Section 626—Mechanically Stabilized Embankment Retaining Walls

626.1 General Description

This Specification covers the required materials, fabrication, construction, measurement, and payment for mechanically stabilized embankment retaining walls.

The scope of work of wall erection includes:

- Grading for wall construction
- Compacting the wall foundation
- General and local dewatering as necessary
- Constructing leveling pads
- Erecting precast panels
- Placing soil reinforcing devices
- Placing and compacting special embankment backfill within the reinforced volume
- Furnishing and placing precast or cast-in-place concrete coping and cast-in-place or precast traffic barrier on top of the wall if shown on the Plans

The wall foundation includes areas underlying the leveling pad and the reinforced volume. Ensure that items used to construct the mechanically stabilized embankment retaining walls but not mentioned in this Specification conform to the applicable Sections of the Standard Specifications.

Ensure that the architectural treatment of the precast panels is according to the Plan details.

For patented mechanically stabilized embankment retaining walls, obtain panels, soil reinforcing devices, connecting devices, joint materials, attachments, and expertise to construct the walls.

626.1.01 Definitions

Wall foundation—the area underlying the leveling pad and the reinforced volume.

626.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 208—Embankments

Section 500—Concrete Structures

Section 511—Reinforcement Steel

Section 514—Epoxy Coated Steel Reinforcement

Section 535—Painting Structures

Section 645—Repair of Galvanized Coatings

Section 809—Geogrid

Section 812—Backfill Materials

Section 848—Pipe Appurtenances

Section 865—Manufacture of Prestressed Concrete Bridge Members

Section 867 – Epoxy Coated Reinforcement Strips

Section 870—Paint

B. Referenced Documents

AASHTO M 243

AASHTO T 22

ASTM A 82

ASTM A 123/A 123M

ASTM A 153/A 153M

ASTM A 185

ASTM A 307

ASTM A 325 (ASTM A 325M)

ASTM A 563

ASTM A 570/A 570M

ASTM A 709 (ASTM A 709M)

ASTM B 695

ASTM D 2240

ASTM F 463 (ASTM F 463M)

GDT 7

GDT 24a

GDT 24b

GDT 35

GDT 75

QPL 9

QPL 58

1992 AASHTO Specifications for Highway Bridges, Section 18, Elastomeric Bearings

Standard Operating Procedure 3, Precast/Prestressed Concrete Bridge Members

626.1.03 Submittals

General Provisions 101 through 150.

626.2 Materials

A. Soil Reinforcing Devices

1. Reinforcing and Tie Strips

   Use tie strips shop-fabricated of hot rolled steel that conform to the minimum requirements of ASTM A 570 Grade 50 (ASTM A 570M Grade 345). Hot roll reinforcing strips from bars to the required shape and dimensions. Their physical and mechanical properties shall conform to ASTM A 709 Grade 36 (ASTM A 709M Grade 250).

2. Soil Reinforcing Mesh

Use soil reinforcing mesh shop-fabricated of cold drawn steel conforming to the minimum requirements of ASTM A 185.

3. Backfill Stabilizing Geogrid:

   Use Backfill Stabilizing Geogrid that conforms to the requirements of Section 809.

B. Connecting Devices

1. Fasteners

   Use high-strength bolts and nuts that are hexagonal cap screw and that conform to ASTM A 325(A 325M), galvanized. Ensure that they are of the diameter shown in the Plans—1-1/2 in (40 mm) long with 3/4 in (20 mm) thread length.

   Use galvanized washers with galvanizing fastener elements conforming to ASTM A 153/A 153M.

2. Steel Strap Connectors

   Use materials that conform to the following standards:

Material	Conforms to the Requirements of:
Steel strap connection bar and plate	ASTM A 709 Grade 36 steel (ASTM A 709 Grade 250)
Bolts	ASTM A 307 (ASTM A 307M)
Nuts	ASTM A 563
Washers	ASTM F 436 (ASTM F 436M)
Coatings for connecting devices	As specified in the Subsection below

3. Attachments

   Use clevis loops and mesh loops fabricated of cold drawn steel wire that conforms to ASTM A 82 and are welded according to ASTM A 185. Ensure that they develop a stress of at least 0.9 times the steel's yield strength. Use loops galvanized according to ASTM A 153/A 153M, Class B 3, or ASTM A 123/A 123M.

