732-R-433 METAL BIN-TYPE RETAINING WALLS

(Revised 02-16-06)

The Standard Specifications are revised as follows:

SECTION 732, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 732 – METAL BIN-TYPE RETAINING WALL

732.01 Description

This work shall consist of furnishing materials and placement of metal bin-type retaining walls in accordance with 105.03.

MATERIALS

732.02 Materials

The Contractor shall make arrangements to purchase the materials described herein, including the wall units and all necessary incidentals.

Materials shall be in accordance with the following:

Structure Backfill 904*

** Slag will not be allowed*

Structure backfill shall have a minimum resistivity of 3000 Ω cm at 100% saturation when tested in accordance with AASHTO T 288. The pH of the backfill material shall be in the range of 5 to 10 as determined in accordance with AASHTO T 289. The maximum soluble salt content of the backfill material shall not exceed 100 ppm chlorides and 200 ppm sulfates as determined in accordance with AASHTO T 291 and AASHTO T 290, respectively. If the minimum resistivity exceeds 5000 Ω cm at 100% saturation, the requirement of testing for chlorides and sulfates may be waived.

(a) Metal Bin-Type Retaining Walls

Metal bin-type retaining walls shall consist of adjoining closed face cells filled with structure backfill to form a gravity type retaining structure. The cells are constructed of sturdy lightweight, steel members that are bolted together. The necessary bolts and appurtenances shall be furnished for complete assembly of the units into a continuous closed face wall of connected bins.

The units in the wall shall be in accordance with the dimensions shown on the plans. The units shall present a uniform workmanlike appearance when assembled. The base metal shall be no less than 16 gage.

The base metal sheets shall be galvanized on both sides by means of the hot-dip process in accordance with ASTM A 123 and the minimum zinc coating thickness shall be 2 oz/sq ft (610 g/m^2). All metal sheets will be inspected to ensure that they are true to size and free from defects, which may impair their strength and durability.

A type A certification in accordance with 916 for the bin-wall shall be furnished prior to use. One copy of all test results performed by the Contractor, which are necessary to demonstrate compliance with the specifications, shall be furnished to the Engineer.

(b) Backfill Material

Backfill materials used for the bin-wall sections shall be structure backfill.

A type A certification in accordance with 916 for structure backfill shall be furnished prior to use. One copy of all test results performed by the Contractor, which are necessary to demonstrate compliance with the specifications, shall be furnished to the Engineer.

CONSTRUCTION REQUIREMENTS

732.03 General

All units shall be so fabricated that units of the same nominal size shall be fully interchangeable. No drilling, punching, or drifting to correct defects in manufacture will be permitted. All units having improperly punched holes shall be replaced with no additional payment. The ends of all stringers and spacers shall be bolted to corner columns by means of connecting channels.

The proper curvature for the face of a wall constructed on a curve shall be obtained by the use of shorter stringers in the front or rear panels of retaining walls as shown on the plans or as otherwise directed.

The wall height and depth may be varied. Two or more designs of retaining walls may be incorporated in the same wall by the use of standard split columns to make the connection on the step-back.

732.04 Foundation Preparation

The foundation for the structure shall be graded level for the bin-walls or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall be compacted in accordance with 203. The base of the wall excavation shall be proofrolled with a vibratory roller weighing no less than 10 t (9 Mg), or with other approved compacting equipment. If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.

732.05 Retaining Wall Excavation

This work shall consist of the excavation of material whose removal is necessary for the construction of the bin-type retaining walls in accordance with the plans, the requirements herein, or as directed. Excavation shall include the construction and subsequent removal of all necessary bracing, shoring, sheeting, cribbing, and all pumping, bailing, and draining.

Prior to starting excavation operations at the wall site, clearing and grubbing shall be in accordance with 201.03. The Contractor shall clear and grub the area to the

excavation in accordance with the limits shown on the plans. All timber, stumps, and debris shall be disposed of in accordance with 201.03.

The Contractor shall notify the Engineer a sufficient time before beginning the excavation so that measurements may be taken of the undisturbed ground.

Where necessary for safety, the excavation shall be shored or braced in accordance with State and local safety standards. Excavation and related work shall be performed such that no portion of the wall is endangered by subsequent operations.

Where excavation for the wall is adjacent to a traveled way, the method for shoring, sheeting, or bracing the excavation opening shall be approved before beginning the excavation. The Contractor shall submit five copies of drawings in accordance with 206.09 showing details of the proposed method of excavation protection.

After the excavation for each wall location has been performed, the Contractor shall notify the Engineer.

All material for backfill shall be subject to approval and shall be free from large or frozen lumps, wood, or other undesirable material. All backfill shall be compacted in accordance with 203.

732.06 Backfill Placement

The filling for the interior of the bin and behind the wall shall be structure backfill placed in layers not to exceed 6 in. (150 m) in thickness. Backfilling behind the wall shall progress with the filling of the bins and shall not be carried ahead of the interior bins. Existing slopes, which are shaped so as to cause a wedge action in the backfill, shall be benched before backfilling.

Structure backfill shall be compacted to 95% of the maximum dry density in accordance with AASHTO T 99. Compaction equipment shall be in accordance with 409.03(d). Density of the compacted backfill will be determined in accordance with 203.24(b).

The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have placement moisture content between optimum and -3 of the optimum moisture content. Backfill material with placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniformly acceptable through the entire lift.

Compaction within 3 ft (1 m) of the back face of the bin-walls shall be achieved by means of a minimum of three passes with a lightweight mechanical tamper, roller, or an alternative vibratory system.

At the end of each day's operation, the last level of backfill shall be sloped away from the bin-walls. In addition, surface runoff from adjacent areas shall not be permitted to enter the wall construction site.

732.07 Method of Measurement

This work will be measured by the square foot (square meter) of facial area for each design height and thickness of wall complete in place and accepted. Common excavation will be measured by the cubic yard (cubic meter) in accordance with 203.27 to the neat lines shown on the plans. Structure backfill will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09.

732.08 Basis of Payment

This work will be paid for at the contract unit price per square foot (square meter) for bin-walls. Common excavation will be paid for at the contract unit price per cubic yard (cubic meter) in accordance with 203.28 to the neat lines shown on the plans. The structure backfill will be paid for at the contract unit price per cubic foot (cubic meter) in accordance with 211.10. Unsuitable foundation materials will be paid for in accordance with 211.10.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Bin-Walls, Metal	*SFT (m2)*

The cost of furnishing, handling, and installing the metal units including all materials, bolts, and appurtenances; necessary excavation and structure backfill testing; and all labor, equipment, all necessary incidentals, or replacement of any metal units damaged and replaced during construction shall be included in the cost of the bin-walls.