. The abutment pile sleeve size shall be selected to resist construction and soil stresses without deleterious deformation. Abutment pile sleeves shall be Corrugated Metal Pipe (CMP) or approved equal.

The Retaining Wall shall be designed and constructed in a manner such that no additional lateral forces will be added to piles supporting the abutments.

Groundwater location varied through the project. Fluctuations of the groundwater table may occur during wall construction or at other times during the life of the structure. The Contractor shall consider the possibility of groundwater fluctuation when developing project design and plans.

Requirements for the Select Granular Backfill and Random Fill are covered in the Special Provisions.

The following products have been approved for the construction of the MSE-Retaining Walls on this project:

- Reinforced Earth
- Foster Geotechnical
- MSE Plus

The bid price per square meter for the approved MSE-Retaining Wall system as outlined in the Special Provisions shall include all costs for wall panels, leveling pad, soil reinforcing elements, coping reinforcing steel (Gr. 420), joint protection, excavation, dewatering, backfilling, trench drain with outlet pipe and all incidentals necessary to construct the MSE-Retaining Walls. The abutment pile sleeves are Subsidiary to the bid item "Steel Piles" as indicated in the Bridge Plans.

Payment will be based on wall areas which are listed above in the table "Summary of Quantities (MSE-Retaining Wall)". The estimated retaining wall area is based on the height from the top of the leveling pad to the top of the wall as indicated in the retaining wall profiles. Additional areas of retaining wall constructed to meet the convenience of constructing certain systems shall be Subsidiary to the plan quantities indicated.

\* **NOTE:** Select Granular Backfill shall be paid for as "Common Excavation Contractor Furnished".

**DESIGN SPECIFICATIONS:**

AASHTO Standard Specifications for Highway Bridges, 1996 Edition with appropriate interim Specifications. (Load Factor Design).

**CONSTRUCTION SPECIFICATIONS:**

Kansas Department of Transportation Standard Specifications for State Road and Bridge Construction, 1990 and Special Provisions.

**DESIGN LOADING:**

- Live Load** Surcharge load of 0.6 meters of earth added to the vertical stress. Barrier impact load as specified by AASHTO Section 2.7.
- Dead Load** Components of wall structure, pavement section and safety barrier.
- Other Loads** As specified by AASHTO.

**UNIT STRESSES:**

- Concrete (Grade 31) (AE)  $f'_c = 31 \text{ MPa}$
- Concrete (Grade 31)  $f'_c = 31 \text{ MPa}$
- Reinforcing Steel (Grade 420)  $f_y = 420 \text{ MPa}$

**DESIGN GUIDELINES:**

The allowable reinforcement material stress shall meet the requirements outlined in AASHTO Sections 5.8.6 and 5.8.7. The wall dimensions shall meet the requirements outlined in AASHTO Section 5.8.1 and 5.8.2. Soil reinforcement lengths shall be a minimum length of 2.5 m or 1.0 H, whichever is greater. Wall height is equal to the distance from the top of the leveling pad to the finished grade at the back of the wall face, including the thickness of the pavement.