   Use a connector bar that is fabricated of cold drawn steel wire that conforms to ASTM A 82 and is galvanized according to ASTM A 123/A123M.

4. Geogrid Connection Bar: Use a connection bar 1 inch (25 mm) by 0.2 inches (5 mm) thick by roll width plus 3 inches meeting the same physical and chemical properties as the backfill stabilizing geogrid.

C. Concrete

Use Class AA concrete for precast panels, except ensure that the 28-day strength is at least 4,000 psi (28 MPa). Except as indicated in the approved mix design, admixtures will not be allowed. Do not use admixtures containing chlorides.

Use Class A concrete for leveling pads, traffic barriers, and coping.

D. Joint Fillers

Treat joints between panels as listed in this Subsection.

In flood plains or other intermittently inundated areas, cover the different joint types as follows:

Joint Type	Action
Joints between panels from an elevation 3 ft (1 m) above the 100-year flood elevation to the bottom of the wall	Cover on the back side of the wall with a woven plastic filter fabric sheet.

Joint Type	Action
Joints between panels from 3 ft (1 m) above the 100-year high water elevation to the top of the wall	Cover on the back side of the wall with a woven or nonwoven plastic filter fabric sheet.
All other locations	Cover joints between panels with a woven or nonwoven plastic filter fabric sheet

Place in horizontal joints between panels two 4 inch by 3 inch by ¾ inch (100 mm by 75 mm by 20 mm) ribbed bearing pads or elastomeric pads as specified on the Plans. Use ribbed bearing pads made of SBR rubber with a durometer hardness of 80 plus or minus 10 as determined by ASTM D 2240.

Use elastomeric pads that are 100% virgin chloroprene (neoprene) and meet the requirements of the 1992 AASHTO Specifications for Highway Bridges, Section 18, Elastomeric Bearings. Caulk the openings on either side of and between the pads with 2 inch by 2 inch (50 mm by 50 mm) open-cell urethane foam strips or equal as approved by the Engineer in addition to any other joint treatment that is required. Caulk vertical joints with 2 inch by 2 inch (50 mm by 50 mm) open-cell urethane foam strips. Piece the urethane foam strips together with a minimum overlap of 4 inches (100 mm).

Use plastic filter fabric sheets with a minimum width as follows:

For Vertical Joints	18 inches (450 mm) wide
For Horizontal Joints	12 inches (300 mm) wide

Overlap the joint with the filter fabric by at least 4 inches (100 mm). When piecing together the filter fabric, overlap by at least 4 inches (100 mm). Glue the filter fabric to the panels using any adhesive on the Qualified Products List (QPL). Use any woven and nonwoven plastic filter fabric listed on the QPL for work in this Specification, subject to the above requirements.

E. MSE Wall Backfill Material

Use material in the MSE Wall Backfill volume that conforms to the requirements of Subsection 812.2.04. In addition, obtain approval for use of the material by the Office of Materials and Research.

F. Coatings For Steel Soil Reinforcing Devices

Apply coatings to the soil reinforcing devices as follows:

1. Galvanize the entire surface of reinforcing and tie strips, mesh, and connecting devices according to ASTM A 123/A 123M. Or galvanize it mechanically according to ASTM B 695, Class 110, unless otherwise specified on the Plans. Also galvanize the surfaces created by punching holes for bolts.
2. Repair damage sustained by the connecting devices, bolts, or reinforcing devices during phases of fabrication, storage, or erection according to Section 645.

   Repair by brush coating with an approved galvanizing repair compound as specified in Subsection 870.2.05.A.2 to the Engineer's satisfaction at no increase in Contract cost.
3. Galvanize the parts of the connecting devices that are threaded according to ASTM A 153/A 153M, Class C. Hot dip galvanize alignment pins.
4. When the Type 2P coating is required on the Plans:
   a. After manufacturer galvanizing is complete, shop-coat the entire surface for the length indicated on the Plans with a two-component coal tar epoxy system indicated in Subsection 535.3.03.D, "Prepare Steel Piling, Swaybracing, and Concrete Piling Surfaces for Special Protective Coatings," for a Type 2P coating according to Subsection 870.2.05.A.1.

b. Use Type 2P coating to field-coat galvanized nuts, bolts, and washers used to connect reinforcing and tie strips. Repair damage to the coating on connecting devices or reinforcing devices from shipping, storage, or erection to the Engineer's satisfaction at no additional cost.

c. Use Type 2P coating to field-coat the parts of the connecting devices exposed after installing the soil reinforcing devices.

