

ITEM 34

CATCH BASINS, INLETS AND MISCELLANEOUS DRAINAGE STRUCTURES

34.01 SCOPE OF WORK

This item shall consist of catch basins, inlets, inspection holes and miscellaneous drainage structures constructed of such materials and in accordance with these Specifications at the locations and in conformity with the lines, grades and dimensions shown on the Plans or required by the Engineer. These structures shall include the furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown the Plans or required by Engineer. The structures shall provide for the collection of surface water with the exception of manholes and inspection holes with closed covers which will be designated on the Plans or required by the Engineer.

34.02 BRICK

Brick shall be medium hard or better grade MA Brick, conforming to the requirements of the latest ASTM "Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)," Serial Designation C 32.

34.03 MORTAR

The mortar for brick masonry and similar work shall be composed of one part of Portland Cement and three parts mortar sand by volume. The Portland Cement shall conform to the requirements of ASTM "Standard Specification for Portland Cement," Serial Designation C 150, Type 1. The sand shall conform to the requirements of AASHTO, "Standard Specification for Aggregate for Masonry Mortar," Serial Designation M 45. The water shall be clean and free from injurious amounts of sewage, oil, acid, strong alkalies or vegetable matter.

34.04 CONCRETE

a) Plain and reinforced concrete used in structures, connection of pipes with structures, support of structures or frames, shall be Class A.

b) Precast concrete catch basins, Inlets and miscellaneous drainage structures may be precast. These precast structures shall meet the requirements set forth in ASTM 478 and ASTM C913.

34.05 FRAMES, COVERS AND GRATINGS

The castings shall conform to the following requirements:

(a) Castings shall meet the requirements of AASHTO, "Standard Specification for Gray Iron Castings," Serial Designation M 105, and shall be made in accordance with City Standard frames, grates and backs as shown on the Drawings.

(b) All castings shall be true to form and dimensions, and shall be free from inclusions of foreign material, casting faults, injurious blow holes, cracks, sponginess, and other defects rendering them unsuitable.

(c) The finished frame and cover or grate shall have the bearing surfaces machined or ground so that there will be no variation that will permit rocking or rattling, and the diameter of the cover or grate shall be such as to fit the frame without wedging.

(d) All grate castings shall be designed for supporting a uniform load of one hundred (100) pounds per square inch. The open areas of the gratings shall be as designated on Plans, and the design loading shall be as specified.

34.06 STEPS

The steps or ladder bars shall be gray or malleable cast iron, galvanized wrought iron, or galvanized steel. The bars shall be smoothly rolled and free from slivers, depressions or seams. The steps shall be the size, length, and shape as shown on the Plans. The steps which are not galvanized shall be given a coat of bituminous paint when directed.

34.07 UNCLASSIFIED EXCAVATION

(a) The Contractor shall do all excavation for structures and structure footings to the lines and grades or elevations, shown on the Plans, or as staked by the Engineer. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the Plans, shall be considered as approximate only, and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be deemed necessary to secure a satisfactory foundation.

(b) Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation, and excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

(c) The Contractor shall do all bracing, sheathing, or shoring necessary to perform and protect the excavation and the structure; also, as required for safety or to conform to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

(d) Unless otherwise provided, bracing, sheathing or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in such a manner as not to disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

(e) After each excavation is completed, the Contractor shall notify the Engineer to that effect, and concrete and reinforcing steel shall be placed after the Engineer has approved the depth of the excavation and the character of the foundation material.

34.08 BRICK STRUCTURES

(a) Foundations

A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of Class A concrete mix. The foundation shall be built to the correct elevation, and shall be finished to insure the least possible resistance of flow.

(b) LAYING BRICK

1. All bricks shall be thoroughly clean. The bed which is to receive the brick shall be thoroughly cleaned and wetted with water before placing mortar thereon. All brick shall be laid in freshly made mortar composed of one part by volume of Portland Cement and three parts by volume of sand, with the possible addition of hydrated lime in an amount not to exceed fifteen percent (15%) by volume of the cement used. The brick shall be laid in courses using the shoved joint method to thoroughly bond them into the mortar and always with the joints completely filled with mortar. The brick shall be laid in a work person-like manner and true to the lines and grades indicated on the Plans. The arrangement of headers and stretchers shall be such as will thoroughly bond the masonry, and unless otherwise indicated, brick masonry shall be of alternate headers and stretchers with consecutive courses breaking joints. The courses shall be laid continuously with joints broken or alternating evenly with the joints in the proceeding courses. The joints shall not be less than one-fourth inch (1/4") more than one-half inch (1/2") in thickness. Face joints shall be neatly struck, using the weather joint. All joints shall be finished properly as the laying of brick progresses.

2. No spalls or batts shall be used except in shaping around irregular openings or connections or when unavoidable to finish out a course, in which case, a full brick shall be used at the corner and the bat in the interior of the course.