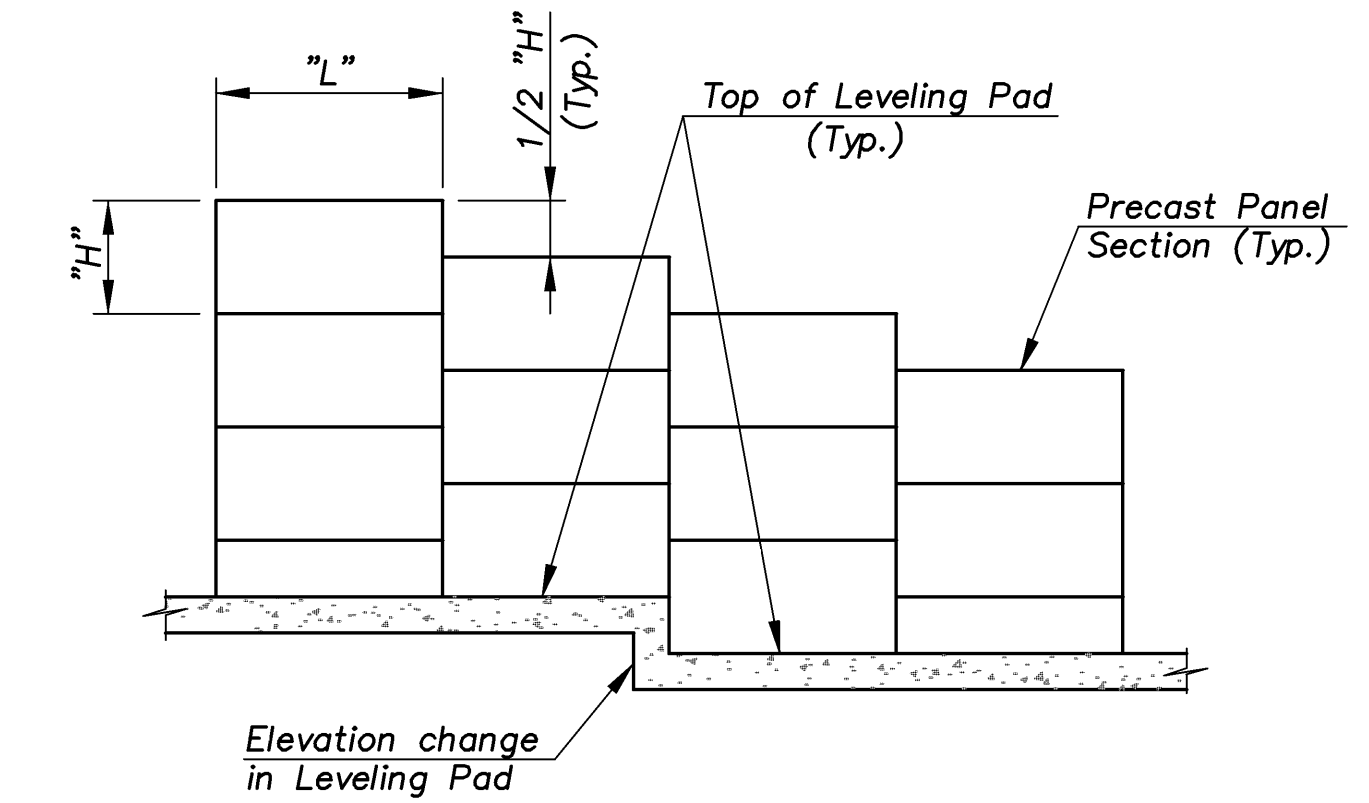
- The minimum safety factor for sliding shall be 1.5.
- The minimum safety factor for overturning shall be 2.0.
- The minimum design life of the structure shall be 75 years.
- The reinforcing steel shall conform to the requirements of ASTM A615M, Grade 420.

Standard wall design shall be based on the following parameters:

- \* 1. Select Granular Backfill:
  - a. Moist density 1842 Kg/m<sup>3</sup>
  - b. Drained friction angle  $\Phi=32^\circ$
- 2. Random Fill behind and below wall:
  - a. Moist density 2000 Kg/m<sup>3</sup>
  - b. Drained friction angle  $\Phi=25^\circ$
  - c. Drained cohesion 5 KPa
  - d. Undrained friction angle  $\Phi=5^\circ$
  - e. Undrained cohesion 4883 Kg/m<sup>2</sup>
 Random fill is to be compacted to Type AA-0-4 standards. Random fill shall be paid for as "Common Excavation (Contractor Furnished)".
- 3. Foundation Soils:
 

Soils through the area of concern in Wichita, Kansas are lean to fat clays and gravely clays overlying the Wellington Formation.
- 4. Maximum total and differential settlement shall be limited such that wall aesthetics and serviceability are not adversely affected.
- 5. Foundation soils found to be unsuitable, as determined by the Engineer, shall be removed and replaced with suitable material. All pavement and base materials behind and below the retaining wall system must be removed completely. The existing soils shall be scarified and re-compacted to Type AA, MR-5-5 standards.
- 6. Foundations:
  - a. The minimum required leveling pad embedment for all retaining walls is 915 mm below the finished grade. (Top of pad).
  - b. Settlements of 100 mm are anticipated.
  - c. Foundation bearing pressures shall not exceed the following:
    - Allowable bearing capacity 187 kPa

SUMMARY OF QUANTITIES (MSE-RETAINING WALL)			
WALL	LOCATION	WALL AREA (m <sup>2</sup> )	CONCRETE MASONRY COATING (m <sup>2</sup> )
"A"	Sta. 3+000.000; 17.848 m Rt. to Sta. 3+344.318; 17.905 m Rt.	2098.2	2198.0
"B"	Sta. 3+344.318; 17.905 m Rt. to Sta. 3+341.340; 17.905 m Lt.	200.7	211.1
"C"	Sta. 3+000.000; 17.848 m Lt. to Sta. 3+341.340; 17.905 m Lt.	1947.6	2046.6
"D"	Sta. 3+570.000; 17.848 m Rt. to Sta. 3+394.111; 17.905 m Rt.	880.0	931.0
"E"	Sta. 3+394.111; 17.905 m Rt. to Sta. 3+391.132; 17.905 m Lt.	180.9	191.4
"F"	Sta. 3+560.000; 17.848 m Lt. to Sta. 3+391.132; 17.905 m Lt.	832.8	881.8
TOTAL		6140.2	6459.9



