

LANDSCAPE RETAINING WALLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Modular Block Retaining Walls
- B. Limestone Retaining Walls
- C. Landscape Timber Retaining Walls

1.02 DESCRIPTION OF WORK

- A. Construction of modular block retaining walls.
- B. Construction of limestone retaining walls.
- C. Construction of landscape timber retaining walls.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

- A. Upon request, submit certification that products supplied comply with identified specifications.
- B. Test results on modular blocks, if required.
- C. Catalog cuts for modular retaining wall blocks and cap stones indicating the size, type, and color proposed for installation.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT**A. Modular Block Retaining Wall:**

1. **Measurement:** Measurement will be in square feet for the area of the face of retaining wall, measured from the top of the leveling pad to the top of the wall, including coping or cap stones.
2. **Payment:** Payment will be at the unit price per square foot of retaining wall.
3. **Includes:** Unit price includes, but is not limited to, excavation, foundation preparation, furnishing and placing wall units, geogrid (if necessary), leveling pad, subdrain, porous backfill material for subdrain, engineering fabric for subdrain, granular backfill material, suitable backfill material, and shoring as necessary.

B. Limestone Retaining Wall:

1. **Measurement:** Measurement will be in square feet for the area of the face of retaining wall.
2. **Payment:** Payment will be at the unit price per square foot of retaining wall.
3. **Includes:** Unit price includes, but is not limited to, excavation, foundation preparation, furnishing and placing leveling pad, limestone, subdrain, porous backfill material for subdrain, engineering fabric for subdrain, suitable backfill material, and shoring as necessary.

C. Landscape Timbers:

1. **Measurement:** Measurement will be in square feet for the area of the face of retaining wall, measured from the top of the leveling pad to the top of the wall.
2. **Payment:** Payment will be at the unit price per square foot of retaining wall.
3. **Includes:** Unit price includes, but is not limited to, excavation, foundation preparation, furnishing and placing leveling pad, landscape timbers, spikes, reinforcing bar, subdrain, porous backfill material for subdrain, engineering fabric for subdrain, suitable backfill material, and shoring as necessary.

D. Excavation and Suitable Backfill Material: If bid separately, excavation for wall construction and placement of suitable backfill material will be measured and paid according to [Section 2010](#).

E. Fence: If the contract documents require a fence, the fence will be measured and paid according to [Section 9060](#).

F. Safety Rail: If the contract documents require a safety rail, the railing will be measured and paid according to [Section 9080](#).

PART 2 - PRODUCTS**2.01 MATERIALS****A. Modular Block Walls:****1. Dry-cast Concrete Wall Units:**

- a. Comply with ASTM C 1372. Test units and provide samples according to ASTM C 140.
- b. Provide certification that the blocks comply with the freeze-thaw durability requirements of ASTM C 1262 and the additional requirements for concrete units of [Iowa DOT Materials I.M. 445.04](#).
- c. Furnish from an approved supplier.
 - 1) [Iowa DOT Materials I.M. 445.04, Appendix A](#) lists approved suppliers.
 - 2) Provide written certification that the blocks comply with ASTM C 1372 and the additional materials requirements of [Iowa DOT Materials I.M. 445.04, Appendix A](#).
- d. In lieu of furnishing blocks from an approved supplier, provide blocks from an approved system.
 - 1) [Iowa DOT Materials I.M. 445.04, Appendix B](#) lists approved systems.
 - 2) Test the required number of blocks from the lot to be installed according to [Iowa DOT Materials I.M. 445.04](#).
 - 3) Submit results of test data to the Engineer.

2. Wet-cast Concrete Wall Units: Comply with the materials and compressive strength requirements of [Iowa DOT Materials I.M. 445.05](#).

- a. Furnish from an approved supplier.
 - 1) [Iowa DOT Materials I.M. 445.05, Appendix A](#) lists approved suppliers.
 - 2) Provide written certification that the blocks comply with [Iowa DOT Materials I.M. 445.05](#).
- b. In lieu of furnishing blocks from an approved supplier, provide blocks from an approved system.
 - 1) [Iowa DOT Materials I.M. 445.05, Appendix B](#) lists approved systems.
 - 2) Test the required number of blocks from the lot to be installed according to [Iowa DOT Materials I.M. 445.05](#).
 - 3) Submit results of test data to the Engineer.

B. Limestone: Furnish limestone slabs with a flat bottom and top and a clean face. Provide slabs with a minimum depth of 8 inches, or as specified in the contract documents, to ensure stability of the wall.

C. Landscape Timbers:

1. Minimum 6 inch by 6 inch (nominal) pressure-treated landscape timbers rated for ground contact. Ensure timbers are straight, solid, have at least three good sides, and are free of visible dry rot, with only a minor amount of splitting or cracking. Ensure all timbers used in a wall have the same cross-sectional area.
2. Provide 3/8 inch diameter galvanized spikes, 10 to 12 inches long.

D. Leveling Pad: Provide material recommended by the wall manufacturer or supplier.

1. **Granular Material:** Comply with [Iowa DOT Section 4132](#).
2. **Concrete:** Comply with [Section 6010](#). Provide Class C Concrete.

