

ITEM 031090

Item 0310901 - CAST IRON WASHINGTON BOLLARD

Item 0310902 - CAST IRON WASHINGTON BOLLARD ILLUMINATED

Item 0310903 - CAST ALUMINUM WASHINGTON BOLLARD

Item 0310904 - CAST ALUMINUM WASHINGTON BOLLARD ILLUMINATED

Item 0310905 - CAST IRON OBSTRUCTION BOLLARD

Item 0310906 - CAST IRON OBSTRUCTION BOLLARD ILLUMINATED

Item 0310907 - CAST ALUMINUM OBSTRUCTION BOLLARD

Item 0310908 - CAST ALUMINUM OBSTRUCTION BOLLARD ILLUMINATED

DESCRIPTION

Work under this item shall consist of furnishing and installing a lighted or unlighted ornamental bollard and concrete foundation at the locations, and of the size and dimensions shown on the plans or as directed by the Engineer in conformity with these specifications. Ornamental bollards shall be as manufactured by Sentry Electric Corporation or approved equal.

REFERENCED ITEMS

None

REQUIRED SUBMITTALS

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for bollard in accordance with the contract general requirements.

Shop Drawings:

Submit 5 copies of shop drawings for bollards in accordance with the contract general requirements. Include color selection chart with submission.

MATERIALS

Bollards: Ornamental bollards shall be fully ASTM 356.1 cast aluminum construction, or Cast Iron, or approved equivalent, free from voids, pits, dents, molding sand and foundry grinding marks. All design radii shall be smooth and intact exterior surface finish shall be smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes.

Cast aluminum ornamental bollards shall be fabricated from aluminum ingot with the following minimum requirements:

Aluminum alloy	319
Yield Strength, KSI	18
Tensile Strength, KSI	27
Brinell Hardness	70
Elongation (% in 2 inches)	2

Cast Iron ornamental bollards shall be fabricated from Cast Iron with the following minimum requirements:

Cast Iron A.S.T.M. A48-83 Class	30
Tensile Strength, KSI	30
Brinell Hardness	201

Ornamental bollards shall be fabricated with dimensions and design characteristics as shown in this specification and the drawings.

Portland Cement Concrete: Concrete for foundations shall conform to Class "A" and shall meet the requirements of Article M.03.01 of The State of Connecticut, Department of Transportation, Standard Specification for Roads, Bridges, and Incidental Construction, Form 816, 2004.

Reinforcing: Reinforcing bars to be furnished and placed under this item shall be "Deformed Bars", ASTM A-615-04 Grade 60, of the sizes and lengths indicated on the plans in the Reinforcing Schedule. Steel reinforcement bars shall be placed in the exact positions shown on the plans or as directed by the Engineer.

Anchor Bolts: The dimensions shall be shown on the plans or as recommended by the manufacturer and the bolts shall be made of steel conforming to ASTM F-1554-99, Grade 55. Anchor bolts, hex nuts, flat washers and split lock washers shall be hot-dip galvanized in accordance with the requirements of ASTM A-153-03, Class C.

Optical Assembly: bollard optical assembly shall be removable for relamping and access to the ballast assembly. The optical assembly shall have the mating anti rotational device which will mate with the base anti rotational device. The optical system shall be made of a multi tiered specular ALZAKreflector system in type V distribution. The reflector system shall be protected by a clear acrylic lens. The optical assembly shall be attached to the locking groove in the base, with four stainless steel cup point screws.

Electrical: Meets U.L. 1572 standard for safety. The ballast shall be a high power factor, constant wattage auto transformer type. The power factor correction shall be at least 90%. The capacitor shall be non-PCB, dry film and be temperature rated for 100 degree C. Luminaire shall have a porcelain socket which is rated for 600V with 4 KV pulse and uses a nickel - plated screw shell with spring - loaded center contact. Luminaire type and size will be specified on the drawings.

Finish: The bollard shall be finished with a three step process consisting of an acid etching industrial wash primer, a two part epoxy base primer and a two part aliphatic acrylic polyurethane finish coat. Finish system shall be Tnemec. Color shall be determined by the Engineer.

Field welding and field bending of anchor bolts is prohibited. If installed anchor bolts do not fit the base plate, the Contractor shall remove and replace the foundation.

The contractor shall ensure anchor bolts are plumb in the foundation. A minimum anchor bolt embedment of at least 24" is required.

CONSTRUCTION METHODS

All manufacturer instructions shall be adhered to in the installation of ornamental bollards. All instructions shall be furnished to the Engineer prior to installation for review and comment.

The ornamental bollards shall have a removable base panel section. The panel shall be secured together at the top and bottom with minimum 1/4"- 20 stainless steel, tamper proof screws.

Ornamental bases shall have an anodize conversion coating to provide proper base for paint if required by the manufacturer.

The contractor shall ensure plumpness of the bollard.

Foundations for bollards shall be a minimum of 42" below grade. The diameter of the foundation shall be constructed to accommodate the bolt circle of the bollard and shall provide a minimum of 2" concrete cover over the anchor bolts. Foundations shall be drilled to the width and depth as required by auger or other suitable equipment. Mass excavation and backfill will not be permitted. A form may or may not be used by the contractor however to ensure that the top of each ornamental bollard fits snugly around each foundation, the Contractor will take measurements and create a standard bolt template for use in securing anchor bolts

in proper position.

The bottom of the ornamental bollard will completely cover the top of the bollard foundation. Any remaining gap between the base and the top of the sidewalk shall be sealed with grout. The top of the concrete foundation shall be made so that it is flush with the surrounding finish grade. The outer edges of the concrete foundation shall not extend outside of the base of the bollard and be visible.

A sample of each bollard shall be supplied to the Engineer for approval prior to ordering if so specified in the contract documents.

METHOD OF MEASUREMENT

Work under these items will be measured for payment by the actual number of Ornamental Bollards and Foundations, of the type specified, installed and accepted in place at each pole with necessary appurtenances.

BASIS FOR PAYMENT

This work will be paid for at the contract unit price for each "(TYPE) ORNAMENTAL BOLLARD (TYPE) which price shall include all materials, tools, equipment, labor and work incidental thereto.

<u>PAY ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
0310901	Cast Iron Washington Bollard	EA
0310902	Cast Iron Washington Bollard Illuminated	EA
0310903	Cast Aluminum Washington Bollard	EA
0310904	Cast Aluminum Washington Bollard Illuminated	EA
0310905	Cast Iron Obstruction Bollard	EA
0310906	Cast Iron Obstruction Bollard Illuminated	EA
0310907	Cast Aluminum Obstruction Bollard	EA
0310908	Cast Aluminum Obstruction Bollard Illuminated	EA