TYPICAL WALL PANEL LAYOUT

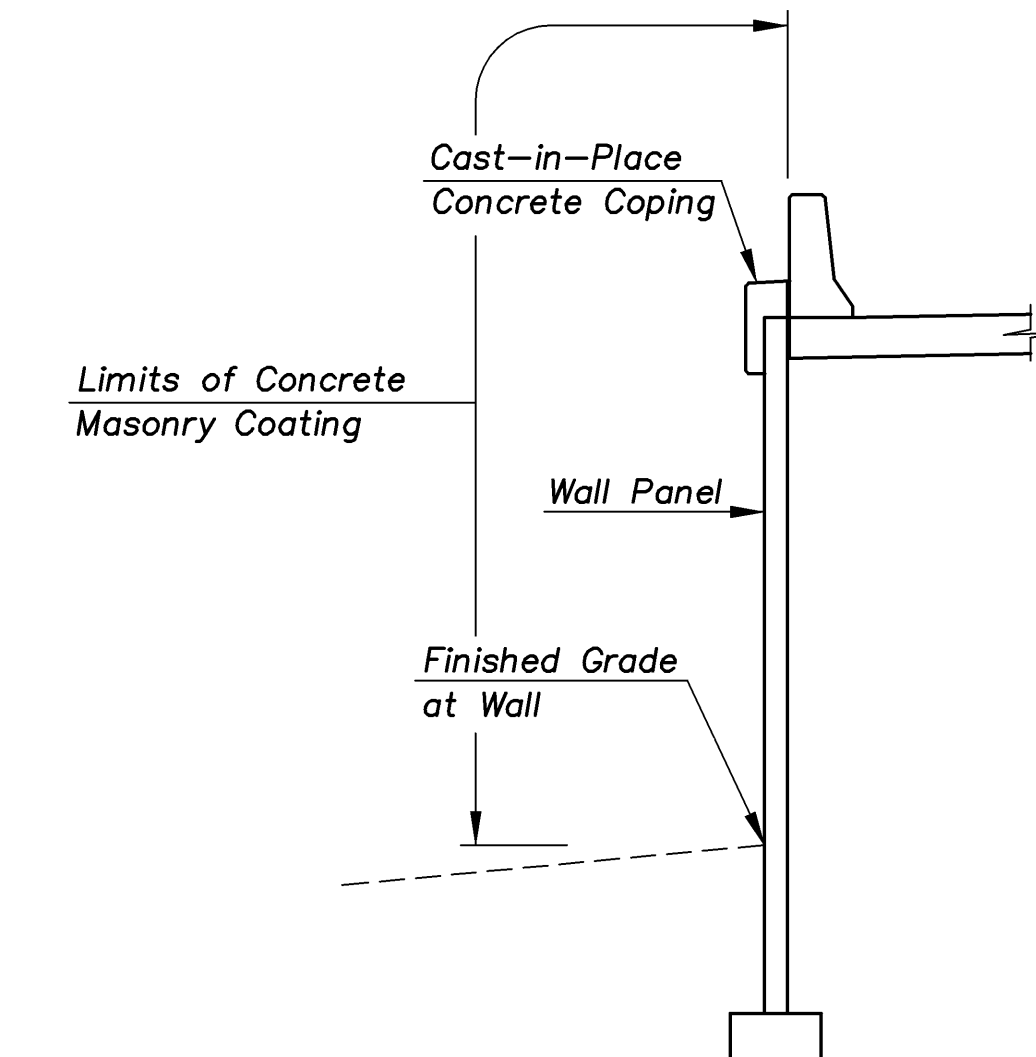
RECAPITULATION OF ROAD QUANTITIES		
BID ITEM	TOTAL	UNIT
MSE-Retaining Wall (Reinforced Earth) Alternate No. 1	6140.2	m <sup>2</sup>
MSE-Retaining Wall (Foster Geotechnical) Alternate No. 2	6140.2	m <sup>2</sup>
MSE-Retaining Wall (MSE Plus) Alternate No. 3	6140.2	m <sup>2</sup>
Concrete Masonry Coating	6459.9	m <sup>2</sup>

**TRENCH DRAIN SYSTEM:**

On the shop drawings, show plan and profile details of the trench drain and outlet pipe, including stations and offsets for horizontal alignment, and pipe slopes. All work and materials necessary for construction of the trench drain system shall be Subsidiary to the bid item "MSE-Retaining Walls".

