SECTION 713 - BEACHING

713.01 DESCRIPTION

This section covers the requirements for the supply and placing of rock, stone or manufactured block beaching for the protection of batter slopes, drainage channels and culvert endwalls as shown on the drawings. Four types of beaching are covered by this section:

Type 1: Un-grouted rock beaching.

Type 2: Grouted rock beaching.

Type 3: Grouted flat stone beaching.

Type 4: Butted paving block beaching.

713.02 CONFORMITY WITH DRAWINGS

The finished surface of the beaching shall conform with the levels, lines and grades as shown on the drawings or as specified.

713.03 MATERIALS

Unless otherwise specified, the Contractor shall supply all materials necessary to construct the beaching as specified, including rock or paving blocks, bedding, filter materials, geotextile, concrete, mortar, reinforcement and drainage pipes.

Prior to the commencement of work, the Contractor shall nominate the source of the proposed materials, supply specified test results and provide a representative sample for approval by the Superintendent.

Materials used for rock beaching shall be resistant to weathering action of air, wind and water and shall be free from staining, laminations, cracks and other structural defects which may reduce its mechanical strength.

All materials used for rock beaching shall comply with the requirements for 'sound' rock as specified in Section 801 and the Los Angeles Value (LAV) requirements of Table 801.033. Rock beaching shall have a minimum specific gravity of 2.5 t/m^3 when tested in accordance with the requirements of the current Australian Standard - *Method for sampling and testing of aggregates-Particle density and water absorption of coarse aggregate-Weighing-in-water method* as listed in Section 175. In addition, the rock beaching shall have a minimum wet strength of 100 kN and a wet/dry strength variation not exceeding 45 when tested in accordance with the requirements of the current Australian Standard – *Methods for Sampling and Testing Aggregates-Wet/Dry Strength Variation* as listed in Section 175.

(a) Beaching Material

(i) Type 1 Beaching

Rock for Type 1 beaching shall consist of dense field or quarry rock.

All rocks shall have a mass of between 20 and 70 kg and at least 60% by number shall be over 40 kg mass. Rocks shall be of such size that the layer of beaching is not less than 225 mm thick.

(ii) Type 2 Beaching

Rock for Type 2 beaching shall have the same general requirements as for Type 1 beaching except that the rocks shall be of such size that the layer of beaching shall be at least 150 mm thick and of mass between 10 kg and 40 kg with at least 60% by number having a mass of over 25 kg. The rocks shall be uniform in colour.

(iii) Type 3 Beaching

Type 3 beaching shall consist of dense, flat stone.

Beaching stone shall be uniform in size, shape and colour. Each piece shall be not less than 65 mm thick and have a face area not less than 0.1 m^2. At least 50% of the pieces by number shall have an area of more than 0.2 m^2.

(iv) Type 4 Beaching

Paving blocks shall be of a type, face size, thickness and colour as specified and shall as a minimum comply with the requirements of the current Australian Standard – *Masonry units, segmental pavers and flags* as listed in Section 175.

(b) Bedding

Type 1 beaching shall not routinely require a granular bedding, however a very robust needle-punched non-woven geotextile (mass >250 g/m^2) shall be laid over the trimmed surface where rock beaching is to be placed. Geotextiles used shall comply with and be placed in accordance with the requirements of Section 210. The geotextile shall be buried to a depth of 300 mm at the edges of beaching and wrapped under the toe wall unless otherwise specified. The geotextile shall be laid evenly with no kinks or folds, and joints shall be formed by overlapping the geotextile by not less than 300 mm and not more than 500 mm.

Where specified or shown on the drawings, Type 1 beaching shall include an open graded (20-100 mm) crushed rock bedding material.

Type 2 beaching shall not require bedding unless otherwise specified or shown on the drawings.

Bedding for Type 3 beaching shall consist of at least 30 mm of mortar, comprising one part portland cement and nine parts sand.

Bedding for Type 4 beaching shall consist of a 50 mm minimum layer of bedding sand or stabilised sand with a slow setting binder.

713.04 PREPARATION OF UNDERLYING SURFACE

Areas on which beaching is to be placed shall be trimmed as required to provide a finished surface level of beaching in accordance with the drawings. Any scours or hollows in the surface shall be filled with compacted Class 4 crushed rock, or trimmings if approved by the Superintendent.

Unless otherwise specified, trimmed material shall be removed from the site.

713.05 BEACHING PLACEMENT

(a) General

Wherever practicable, the placement of beaching materials shall be only by mechanical means. For beaching materials with a mass greater than or equal to 12 kg, placement by mechanical means is mandatory.

Prior to commencement of any work where placement of rock beaching is proposed, a detailed job safety assessment shall be undertaken by a suitably qualified and experienced professional and a suitable Safe Work Method Statement developed to cover all necessary elements.

The completed job safety assessment and the approved Safe Work Method Statement shall be submitted to the Superintendent for review.