5. Epoxy coat the entire surface according Section 514 and Section 867, when required on the Plans.

a. Do not galvanize the soil reinforcing devices if this coating method is used.

b. Use Type 2P coating to field-coat galvanized nuts, bolts, and washers used to connect reinforcing and tie strips.

c. Use Type 2P coating to field-coat the parts of the connecting devices exposed after installing the soil reinforcing devices.

6. Repair damage to the coating on the connecting devices or soil reinforcing devices from shipping, storage, or erection to the Engineer's satisfaction at no additional cost.

G. Reinforcing Steel

Use reinforcing steel that conforms to the requirements of Section 511.

H. Welded Wire Fabric for Precast Panels

Use welded wire fabric that conforms to the requirements of ASTM A 82.

I. Certification

The Department will use certified test report as specified in Subsection 106.05, "Materials Certification" and perform routine tests as a basis for material acceptance furnished for The Work.

J. Corrosion Inhibiting Material

For the corrosion inhibiting material, use a bituminous plastic cement material that conforms to the requirements of Section 848, AASHTO M 243 Trowel Grade Asphalt Mastic, or use an approved corrosion-inhibiting grease.

626.2.01 Delivery, Storage, and Handling

Handle, store, and ship panels to eliminate the danger of chipping, cracking, discoloring, fracturing, and excessive bending stresses.

Repair at the plant the panels damaged during handling or storage at the casting plant as directed by the Engineer. Panels damaged during handling, storing, or shipping may be rejected upon delivery at the Engineer's discretion.

Support panels in storage on firm blocking located immediately adjacent to embedded connecting devices to avoid bending the connecting devices. Repair the coating on ties or soil-reinforcing devices damaged during handling or placing to the Engineer's satisfaction.

626.3 Construction Requirements

626.3.01 Personnel

A. Wall Crew Supervisor

Ensure that the wall crew supervisor has previous satisfactory experience in erecting mechanically stabilized walls.

626.3.02 Equipment

General Provisions 101 through 150.

626.3.03 Preparation

A. Prepare the Foundation

Before beginning construction, prepare the foundation as follows:

1. Grade the foundation for the mechanically stabilized embankment retaining wall level to a width equal to or exceeding the width of the reinforced volume and leveling pad.

   Use the top of the leveling pad as the grade elevation.

2. Before beginning the wall and leveling pad construction, compact the foundation to at least 95 percent of maximum laboratory dry density as determined by GDT 7.

3. Where walls are used as a bridge abutment, compact the foundation material as follows:

   a. When a portion of the wall is a bridge abutment, ensure that portions of the wall within 100 ft (30 m) of the lateral limits of the bridge have foundation material compacted to at least 100 percent of maximum laboratory dry density as determined by GDT 7.

   When walls are used solely as bridge abutments, compact the foundation material for the entire wall to at least 100 percent of maximum laboratory dry density as determined by GDT 7.

   Place and compact the embankment beneath the wall according to Section 208.

4. If excavating below the leveling pad elevation, reconstruct the area as embankment.

5. Remove and replace foundation soils that are incapable of sustaining the required compaction as directed by the Office of Materials and Research.

6. At each panel foundation level, provide a non-reinforced concrete leveling pad as shown on the Plans.

   a. Place leveling pads so they are level within 1/8 in (3 mm) per pad or per 10 ft (3 m), whichever length is greater.

   b. Repair or replace leveling pads that do not meet this requirement as directed by the Engineer at the Contractor's expense.

   If using bearing pads on the leveling pad on the initial row of panels, also use them on all the leveling pads of that wall.

   Fill the horizontal joint between the leveling pad and panels with 2 in by 2 in (50 mm by 50 mm) polyether foam strips and cover with filter cloth.

   Use neoprene strips 3/16 in (5 mm) thick as necessary to level panels. Do not use more than 3/8 in (10 mm) of neoprene strips.

