

**UNDERDRAIN SYSTEM**

Underdrain Pipe (perforated and unperforated), Aggregate for underdrains, Geo-textile fabric, Outfall pipe, Concrete outlet flume, and all other materials and labor required for installation shall be subsidiary to Retaining Wall (MSE).

On the shop drawings, show plan and profile details of the underdrain and outlet pipe, including stations and offsets for horizontal alignment and pipe slopes.

**APPROVED WALLS**

The following products have been approved for the construction of the Mechanically Stabilized Embankment (M.S.E.) Walls on this project:

- Pyramid
- MESA
- Anchor Landmark
- Keystone I

Color of wall to be a brown, matching color of existing modular retaining wall on sidewalk northwest of bridge.

**PAYMENT**

The M.S.E. walls shall be constructed of retaining wall systems as described in the Special Provisions. All labor, materials, equipment, and incidentals required to construct the retaining wall system shall be paid for at the contract unit price per square ft of "Retaining Wall (\*\*\*)" based on the Nominal Wall Area as shown in the plans.

\*\* = One of the four approved products listed above.

Nominal M.S.E. wall areas are based on the pay height as measured from the top of the wall to the top of the leveling pad as shown on the plans.

Wall elevations shown on Sheet # 39 are presented to establish limits of pay quantities (with coping). Top of wall and top of footing elevations will vary to accommodate the specific requirements of the various wall systems.

Excavation required to construct the earth retaining system shall not be paid for directly but shall be considered subsidiary to the bid item "Retaining Wall (\*\*\*)". All excavated material shall be removed from the site.

The bid price per square feet for the approved M.S.E. system as outlined in the Special Provisions shall include all costs for wall panels, form liner, select granular backfill material, soil reinforcing elements, leveling pad, coping, coping reinforcing steel (Grade 60), joint protection, excavation, trench drain and outlet pipe, dewatering, backfilling and all incidentals necessary to construct the wall.

Item	Quantity
Select Granular Backfill	175 C.Y.
Soil Reinforcing Elements	As applicable
Leveling Pad	35.7 Ft.
Coping	30.0 Ft.
Coping Reinforcing Steel (Grade 60)	As required

\* Based on minimum reinforcement length required. See Sheet #39 for lengths. Additional quantities of these items will be necessary if the Reinforcement Length is increased above the minimum length.

**EARTH FILL**

See Special Provisions for requirements for Select Granular Backfill.

The entire retained earth volume shall be backfilled with select granular material in accordance with the Special Provisions unless otherwise directed by the Engineer. Where fill slopes are shown to wrap around the end of the earth retaining system, the fill shall contain a zone of granular material adjacent to the wall system to facilitate drainage of the contained material unless otherwise directed by the Engineer. Granular backfill material shall meet the requirements as described in the Special Provisions. Select granular backfill material shall not be paid for separately but shall be considered subsidiary to the bid item "Retaining Wall (\*\*\*)". Estimated quantities of select granular material are shown in the plans for the Contractor's information only.

**DESIGN SPECIFICATIONS**

AASHTO standard specifications, 1996 edition and latest interim specifications.

**DESIGN LOADING**

Live Load Surcharge load of 2'-0" of earth added to the vertical stress.

Dead Load Components of wall structure.

Other Loads As specified by AASHTO.  
Seismic design need not be considered.

**MSE WALL DESIGN GUIDELINES**

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

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

The allowable reinforcement material stress shall meet the requirements outlined in AASHTO Section 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 4'-0" or 0.9 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 A615-95, Grade 60.

Standard wall design shall be based on the following parameters:

1. Select Granular Fill
  - a. Moist density 115 PCF
  - b. Drained friction angle Phi = 34°
2. Foundation Soils  
A Geological Engineer shall test the area and provide soil parameter data to the wall manufacturer, subsidiary to the bid item, "Retaining Wall (\*\*\*)".
3. Maximum total and differential settlement shall be limited such that wall aesthetics and serviceability are not adversely affected.
4. 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 recompact to Type AA, MR-5-5 standards.
5.
  - a. The minimum required leveling pad embedment for all retaining walls is 4'-0" below the finished grade (top of pad)
  - b. Settlements are not anticipated

SUMMARY OF QUANTITIES - MSE RETAINING WALLS			
Wall	Location	Retaining Wall (***) (SF)	Geomembrane (SF)
Northwest Quadrant	Sta. 9+84.03 to	114.47	144
	Sta. 9+91.00		
Southwest Quadrant	Sta. 9+86.45 to	114.47	144
	Sta. 9+91.10		
Northeast Quadrant	Sta. 12+58.94 to	93.08	126
	Sta. 12+58.94		
TOTAL		322.02	414

**SHOP DRAWINGS:**  
Provide shop drawings and calculations for review by the Engineer 3 weeks prior to fabrication. Shop drawings shall include plan and vertical limits of retaining wall, coping, and footing, and reinforcing grid.

CITY OF WICHITA JAMES ARMOUR, P.E., CITY ENGINEER 13TH STREET BRIDGE OVER LITTLE ARKANSAS RIVER <b>RETAINING WALL          NOTES &amp; QUANTITIES</b>		
		
SCALE	DATE 10/9/2007	DWG NO. 35750A