

SECTION 506—RETAINING WALLS

506.01—Description

This work shall consist of constructing rubble and hydraulic cement concrete retaining walls in accordance with the plans and these specifications and in conformity to the lines and grades shown on the plans or as established by the Engineer.

506.02—Materials

- (a) **Dry rubble and mortar rubble retaining walls** shall be constructed of stone conforming to the requirements of Section 204 and mortar conforming to the requirements of Section 218.
- (b) **Hydraulic cement concrete retaining walls** shall be constructed of concrete conforming to the requirements of Section 217.
- (c) **Reinforced concrete crib walls** shall be constructed of precast concrete units. Concrete shall conform to the requirements of Section 217 except that No. 7 aggregate may be used in lieu of No. 57 aggregate. Crib units shall be free from cracks, depressions, spalls, patched or plastered surfaces or edges, and any other defects that might impair their strength or durability.
- (d) **Drain pipe** shall conform to the requirements of Section 232.02.
- (e) **Reinforcing steel** shall conform to the requirements of Section 223, Grade 40 or 60.
- (f) **Porous backfill** shall conform to the requirements of Section 204.02(c).
- (g) **Granular backfill within crib walls** shall be any material available within the project limits consisting of sand, sandy loam, gravel, rock, or a combination thereof. Materials containing a high percentage of fines, such as clay and silt soils, shall not be used.
- (h) **Piles** shall conform to the requirements of Section 403.

506.03—Procedures

Excavation, backfill, and foundation exploration shall conform to the requirements of Section 401.

Concrete construction shall be performed in accordance with the requirements of Section 404. Immediately following finishing operations, concrete shall be cured and protected in accordance with the requirements of Section 404.03.

- (a) **Dry Rubble and Mortar Rubble Retaining Walls:** Stones shall not be placed in freezing weather or when stone contains frost.

Each stone shall have a thickness of at least 8 inches; a width of at least 1 1/2 times the thickness; and, except for headers, a length at least equal to 1 1/2 times the width. The thickness of courses if varied shall diminish from the bottom to the top of the wall.

Header stones in the heart of the wall shall be the same size as in the face and shall extend at least 12 inches into the core or backing. They shall occupy at least 1/5 of the face area of the wall and shall be evenly distributed. Header stones in walls 2 feet or less in thickness shall extend entirely through the wall.

Stones shall be roughly squared on joints, beds, and faces. Selected stone, roughly squared and pitched to line, shall be used at angles and ends of walls.

Stones shall be placed to line and in courses roughly leveled. Bottom or foundation courses shall be composed of large, selected stones. Courses shall be placed with bearing beds parallel to the natural bed of the material.

Shaping or dressing of stone shall be performed before stone is placed in the wall. Dressing or hammering that will loosen the stone will not be permitted after placement.

- 1 **Dry rubble retaining walls:** Face joints shall be not more than 1 inch in width.

Each stone shall have a firm bearing on the underlying course at no fewer than three points. Open joints, both front and rear, shall be chinked with spalls fitted to take firm bearing on their top and bottom surfaces and shall have a firm bearing throughout the length of the stone.

- 2 **Mortar rubble retaining walls:** Each stone shall be cleaned and thoroughly wetted with water before it is placed, and the bed that is to receive it shall be cleaned and moistened. Stones shall be bedded in freshly prepared mortar. Mortar joints shall be full, and stones shall be carefully settled in place before mortar has set. Spalls will not be permitted in beds. Joints and beds shall not have an average thickness of more than 1 inch.

Whenever possible, face joints shall be properly pointed before mortar has set. Joints that cannot be pointed shall be prepared for pointing by raking them out to a depth of 2 inches before mortar has set. Face surfaces of stones shall not be smeared with mortar forced out of joints.

Vertical joints in each course shall offset joints with those in adjoining courses by at least 6 inches. A vertical joint shall not be located directly above or below a header.

If a stone is moved or a joint is broken, the stone shall be taken up, mortar shall be thoroughly cleaned from the bed and joints, and stone shall be placed in fresh mortar.

Joints that are not pointed at the time stone is placed shall be thoroughly wetted with clean water and filled with mortar. Mortar shall be driven into joints and finished with an approved pointing tool. The wall shall be kept wet while pointing is being done. In hot or dry weather, pointed masonry shall be protected from the sun and kept wet by saturated burlap for at least 3 days after completion.

After pointing is completed and mortar has set, the wall shall be thoroughly cleaned and left in a neat, orderly condition.

- (b) **Concrete Retaining Walls:** Concrete retaining walls shall be constructed in accordance with the requirements of Sections 403, 404, and 406.
- (c) **Reinforced Concrete Crib Walls:** Crib units that are damaged during erection shall be removed and replaced at the Contractor's expense.

Granular backfill shall be used inside and approximately 2 feet in back of and beyond each end of a crib. Backfilling for the crib wall shall follow closely the erection of successive tiers of units. The wall shall not be placed higher than 3 feet above the backfilled portion. Backfill shall be placed carefully to avoid distorting the crib wall.

506.04—Measurement and Payment

Standard retaining walls will be measured in cubic yards, complete-in-place, within the limiting dimensions shown on the plans, and will be paid for at the contract unit price per cubic yard. This price shall include rubble stone, concrete, joint material, and weep holes.

Concrete and reinforcing steel for special design retaining walls will be measured and paid for in accordance with the requirements of Sections 404.08 and 406.04, respectively.

Reinforced concrete crib walls will be measured in cubic feet of the net volume of concrete in crib units, complete-in-place, and will be paid for at the contract unit price per cubic foot. This price shall include concrete and reinforcing steel.

Granular backfill will be measured and paid for as regular excavation in accordance with the requirements of Section 303.06.

Porous backfill for retaining walls will be measured and paid for in accordance with the requirements of Section 401.04.

Piles for retaining walls will be measured and paid for in accordance with the requirements of Section 403.08.

Excavation for retaining walls will be measured in accordance with the requirements of Section 401.04 and will be paid for at the contract unit price per cubic yard. This price shall include excavation, foundation exploration, sheeting and shoring, placing and compacting backfill and disposal of surplus material, and porous backfill when not specified as a separate pay item.

Payment will be made under:

| Pay Item | Pay Unit |
|---------------------------|-----------------|
| Retaining wall (Standard) | Cubic yard |
| Concrete crib (Standard) | Cubic foot |
| Retaining wall excavation | Cubic yard |