The documentation submitted must demonstrate compliance with the Occupational Health and Safety Regulations 2007, in particular, Part 3.1 – Manual Handling, Part 3.3 - Prevention of Falls and Part 5.1 – Construction.

Beaching materials shall be firmly bedded on the prepared embankment and/or bedding if required and laid in courses commencing from the bottom of any slope.

Placed un-grouted beaching shall form a tight 'interlocking grid', which will prevent the removal of individual rocks.

The general surface of the finished beaching shall not vary from a 3 metre straight edge laid across the surface of the beaching by more than:

100 mm for Type 1 Beaching
75 mm for Type 2 Beaching
30 mm for Type 3 Beaching
20 mm for Type 4 Beaching

Finished surface levels of rock beaching placed in open drains shall be flush with adjacent soil levels to allow mowing and maintenance practices over the finished rock surface. Rock beaching shall not protrude more than 50 mm above the surrounding ground levels.

The finished rock surface shall be stable to allow public access and shall comply with the requirements of Section 28 of the OH&S Act 2004 'Design for Safe Workplaces'.

(b) Type 1 Beaching

Gaps between rocks shall be as narrow as practicable and not exceed 60 mm on average. Unless otherwise specified, voids shall be filled to at least mid-height of the rocks with topsoil.

The level of the bedding material shall be adjusted and where planting is required to occur around Type 1 rock beaching. The bedding material shall allow for a depth of 75 mm of topsoil to finish flush with the rock surface and adjacent ground levels.

(c) Type 2 Beaching

Width of joints may vary between 10 mm and 60 mm, with an average not exceeding 40 mm. Level difference between edges of adjacent rocks shall not exceed 40 mm. The joint pattern shall be random and the joints kept free from debris before grouting.

(d) Type 3 Beaching

Beaching material shall be thoroughly cleaned and saturated with water before being bedded on fresh mortar as specified in Clause 713.03(b).

The joint pattern shall be random and the joints kept free from debris prior to grouting. Width of joints may vary between 10 mm and 60 mm, with an average not exceeding 40 mm. Level difference between edges of adjacent stones shall not exceed 25 mm.

(e) Type 4 Beaching

The blocks shall be placed on the specified bedding sand and laid in accordance with the manufacturer's recommendation. Edge blocks shall be neatly cut to establish straight edges. Dry sand shall be broomed into the joints on completion and lightly watered. The sand used in this mixture shall all pass a 1.18 mm AS sieve and 10-20% shall pass a 0.075 mm AS sieve.

713.06 GROUTING

Grouting with mortar shall be carried out when the air temperature is above 5°C and work shall be kept moist for three days after grouting.

Joint mortar shall consist of one part portland cement and three parts sand by volume, and be thoroughly mixed with water to produce grout of suitable consistency. Propriety cementitious mortars with equivalent performance may be used if approved by the Superintendent.

Grouted rock beaching shall be initially placed on a bed of mortar which infiltrates joints and final grouting shall ensure that mortar is firmly tamped into joints to a minimum depth of 150 mm.

The joints shall be neatly finished by filling with mortar. The final level of the mortar shall not be within 10 mm of the finished rock surface. Care shall be taken to keep the exposed rock face clean. Brooming of mortar across the face of the rocks will not be permitted.

713.07 PERIMETER WALLS

Perimeter and toe walls shall be constructed where shown on the drawings.

For Type 1 Beaching, toe walls 600 mm wide by 600 mm deep shall be constructed. They shall be lined with geotextile fabric and filled with hand packed rock, the larger voids between rocks being filled with smaller stones.

For Types 2, 3 and 4 Beaching, concrete perimeter walls shall be constructed around exposed edges of the beaching. Concrete used for this purpose shall be N20 strength grade complying with the requirements of Section 703.

Toe walls shall be 300 mm wide by 400 mm deep at the front face and reinforced with L8TM trench mesh top and bottom. The upper surface of the toe wall shall slope upwards at either the slope of the rock beaching or the adjacent verge as shown on the drawings. Side walls and other perimeter walls shall be 150 mm wide by 250 mm deep. The top of the walls shall be continuous with the beaching.

713.08 DRAINAGE

(a) Where specified, or shown on the drawings, a 100 mm diameter PVC pipe shall be laid down the batter in a trench beneath the bedding to discharge immediately above the top of the toe wall. The pipe shall be securely bedded within the backfilled compacted crushed rock or natural gravel trench.

(b) Weepholes consisting of 75 mm diameter PVC pipes shall be placed through the beaching at 2 m centres immediately above the top of the concrete toe wall and cut off flush with the face of beaching. Weepholes and other drainage lines shall not directly discharge onto areas of public access or shared user pathways.

713.09 CLEANING

On completion of the work, the beaching shall be cleaned to remove all foreign materials and discolouration from the beaching surface. Any joint mortar adhering to the surrounding rock surfaces shall be removed.