   If more leveling is required, take other corrective action, such as replacing the leveling pad or replacing panels.

7. Embed the wall at least 5 ft (1.5 m) into an embankment, when shown on the Plans. Construct the embankment before constructing the leveling pad and placing backfill for the wall.

   For step details on leveling pads, see plans and construction details.

626.3.04 Fabrication

A. Soil-Reinforcing Devices

Have steel soil-reinforcing devices shop fabricated. Use shop fabricated steel mesh of cold drawn steel welded into the finished mesh fabric according to ASTM A 185.

Cut soil-reinforcing devices to lengths and tolerances shown on the Plans. Punch holes for bolts in the location shown. Ensure that soil-reinforcing devices are true to size and free of defects that may impair the strength or durability.

B. Connecting Devices

Use connecting devices of the dimensions shown on the Plans. Assemble connecting members and soil-reinforcing devices before galvanizing the connecting devices. Ensure that the connecting devices are true to size and are free of defects that may impair the strength or durability.

Tie strips may be partially bent to no more than a 1 in (25 mm) radius before they are shipped to the precast yard. Perform final bending at the precast yard.

Do not allow connecting devices, reinforcing steel, or welded wire fabric used in the panels to contact each other.

C. Bolts and Nuts

Ensure that the nominal diameter is as defined in Subsection 626.2.B, "Connecting Devices."

D. Precast Panels

Use precast panel materials as specified in Subsection 626.2, "Materials." Before casting, set the following in place to the dimensions and tolerances shown on the drawings:

- Tie strips
- Mesh attachment straps
- Coil embeds
- Coil bolts
- Reinforcing steel
- Welded wire fabric
- Connecting pins
- Handling devices

Do not allow the metal connecting devices and reinforcing steel to contact each other when in their final position in the panel.

1. Testing and Inspection

   Use precast concrete panels that are cast at a Class A or B plant that conforms to Standard Operating Procedure 3, Precast/Prestressed Concrete Bridge Members. See QPL 9 for a list of approved plants.

2. Casting

   Cast the panels using steel forms.

   a. Cast the front face of the panel (the face exposed to view when installed in the wall) against a steel form or architectural form liner. Float finish the back face.

   b. Place the concrete in each panel without interruption and consolidate it using an approved vibrator. Supplement vibration with hand tamping as necessary to force the concrete into the corners of the forms and prevent the formation of stone pockets or cleavage planes from forming.

   c. Use clear form oil from only one manufacturer throughout the casting operation.

3. Curing

   Cure the panels as specified in Subsection 500.3.05.Z, "Cure Concrete," or Subsection 865.2.01.B.10, "Concrete Curing." Cure for at least 12 hours or until the concrete develops the specified compressive strength. The Engineer will reject panels that do not reach specified strength within 28 days.

4. Removing Forms

   Keep forms in place until they can be removed without damaging the panel.

5. Concrete Finishing and Tolerances

   Finish the concrete surface for the front face as designated on the Plans. Float-finish the rear face enough to eliminate open aggregate pockets and distortions greater than 1/4 in. (6 mm).

   Only use panels manufactured within the following tolerances:

   - All dimensions are within 3/16 in. (5 mm).
   - Angular distortion in the panel's height does not exceed 3/16 in. (5 mm) in 5 ft. (1.5 m).
   - Diagonal tolerance from Plan dimensions is no more than 3/8 in. (10 mm).

For textured finishes, surface defects greater than 5/16 in. (8 mm) in 5 ft (1.5 m) will be rejected.

6. Determining Compressive Strength

   Perform compression tests to determine the minimum strength requirements on cylinders.

   a. Make at least three cylinders to determine when the units may be put into service from each day's production and cure according to GDT 35.D.B.6.

      Make two additional cylinders from each day's production or from each 10 cubic yards of concrete placed, whichever is the lesser amount of concrete, to determine the 28-day strength.

   b. Ensure that the shipping strength is equal to the required 28-day strength for each day's production or for each 10 yd^3 (7.5 m^3) of concrete placed, whichever amount of concrete is less.

   c. Cure according to GDT 35.D.B.6. Ensure that the 28-day compressive strength is at least 4,000 psi (28 MPa). Perform compressive strength tests according to AASHTO T 22.

