

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- .1 This section specifies requirements for supplying and placing rock scour protection, filter stone and armour stone for erosion protection at locations and to dimensions indicated on drawings or designated by Departmental Representative.

### **1.2 RELATED SECTIONS**

- .1 Section 31 23 25 - Rock and Gravel Fill.
- .2 Section 31 32 21 - Geotextiles.

### **1.3 MEASUREMENT FOR PAYMENT**

- .1 Filter stone: Supply and placement of filter stone, including the cost of all plant, labour, equipment, and materials required to complete the work as specified, will be measured by the cubic meter place measure (CMPM). The volume of material will be determined in place from measurements taken prior to and at completion of the work. Include incidental to this unit price all costs associated with the supply and installation of geotextile, as detailed on the drawings.
- .2 Rock scour protection: Supply and placement of rock scour protection , including the cost of all plant, labour, equipment, and materials required to complete the work as specified, will be measured by the cubic meter place measure (CMPM). The volume of material will be determined in place from measurements taken prior to and at completion of the work.
- .3 Amour Stone: Supply and placement of amour stone protection, including the cost of all plant, labour, equipment, and materials required to complete the work as specified, will be measured by the cubic metre (CMPM). The volume of material will be determined in place from measurements taken prior to and at completion of the work.

## **PART 2 - PRODUCTS**

### **2.1 FILTER STONE**

- .1 Hard, dense with relative density (specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects.

## **PART 2 - PRODUCTS**

### **(CONT'D)**

#### **2.1 FILTER STONE**

##### **(CONT'D)**

- .2 Stones to be used as filter stone will measure approximately 250 – 300 mm diameter.
- .3 Supply rock spalls to fill open joints.
- .4 Field stones of appropriate sizes are acceptable for hand-placed filter stone.

#### **2.2 ROCK SCOUR PROTECTION**

- .1 Hard, dense with relative density (specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects.
- .2 Stones to be used as rock scour protection to be well graded with maximum sizes not exceeding 700 mm on any side and minimum size of not less than 500 mm on any side.
- .3 Field stones of appropriate sizes are acceptable.

#### **2.3 ARMOUR STONE PROTECTION**

- .1 Hard, dense with relative density (specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects.
- .2 Stones to be used will weigh not less than 1.0 tonnes or more than 2.0 tonnes.
- .3 Field stones of appropriate sizes are acceptable.

## **PART 3 - EXECUTION**

### **3.1 PLACING**

- .1 Install silt curtain around construction areas prior to commencement of operations, to prevent silt from escaping the construction area.
- .2 Place filter stone/rock scour protection/amour stone protection as directed to thickness and details indicated on drawings or as designated by Departmental Representative.

**PART 3 - EXECUTION**  
**(CONT'D)**

**3.1 PLACING**  
**(CONT'D)**

- .3 Where stones are to be placed on slopes, ensure that fill is placed to the slopes as indicated on the drawings.
- .4 Fine grade area to be protected to uniform even surface. Fill depressions with suitable material and compact to provide firm bed.
- .5 Place stones in manner approved by Departmental Representative to secure surface and a stable mass. Place larger stones at bottom of slopes.
- .6 Hand Placing:
  - .1 Use larger stones for lower courses and as headers for subsequent courses.
  - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
  - .3 Finish surface evenly, free of large openings and neat in appearance.
- .7 Filter stones shall be carefully placed to give a thickness perpendicular to slope as indicated on drawings.
- .8 Place armour stone in locations as shown on the drawings, and in a manner approved by the Departmental Representative.
  - .1 Dumping of armour stone will not be permitted. Each stone will be lifted and individually placed.
  - .2 Side slopes to be 1.5 horizontal to 1.0 vertical as indicated on the drawings.
  - .3 Place armour stone to a total layer thickness as indicated on the drawings.
  - .4 Contractor will choose his stones and place them in such a way that the whole structure will be bonded and consolidated to as great an extent as nature or rock will allow.

**3.2 TESTING**

- .1 Submit rock materials samples for testing to testing laboratory approved by the Departmental Representative prior to commencement of quarry production. Allow sufficient lead time to perform and report tests before start of production.
- .2 Contractor will be responsible for procurement of samples for testing and arrange and pay for shipment of samples to testing laboratory.
- .3 Departmental Representative will pay for costs associated with laboratory testing of proposed rock materials.

**PART 3 - EXECUTION**  
**(CONT'D)**

**3.2 TESTING**  
**(CONT'D)**

- .4 Only materials satisfactorily tested and approved by the Departmental Representative will be quarried and placed in the work.