Section 516—Aluminum Handrail

516.1 General Description

This work consists of placing handrail and posts made of cast, rolled, or extruded aluminum or of combinations of these materials. It also includes setting anchorages and preparing bearing areas.

516.1.01 Definitions

General Provisions 101 through 150.

516.1.02 Related References

A. Standard Specifications

Section 500—Concrete Structures

B. Referenced Documents

General Provisions 101 through 150.

516.1.03 Submittals

General Provisions 101 through 150.

516.2 Materials

All cast posts for any one structure shall be produced by the same manufacturer.

All materials shall meet the requirements of the following Specifications:

Material	Section
Aluminum Alloy Sheet and Plate	850.2.01
Aluminum Alloy Bars, Rods, Shapes, and Wire	850.2.02
Aluminum Alloy Bolts, Nuts, and Set Screws	850.2.03
Aluminum Alloy Washers	850.2.04
Aluminum Alloy Rivets	850.2.05
Aluminum Alloy Shims	850.2.06
Cast Aluminum Alloy Railing Post	854.2.02
Aluminum Alloy Sand Mold Castings	854.2.03
Aluminum Alloy Extruded Tubing	850.2.07
Aluminum Alloy Pipe	850.2.08
Aluminum Impregnated Caulking Compound	870.2.05.A.3
Neoprene Pads	885.2.01
Steel Bolts, Nuts, and Washers	852.2.01
Plain Steel Bars—Threaded Ends	852.2.02
Galvanizing	852.2.01.B

516.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

516.3 Construction Requirements

516.3.01 Personnel

General Provisions 101 through 150.

516.3.02 Equipment

General Provisions 101 through 150.

516.3.03 Preparation

General Provisions 101 through 150.

516.3.04 Fabrication

A. Fabricate Handrail

Fabricate handrail as follows:

1. Fabrication Material

   Fabricate handrail from plates, shapes, bars, pipe, castings, or from combinations of these materials as shown on the Plan details.

2. Handrail Not Supported on Concrete Parapets

   When erected bridge handrail will not be supported on a concrete parapet, fabricate the handrail so posts will be plumb.

516.3.05 Construction

A. Construct and Erect Handrail

Construct and erect handrail according to the Plan details and as follows:

1. Set Anchor Bolts

   Set anchor bolts as follows:

   a. Set the anchor bolts according to the Plan details and ensure that the bolts have the correct spacing and projection.

      Projections shown on the Plans are for flat grades and assume no use of shims.

   b. On other grades or where shims are needed, modify the projection shown on the Plans so that after all shims, pads, posts, and washers have been placed, the anchor bolt nut can be screwed completely onto the anchor bolt.

   c. If the projection is too short, lengthen or replace the bolt (at the Contractor's expense) as directed by the Engineer.

2. Prepare Bearing Areas

   Before placing the posts, prepare bearing areas as follows to obtain full contact between the posts or shims or pads and the concrete:

   a. Remove all concrete protrusions.

   b. Fill all depressions.

   c. Ensure that bearing areas for posts are true to grade.

   d. Finish concrete with the Type IV—Floated Surface Finish specified in Section 500.3.05.AB.5, "Type IV—Floated Surface Finish."

3. Protect Contact Surfaces

   Where aluminum alloys contact other materials, protect the contact surfaces as detailed on the Plans or as follows:

   a. **Contact with Other Metals or Wood.** Separate the contact surfaces with neoprene pads.

      Do not place aluminum alloys in direct contact with copper, copper base alloys, lead, nickel, iron, steel, or wood.

   b. **Contact with Concrete, Stone, or Masonry.** Separate the contact surfaces with neoprene pads.

4. Erect Handrail

   Erect handrail as follows:

   a. If the finish on rails or posts is damaged in handling, either repair it to the satisfaction of the Engineer or replace it (both at the Contractor's expense).

   b. Make all rails parallel to grade.

   c. Where bridge rail will be supported on a concrete parapet, set handrail posts normal to grade.

   d. Set other handrail posts plumb. If necessary, use aluminum alloy shims under post bases to achieve plumb posts.

e. Tighten the anchor bolt nuts to a snug fit with full bearing on the base of the post.
f. When posts and rails are completely bolted into place, ensure that they are true to line and grade.

516.3.06 Quality Acceptance

General Provisions 101 through 150.

516.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

516.4 Measurement

This work will be measured for payment in linear feet (meters) of accepted handrail. Handrail will be measured along the top rail from out-to-out of ends of aluminum rail or from out-to-out of aluminum end posts, whichever is greater. No deductions will be made for openings at deck expansion joints or at light standards.

516.4.01 Limits

General Provisions 101 through 150.

516.5 Payment

This work will be paid for at the Contract Price per linear foot (meter) for aluminum handrail complete in place.

Payment will be made under:

Item No. 516	Aluminum Handrail, (Type)	Per linear foot (meter)

516.5.01 Adjustments

General Provisions 101 through 150.

Section 517—Protective Concrete Collar for Existing Columns

517.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 518—Raise Existing Bridge

518.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 519—Concrete Bridge Deck Overlay

519.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 520—Piling

520.1 General Description

This work consists of placing completed piling in structures. The work includes incidentals and additional work except for the following:

- Prestressed concrete cylinder piling (see Project Special Provisions)