7. Rejection

   Panels will be rejected if they do not meet the requirements above. The following defects are also cause for rejection:

   - Indications of imperfect molding that result in tolerances being exceeded
   - Honeycombed or open texture concrete

8. Marking

   Clearly and permanently mark on the rear face of each panel the date of manufacture, lot number, and type of panel.

E. Precast Coping and Precast Traffic Barrier

To construct the precast portion of the coping or precast traffic barrier, use materials that conform to Subsection 626.2.C, "Concrete." Use the same procedures for precasting, testing, and inspection as those for precast panels.

626.3.05 Construction

A. Wall Erection

Place precast panels so that their final position at the completion of the wall is vertical.

1. Adjust the batter to allow for the effect of backfill type, equipment, and construction method on panel movement.
2. In general, batter the panels 1/2 in. (10 mm) in 4 ft (1 m) into the reinforced volume to allow the panel to move during backfill placement and compaction.
3. Place panels in successive horizontal lifts as backfill is placed.
   a. When placing backfill behind a panel, maintain the panel in a vertical position by placing clamps and temporary wooden wedges in the joints at the junction of two adjacent panels on the external side of the wall.
   b. Use external bracing for the initial lift. Keep the wedges in place until the fourth layer of panels is placed, then remove the bottom layer of wedges.
   c. Remove each succeeding layer of wedges when placing the succeeding panel layers.
   d. When the wall is completed, remove the wedges. Do not use the wedges to level the panels on leveling pads.
   e. Remove the wedges placed below the groundline on the front face of the wall before backfilling this area.
4. Alignment and tolerance are as follows:
   a. Ensure that the horizontal and vertical joint openings between panels are uniform. Ensure that the opening is 7/8 in ± 3/8 in. (22 mm ± 10 mm).
   b. Ensure that the vertical tolerance (plumbness) and horizontal alignment tolerance as the wall is constructed does not exceed 3/4 in (20 mm) when measured along a 10 ft (3 m) straightedge.

c. Ensure that the overall vertical tolerance of the wall (plumbness from top to bottom) in its final position does not exceed 1/2 in per 10 ft (13 mm per 3 m) of wall height.

d. Place cast-in-place concrete on top of the wall panel to bring the precast coping elements on top of the wall to proper grade. See the plans or construction details.

Before placing special backfill material on a soil-reinforcing device, complete the connections to the panels.

B. Joint Fillers

Treat joints between the panels as follows:

1. In flood plains or other intermittently inundated areas, cover the joints as follows:
   - Use a woven plastic filter fabric sheet to cover the joint on the back side of the wall between panels from 3 ft (1 m) above the 100-year flood elevation to the bottom of the wall.
   - Use a woven or nonwoven plastic filter fabric sheet to cover the joint on the back side of the wall between panels from 3 ft (1 m) above the 100-year high-water elevation to the top of the wall.
2. At other locations, cover joints between panels with a woven or nonwoven plastic filter fabric sheet.
3. Ensure that horizontal joints between panels contain two 4 by 3 by ¾ in (100 by 75 by 20 mm) ribbed bearing pads or elastomeric pads as specified on the Plans. Use ribbed bearing pads that are SBR rubber with a durometer hardness of 80 plus or minus 10 as required in ASTM D 2240.
4. Use elastomeric pads that are 100 percent virgin chloroprene (neoprene) meeting the requirements of the 1992 AASHTO Specifications for Highway Bridges, Section 18, Elastomeric Bearings.
5. Caulk the openings on either side of and between the pads with 2 by 2 in (50 by 50 mm) open cell urethane foam strips, or equal as approved by the Engineer in addition to other required joint treatments.
6. Caulk vertical joints with 2 by 2 in (50 by 50 m) or open cell urethane foam strips. When piecing the urethane foam strips together, overlap them at least 4 in. (100 mm).
7. Ensure that the minimum width of the plastic filter fabric sheets are as follows:

For vertical joints	18 in (450 mm) wide
For horizontal joints	12 in (300 mm) wide

8. Overlap the filter fabric with the joint at least 4 in. (100 mm).
9. When piecing the filter fabric together, overlap at least 4 in. (100 mm).
10. Glue the filter fabric to the panels. Use an adhesive on QPL 58.