**GEOTEXTILE FABRIC:**

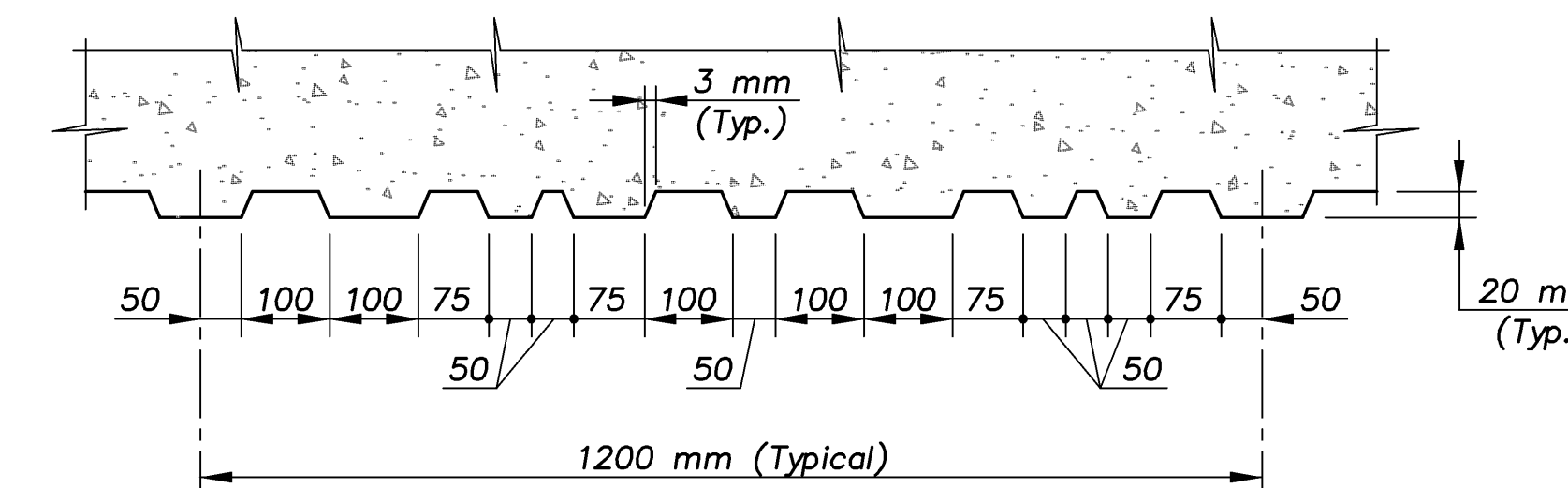
The Geotextile Fabric shall conform to the requirements of the Standard Specifications. The edges shall be anchored as shown in the details. The limits of the Geotextile Fabric extends from the Wall Layout Line to a point 915 mm beyond the Select Granular Backfill limit. All work and material necessary to construct the Geotextile Fabric shall be Subsidiary to the bid item "MSE-Retaining Walls".



LIMITS OF CONCRETE MASONRY COATING

**CONCRETE MASONRY COATING:**

Concrete Masonry Coating shall be applied to all exterior concrete surfaces of the Barrier, Wall Panels and cast-in-place Concrete Coping, within the limits detailed on the Plans. The color of the Concrete Masonry Coating shall match Color No. 30318 (Limestone Tan) of Federal Standard 595B, unless an equal is approved by the Engineer. A non-petroleum based form release agent shall be used on formed surfaces to be coated. All labor, materials and incidentals required to perform this work shall be paid for as "Concrete Masonry Coating" in accordance with the Special Provisions.



SURFACE TREATMENT DETAIL  
(Repeating High/Low Board Pattern)

MSE-WALL/DETAILS 1:100

KANSAS DEPARTMENT OF TRANSPORTATION		<p><b>Cook, Flatt &amp; Strobel</b> ENGINEERS, P. A.</p>	
MSE-RETAINING WALL DETAILS (ARMOUR ROAD BRIDGE)			
DESIGNED	R.S.C.	SCALE	Varies
DETAILED	T.R.G.	DATE	
Proj. No.	54-87 K-8258-01	SEDGWICK COUNTY	QUANTITIES T.R.G. SHEET 1 OF 8