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## 1.0 GENERAL

### 1.1 QUALITY CONTROL

- .1 Perform quality control tests for riprap and riprap bedding specified in Section 02330 – Earthwork Materials.
- .2 Transport only suitable materials meeting the specifications to the Site.

### 1.2 QUALITY ASSURANCE

- .1 The Minister may perform testing to assure conformance to the specified requirements after the materials have been placed.
- .2 The Minister may reject riprap and riprap bedding at the source, in the transport vehicle, in the stockpile, or in place.
- .3 During the course of the Work, and prior to acceptance, provide assistance to the Minister in conducting the following quality assurance testing:
  - .1 Load a 7 m<sup>3</sup> sample of each class of riprap, selected by the Minister, and transport to the on-Site test location as designated by the Minister. Weigh selected boulders from the sample to establish reference sizes for sorting. Sort all of the boulders in the sample into similar weight groups, and spread each weight group in a single row. The Minister will count the number of boulders in each weight group, compute the effective particle size ( $D_e$ ) and weight for each group, and determine the gradation for the sample.
  - .2 Provide a weigh scale capable of weighing each boulder individually. Calibrate the weigh scale at the start [and at the midpoint] of the riprap placement operations, or as required by the Minister.
  - .3 Provide all necessary labour and equipment to load, weigh, sort and spread the riprap samples.
  - .4 If the tested riprap sample meets the specifications, incorporate the riprap in the Work at a location designated by the Minister for reference purposes.
  - .5 A minimum of 1 gradation test may be conducted for each class of riprap, and for every [2000 m<sup>3</sup>] of each class of riprap. The frequency of riprap testing may be increased as deemed necessary by the Minister until the Contractor consistently meets the specified requirements.
- .4 The Minister may take samples of riprap bedding for quality assurance testing. Cooperate with the Minister during testing.

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## **2.0 PRODUCTS**

### **2.1 MATERIALS**

- .1 Provide materials in accordance with the following.
- .2 Riprap Zone [6A, 6B and 6C]: Refer to Section 02330 – Earthwork Materials for material specifications.
- .3 Riprap Bedding Zone [5A and 5B]: Refer to Section 02330 – Earthwork Materials for material specifications.

## **3.0 EXECUTION**

### **3.1 STOCKPILES**

- .1 Obtain prior authorization from the Minister for temporary stockpile locations on-Site. Do not stockpile riprap or riprap bedding in areas where contamination with the underlying soils can occur. Prepare stockpile areas by grading the area level, and diverting drainage from adjacent areas away from the stockpile locations.
- .2 Stockpile riprap and riprap bedding in a manner that minimizes segregation.

### **3.2 PLACEMENT**

- .1 Place riprap and riprap bedding at the locations, and to the lines, grades, slopes, and elevations specified in the Contract Documents.
- .2 Surfaces to receive riprap and riprap bedding may be frozen, but remove water, snow, ice, frozen lumps, and other deleterious materials from receiving surfaces.
- .3 Do not place riprap and riprap bedding until the receiving surfaces have been inspected by the Minister. Rectify defects, including any identified by the Minister, until the receiving surfaces meet the requirements of the Contract Documents.
- .4 Place riprap and riprap bedding by clam shell, dragline, backhoe, or similar lifting equipment. Do not end-dump and push riprap and riprap bedding into place on the slopes.
- .5 Do not cause segregation, particle damage, breakdown, or excessive displacement of the previously placed riprap and riprap bedding. Replace or repair damaged or displaced material.
- .6 Obtain the specified distribution of the various sizes of particles throughout the mass by using selective loading at the source or stockpile, by controlled dumping of successive loads during placing, or by other methods of placement.
- .7 Commence placement of riprap and riprap bedding from the toe of the slope and proceed up the slope.
- .8 Place riprap and riprap bedding to its full thickness in one operation. Compaction is not required.

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- .9 Place riprap in a closely packed arrangement such that smaller rocks fill the voids between larger rocks and there are no unfilled spaces that would permit the escape of underlying layers of placed materials. Interlock particles and dress slopes as required.
- .10 Rearrange rocks to eliminate any tendency of the rocks to move or slide after placement.
- .11 Do not break individual riprap particles after placement.
- .12 Do not allow equipment to travel upon riprap and riprap bedding.
- .13 Provide a completed riprap surface that is smooth, regular, and uniform.

**3.3 PLACEMENT TOLERANCES**

- .1 Place riprap within a tolerance of +100 mm of the specified thickness and within a tolerance of +100 mm of the specified elevation.
- .2 Place riprap bedding to within a tolerance of +50 mm of the specified thickness and within a tolerance of +100 mm of the specified elevation.

**END OF SECTION**