C. MSE Wall Backfill

Place backfill shortly after erecting each lift panel. Follow these guidelines:

1. Place backfill lift to a uniform thickness and place it from the back face of the wall to 1 ft (300 mm) beyond the end of the soil-reinforcing devices.
2. At each soil-reinforcing device level, compact the backfill to the full length of reinforcing devices and slope it to drain away from the wall before placing and attaching the next layer of reinforcing devices.
3. Level the compacted backfill with the connecting device before connecting the reinforcing device.
4. Repair damaged soil reinforcing devices or panels before attaching and backfilling the reinforcing devices.
5. Place soil reinforcing devices at 90 degrees to the face of the wall, unless otherwise indicated on the Plans or by the Engineer.
6. Ensure that the maximum lift thickness is 8 in (200 mm) (loose) and closely follows panel erection. Decrease this lift thickness to obtain the specified density, if required.

7. Compact the embankment backfill material to at least 100 percent of maximum laboratory dry density as determined by GDT 7 or GDT 24a, GDT 24b Method A or B, for full depth of the material.
8. Compact the embankment backfill material without disturbing or displacing the reinforcing devices and panels.
9. Compact from the area nearest the wall face to the back of the reinforcing devices except for a strip 3 ft (1 m) wide adjacent to the backside of the wall.

   After compacting the remainder of the layer, compact this 3 ft (1 m) strip with light mechanical tampers without causing the panels to move outward.
10. Whenever a compaction test fails on a special embankment backfill lift, do not place additional material over that area until the lift is re-compacted and obtains a passing compaction test.
11. Ensure that the stabilizing geogrid at any layer is held taut, by mechanical means, free of wrinkles, bends or undulations until the special backfill material has been placed and compacted above the restrained layer to the level of the next layer of stabilizing geogrid. Release the uppermost layer of stabilizing geogrid after the final layer of special backfill is placed and compacted.

D. Storm Drains

Provide precast panels that have the appropriate storm drain openings into panels at the elevation and locations indicated on drainage profiles.

Place catch basins so that pipes will enter perpendicular (plan view) to the panels or below the leveling pads as shown on the Plans. Coordinate the catch basin construction and the storm drain placement with the wall construction.

E. Dewatering

Furnish, install, operate, and maintain satisfactory dewatering systems to maintain the site in a dry and workable condition to permit grading, compacting the wall foundation, and erecting and backfilling the wall. Furnish dewatering system equipment and materials and continue the system as long as necessary.

F. Catch Basins and Longitudinal Pipes

When catch basins are located behind the wall and the Wall Plans do not indicate a specific construction method, use the method outlined in the construction details.

When longitudinal pipes are located behind the wall, follow this procedure if specific details are not shown on the Wall Plans:

1. Bend the soil-reinforcing device around the pipe without damaging the device, its coating, or its attachment to the precast panel. See the construction details.
2. If the pipe is too close to the wall to bend the soil-reinforcing device without damaging it, the Engineer will investigate relocating the pipe. The Engineer will contact the design office that designed the drainage system or the office responsible for the pipe and will investigate the pipe relocation.
3. If the pipe cannot be relocated or if the pipe is too large for relocation to be feasible, use the back-up panel procedure indicated on the construction details.

Use precast concrete or cast-in-place concrete for:

- Drainage structures that are within the special embankment backfill
- Drainage structures that are outside the special embankment backfill but that are within 5 ft (1.5 m) of the front face of the wall

626.3.06 Quality Acceptance

General Provisions 101 through 150.

626.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

626.4 Measurement

When a mechanically stabilized embankment retaining wall is built to Plan dimensions, the Plan quantities are the pay quantities. When the Engineer changes Plan dimensions during construction, or when original Plans are in error, the revised Plan quantities are the pay quantities.

A. Excavation and Shoring

Excavation, including removing unstable material and shoring for construction of the mechanically stabilized embankment retaining wall, will not be measured and paid for separately.

B. Precast Concrete Panels

The panels complete in place and accepted are measured for payment by the square foot (meter). The area of drains through the wall are not deducted.

C. Soil Reinforcing Devices

The reinforcing strips, backfill stabilizing mesh, or backfill stabilizing geogrid is measured for payment by the linear foot (meter) of strip, mesh or geogrid.