E. Subdrain: Comply with [Section 4040, 2.02](#). Minimum 4 inch diameter pipe.

2.01 MATERIALS (Continued)

- F. Porous Backfill Material (for Subdrain):** Comply with [Section 4040, 2.04](#).
- G. Engineering Fabric:** Provide fabric complying with [Iowa DOT Article 4196.01](#) for subsurface drainage.
- H. Unit Fill Material:** Comply with [Iowa DOT Section 4131](#).
- I. Backfill Material:**
 - 1. Granular Backfill Material:** Comply with [Iowa DOT Section 4133](#) when granular backfill material is necessary according to the manufacturer's requirements.
 - 2. Suitable Backfill Material:** Comply with [Section 2010](#).
- J. Fence:** If the contract documents require a fence, comply with [Section 9060](#).
- K. Safety Rail:** If the contract documents require a safety rail, comply with [Section 9080](#).

PART 3 - EXECUTION**3.01 EXCAVATION AND EMBANKMENT**

- A. Prior to beginning wall construction, compact proposed embankment behind the wall according to the field quality control requirements of [Section 2010](#) with the following exception: compact to a minimum of 90% of maximum Standard Proctor Density.
- B. Excavate to the line and grade specified in the contract documents. Minimize over-excavation. Install sheeting, shoring, or other retention systems as required to ensure the stability of the excavation.

3.02 INSTALLATION**A. General:**

- 1. **Height:** Overall wall height is limited to 4 feet.
- 2. **Foundation Soil Preparation:** Excavate and compact 12 inches of native soil beneath the leveling pad to 95% of maximum Standard Proctor Density.
- 3. **Leveling Pad:**
 - a. Construct a minimum 6 inch thick leveling pad of granular material, at a depth such that the entire first course will be completely below the finished grade at the base of the wall.
 - b. Compact granular material with a minimum of three passes of a vibratory plate compactor.
- 4. **Subdrain:**
 - a. Install subdrain behind the first course of retaining wall. Place porous backfill material around the subdrain to a minimum cover of 3 inches, and ensure a trench width of at least 8 inches.
 - b. Wrap porous backfill material with engineering fabric.
 - c. Ensure positive drainage on subdrain, and outlet subdrains into a storm sewer or along a slope at an elevation lower than the lowest point in the pipe behind the wall.
- 5. **Fence:** If the contract documents require a fence, comply with [Section 9060](#).
- 6. **Safety Rail:** If the contract documents require a safety rail, comply with [Section 9080](#).

B. Modular Block Retaining Wall:

- 1. **Unit Installation:**
 - a. Place units side by side for the full length of wall alignment. Establish alignment by means of a string line or offset from the base line.
 - b. Ensure units are in full contact with the leveling pad.
 - c. Install connecting pins. Fill open cells of blocks with unit fill material; tamp the fill.
 - d. Sweep all excess material from top of units and install the next course. Ensure each course is completely filled prior to proceeding to the successive course.
 - e. Place each course so that pins protrude into adjoining courses a minimum of 1 inch or to tolerances recommended by the supplier/manufacturer. Two pins are required per unit. Repeat the above procedure for each course to the top of wall height.
 - f. At the end of each course, where the wall changes elevation, turn the units into the backfill material. Place units to create the minimum radius possible. Install a minimum of three units into the grade. Ensure only the front face of the units is visible from the side of the wall.

3.02 INSTALLATION (Continued)**2. Backfill Material Placement:**

- a. Place each lift of granular backfill material following the erection of each lift of wall. Where reinforcement material is present, roughly level the backfill material before placing and connecting the reinforcement. If necessary, decrease the lift thickness to obtain the specified density.
 - b. At the end of each day's operations, shape the last level of backfill material to allow runoff of rain water away from the wall face.
 - c. Compact granular backfill material according to the field quality control requirements of [Section 2010](#) with the following exception: ensure the moisture content falls within a range from 3% under optimum moisture to no more than the optimum moisture content.
 - d. Place and compact backfill material without disturbing or distorting the tieback reinforcement (if present) or the wall. Do not use tamping type rollers or other rollers that may damage the reinforcing. Use light mechanical tampers to achieve the required compaction in a strip 3 feet wide adjacent to the backside of the wall; compaction density testing will not be required within 3 feet of the back of the wall.
- 3. Tieback Reinforcement Installation:** Install tieback reinforcement according to the manufacturer's requirements.

C. Limestone Retaining Wall:

1. Place limestone slabs. Ensure adjacent slabs are in full contact without gaps.
2. Stagger vertical joints so no joint is located closer than 2 feet to a joint in the course below it.
3. After each course is laid, place backfill material behind the wall and compact with hand tools to a density equal to or greater than the existing soil behind the wall.

D. Landscape Timbers:

1. Lay first course of timbers horizontally, ensuring timbers are level. Set back each succeeding course 1/2 inch.
2. Secure each course to the course below it using spikes placed 2 feet from each joint and spaced at no more than 4 feet. Drill pilot holes in timbers to facilitate installation of spikes.
3. Stagger vertical joints so no joint is located closer than 2 feet to a joint in the course below it.
4. Install tiebacks with length equal to the wall height, perpendicular to the wall face, spaced at 8 feet. Stagger location of tieback on each course. Do not install tiebacks in bottom three courses or upper two courses of timbers. Ensure the end of the tieback is flush with the front of the retaining wall. Attach tieback to course below it using a spike.
5. After each course is laid, place backfill material behind the wall and compact with hand tools to a density equal to or greater than the existing soil behind the wall.

END OF SECTION