3. In case any brick is removed, or a joint broken during the laying, the brick shall be taken up, the mortar thoroughly cleaned from the brick, bed, joints, and the brick re-laid in fresh mortar. In hot and dry weather or when directed, the brick masonry shall be protected and kept moist for a period of at least forty-eight (48) hours after laying of the brick.
4. Brick masonry shall not be constructed in freezing weather or when bricks contain frost, except by written permission of the Engineer and subject to such conditions for protection against freezing.

34.09 CONCRETE STRUCTURES

- (a) The structures shall be constructed of concrete, built on prepared foundations, conforming to the dimensions and form indicated on the Plans. Any reinforcement required shall be of the kind, type and size, and shall be furnished, located, spaced, bent and fastened as indicated on the Plans. It shall be approved by the Engineer before the concrete is poured.
- (b) All invert channels shall be constructed and shaped accurately so as to be smooth, uniform, and cause minimum resistance to flow. The interior bottom shall be sloped downward toward the outlet.
- (c) Precast Concrete structures may be used in lieu of any poured in place concrete structure.

34.10 INLET AND OUTLET PIPES

Inlet and outlet pipes shall extend toward the walls of the structures for a sufficient distance beyond the outside surface for connections, but shall be cut off flush with the wall on the inside surface unless otherwise directed. Concrete or brick and mortar shall be constructed around the pipes so as to prevent leakage and form a neat connection.

34.11 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS

- (a) All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the Engineer and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in-place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.
- (b) When frames or fittings are to be placed upon previously constructed masonry, the bearing surface or masonry shall be brought true to line and grade and present an even bearing surface in order that the entire face or back of the unit will come in contact with the masonry, as indicated on the Plans or as directed and approved by the Engineer. All units shall set firm and secure.

(c) After the frames or fittings have been set in final position and the concrete or mortar has been allowed to harden for seven (7) days, the grates or covers shall be placed and fastened down.

34.12 INSTALLATION OF STEPS

The steps shall be installed as indicated on the Plans, or as directed by the Engineer. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is poured. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until seven (7) days have elapsed. After this period has expired, the steps shall be cleaned and painted, unless they have been galvanized.

34.13 BACKFILLING

(a) After a structure has been completed, the area around it shall be filled with approved material, in horizontal layers not to exceed three inches (3") in loose depth, and compacted to the density specified. The fill shall be made to the elevation shown on the Plans, or as directed by the Engineer.

(b) No backfilling shall be placed against any structure until permission is given by the Engineer. In the case of concrete, such permission will not be granted until the concrete has been in place for fourteen (14) days, or until the tests made by the laboratory under the supervision of the Engineer establish that the concrete has attained sufficient strength to withstand any pressure created by the methods used and materials placed without damage or strain beyond a safe factor. Adequate provisions shall be made for thorough drainage.

(c) Fill shall be deposited all around a structure to approximately the same elevation at the same time. Special care shall be taken to prevent any wedging action against the structure, and all slopes bounding or within the area to be backfilled will be stepped or serrated to prevent wedge action.

(d) All backfill shall be compacted to the density required by Item 1.

(e) Backfill shall not be measured for direct payment. Performance of this work is not payable directly, but shall be considered as subsidiary obligation of the Contractor, covered under the contract unit price for the structure involved.

34.14 CLEANING AND RESTORATION OF SITE

(a) After the backfilling is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankment, shoulder or as ordered by the Engineer.

(b) After all work is completed, the Contractor shall remove all of his/her tools from the construction site, leaving the entire site free, clear and in good condition.

(c) Performance of the work described in this section is not payable directly, but shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for the structure.

34.15 DETERMINATION OF PAY QUANTITIES (IF APPLICABLE)

(a) The quantities of catch basins or inlets shown on the Drawings for which payment will be allowed shall be the actual number of each type, size and depth of catch basin or inlet, four feet deep or less, installed by the Contractor and accepted by the Engineer.

(b) The depth of all catch basins or inlets will be measured from the top of the frame to the invert of the lowest sewer entering or leaving the structure. Catch basins or inlets four feet or less in depth shall be measured and paid for as one catch basin or inlet at the contract unit price, each, for the catch basin or inlet as set forth under the applicable item in the Bid Schedule.

(c) For a catch basin or inlet more than four feet in depth, payment will be allowed for extra depth, per vertical foot, for each foot thereof over four feet at the applicable unit price provided for in the Bid Schedule. Fractions of a foot of extra depth shall be accumulated until one foot has been constructed for payment.

(d) All other items such as rock excavation, pipe, etc., shall be paid for under their respective items in the Bid Schedule as elsewhere provided herein.

34.16 PAYMENT (IF APPLICABLE)

Payment for all catch basins or inlets as constructed under these Specifications shall be made for the quantities determined in the manner specified above as listed under the contract pay items in the Bid Schedule. These amounts, so paid, shall constitute full compensation to the Contractor under this item and shall cover the cost of furnishing all labor, materials, tools, plant equipment, services, and other expenses in connection with the furnishing and construction of catch basins or inlets complete-in-place including all excavation, backfill, masonry, all castings, reinforcing steel, inspection and tests, all as herein specified.

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