D. Backfill

The special embankment backfill used in the mechanically stabilized embankment retaining wall volume is measured for payment by the cubic yard (meter) and as shown on the Plans. The limits of the mechanically stabilized embankment retaining wall volume are as follows:

1. The width shall be the length of the reinforcing devices plus 12 in (300 mm). Where reinforcing device length changes, the volume width change will occur midway between reinforcing device layers.
2. The height shall extend from the top of the leveling pad to at least 6 in (150 mm) or to a maximum of 3 ft (1 m) above the uppermost reinforcing device layer. The uppermost reinforcing device layer may be attached to the wall, traffic barrier, or bridge cap.
3. The length shall extend for the entire length of the wall.
4. Backfill material required by construction procedures to extend beyond the mechanically stabilized embankment retaining wall volume is incidental and is included in the price bid for Contract items.
5. If the mechanically stabilized embankment retaining wall volume increases from undercut ordered by the Engineer and requires special embankment backfill to provide stability, as determined by the Engineer, this will be measured and paid for at the Contract Unit Price bid per cubic yard (meter) for special embankment backfill.

   If undercuts are not provided for on the Plans and the Engineer determines that special embankment backfill is not appropriate, backfill with foundation material conforming to Subsection 812.2.02, "Foundation Backfill, Type II." Payment for foundation backfill material used in this application is at the Contract Price bid per cubic yard (meter) for special embankment backfill.

   Backfill for undercut areas that do not require materials of grades higher than common excavation soils will not be measured or paid for separately.

E. Concrete Leveling Pads

Concrete leveling pads are measured for payment by the linear foot (meter). This includes steps shown on the Plans.

F. Dewatering

No separate measurement or payment will be made for dewatering. Include the cost of dewatering in the price bid for special embankment backfill.

G. Units Mounted on the Mechanically Stabilized Embankment Retaining Wall

Units on the mechanically stabilized embankment retaining wall, complete in place and accepted, will be designated on the Plans and paid for at the Contract Unit Price bid per linear foot (meter) for each of the following unit types:

- Cast-in-place coping A
- Cast-in-place coping B
- Precast coping
- Traffic barrier V
- Traffic barrier H

Use traffic barrier H and cast-in-place coping B whenever noise walls, light standards, or other appurtenances are mounted on top of the barrier or coping. Use traffic barrier V and cast-in-place coping A when no appurtenance is used on top of the barrier or coping. Cast all traffic barriers in place except traffic barrier H, which is precast when detailed as precast on the Plans.

626.4.01 Limits

General Provisions 101 through 150.

626.5 Payment

When mechanically stabilized embankment retaining walls are built to Plan dimensions, the Plan quantity will be the pay quantity. When Plan dimensions are revised at the Engineer's direction, mechanically stabilized embankment retaining wall will be paid for using the revised Plan quantities. Payment is full compensation for fabricating, transporting, and erecting material according to the Plans and Specifications.

Separate measurement or payment is not made for tools, superintendence, labor, fasteners, coatings, joint materials (including but not limited to SBR or elastomeric pads, polyether foam, and filter fabric), site preparation, filler concrete, or other incidentals for performing the work. Soil-reinforcing devices attached to the traffic barrier or coping are not measured separately for payment but are included in the price bid for traffic barrier or coping.

Concrete side barrier, noise walls, light standards, V-gutters, guard rail, fencing, and handrail, when shown on the Plans, will be paid for according to the applicable sections of the Project Specifications. Anchor bolts for sleeves for mounting fencing and light standards or noise walls on the wall are included in the price bid for wall items.

Payment will be made under:

Item No. 626	Concrete facia panels	Per square foot (meter)
Item No. 626	Backfill stabilizing devices	Per linear foot (meter)
Item No. 626	MSE wall backfill material	Per cubic yard (meter)
Item No. 626	Concrete leveling pad	Per linear foot (meter)
Item No. 626	Cast-in-place coping A	Per linear foot (meter)
Item No. 626	Cast-in-place coping B	Per linear foot (meter)
Item No. 626	Traffic barrier V	Per linear foot (meter)
Item No. 626	Traffic barrier H	Per linear foot (meter)
Item No. 626	Precast coping	Per linear foot (meter)

626.5.01 Adjustments

General Provisions 101 through 150.