

## **SECTION 4 SLOPE PROTECTION (RIP-RAP)**

### **4.01 SCOPE OF WORK**

The work covered by this section consists of furnishing all labor, equipment, and materials, and performing all operations in connection with the construction of slope protection for the areas shown on the drawings or as directed by the City Engineer in accordance with these specifications and applicable drawings. All work shall conform to Section 72 of the State Standard Specification.

### **4.02 MATERIAL**

Cobbles used for rip-rap shall conform to the following requirements. The rip-rap shall be well graded within the following limits:

- A. The minimum size of stone shall be no less than 4 inches and the maximum size of stone shall be no more than 10 inches. Rip-rap shall be well graded from the minimum size stone to the maximum size stone permitted. The rip-rap shall be clean and free of dirt, sand and clay or other objectionable materials. Materials not meeting the above requirements as delivered at the site shall be rejected.
- B. Rocks and cobbles used for rip-rap shall have a minimum apparent specific gravity of 2.5 measured by California Test Method 206, and a minimum durability index of 52 as measured by California Test Method 229. The Contractor shall provide certified test results from the suppliers. All cobble rip-rap shall be placed so as to provide a minimum of voids. Local surface irregularities on the rip-rap shall not vary from the planned slopes by more than half of the specified thickness.

### **4.03 FOUNDATION PREPARATION**

Areas on which rip-rap is to be placed shall be trimmed and dressed to conform to cross sections shown on the drawings. Immediately prior to placing the rip-rap, the prepared base will be inspected by the City Engineer and no material shall be placed thereon until that area has been approved.

### **4.04 PLACEMENT**

Stone for rip-rap shall be placed on the prepared base in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids, and shall be constructed to the lines and grades shown on the drawings. Rip-rap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the bedding material.