1. **GENERAL**
   1. **SECTION INCLUDES**
      1. Shop fabricated ferrous metal pipe bollards, galvanized and prime painted.
   2. **REFERENCES**
      1. ASTM A53 ‑ Pipe, Steel, Black and Hot‑Dipped, Zinc‑coated Welded and Seamless Steel Pipe.
      2. ASTM A123 ‑ Zinc Coating (Hot‑Dip) on Iron and Steel Products.
      3. SSPC SP-2 – Steel Structures Painting Council, Steel Preparation.
   3. **SUBMITTALS**
      1. Shop Drawings: Indicate profiles and sizes.
   4. **FIELD MEASUREMENTS**
      1. Verify field measurements.
2. **PRODUCTS**
   1. **MATERIALS**
      1. Pipe: ASTM A53, Grade B, Schedule 40.
         1. Size: 4 inch nominal, .237 inch wall thickness.
      2. Shop and Touch‑Up Primer: Series P10-99 modified alkyd, red color, air dried, by Tnemec or equal as approved in accordance with Division 1, General Requirements for substitutions.
      3. Touch‑Up Primer for Galvanized Surfaces: Ready mixed Zinc rich galvanizing compound, DEVCON Z, by Devcon Corp., Danvers, MA, GALVICON, by Southern Coatings, Sumter, SC, or equal as approved in accordance with Division 1, General Requirements for substitutions.
      4. Concrete: As specified in Section 03 30 00, 3500 psi minimum.
      5. Reinforcing: Deformed bars, as specified in Section 03200.
   2. **FABRICATION**
      1. Fit and shop assemble for delivery to site.
      2. Ease exposed edges to small uniform radius.
      3. Weld cap plate 1/8 inches thick, continuous weld and grind edges smooth.
      4. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 1/2 inch steel machine bolt.
   3. **FINISHES**
      1. Clean surfaces of rust, scale, grease and foreign matter prior to finishing, SSPC SP-2.
      2. Galvanize steel items to a zinc coating thickness in accordance with ASTM A123. Surfaces shall be free of icicles, spangles and puddling. Vent all enclosed spaces.
      3. Prime paint items with two coats.
      4. Paint bollards with Special Coatings under Section 09 90 00, Painting.
3. **EXECUTION**
   1. **EXAMINATION**
      1. Verify that field conditions are acceptable and are ready to receive work.
      2. Beginning of installation means erector accepts existing conditions.
   2. **INSTALLATION**
      1. Install bollards plumb and level, in concrete foundation.
      2. Concrete: Minimum 14 inch diameter, 3 ft deep.
      3. Reinforcing: Provide four No. 4 bars vertically, with four No. 3 horizontal ties.
   3. **ERECTION TOLERANCE**
      1. Maximum Variation From Plumb: 1/4 inch.
      2. Maximum Offset From True Alignment: 1/4 inch.

**END OF SECTION**