This specification outlines the requirements for supply and installation of baskets fabricated from wire mesh and filled with stone. A gabion structure consists of a number of baskets placed and wired together so that joints between baskets are as strong as the wire mesh, making a monolithic structure.

PART 1 REFERENCES

1.1 NOT APPLICABLE

PART 2 GENERAL

2.1 NOT APPLICABLE

PART 3 PRODUCTS

3.1 MATERIALS

.1 Gabion baskets:

.1 Fabricated so that sides, ends, lid and internal diaphragms readily assemble at site into rectangular baskets of sizes indicated.

.2 Single unit construction or with joints having strength and flexibility equal to that of mesh.

.3 When the length exceeds horizontal width, provide diaphragms of same mesh as gabion walls to divide basket into equal cells of a length not in excess of horizontal width.

.4 Wire mesh to be uniform hexagonal pattern wire woven in a triple twist pattern or welded wire with openings of approximately not greater than 80 x 100 mm and fabricated to be non-ravelling. Perimeter edges of mesh to be securely selvedged so that joints formed by tying selvedges are as strong as body of mesh.

.5 Wire to have following mechanical properties:

.1 Wire for mesh: 3.0 mm diameter
.2 Wire for selvedges: 3.8 mm diameter
.3 Wire for binding: 2.2 mm diameter
.4 Minimum tensile: 400 mPa strength
.5 Minimum elongation: 10 %
.6 Wire: hot dipped galvanized with a minimum of 250 g/m^2 and/or covered with a 0.5 mm thick polyvinyl chloride coating as specified in the MERX Schedule of Quantities and Prices.

.2 Stone fill:

.1 Stone to be clean, hard, durable and abrasion resistant and such that it will not disintegrate from action of wetting and drying, wave action, freezing and thawing cycles.

~~.1~~.2 Stones shall be either boulder, broken rock, quarry stone, broken concrete or gravel screenings.

.3 Stone to be minimum 100 mm to maximum 200 mm dimension unless otherwise specified.

.3 Tie-wire to secure the baskets shall be vinyl coated.

.4 Geotextile (filter fabric):

.1 Geotextile in accordance with Section 02897 – Geotextile (Filter Fabric). Type as indicated in Contract Documents.

3.2 PRODUCTION

.1 Gabions shall be so fabricated that the sides, ends, lid, base and diaphragms can be readily assembled at the construction site into rectangular baskets of the specified sizes. Gabions shall have all components interconnected in such a manner that the strength and flexibility at the point of connection is at least equal to that of the mesh.

.2 Where the length of the gabion exceeds its horizontal width, the gabion shall be divided by diaphragms, of the same mesh and thickness of steel wire as the body of the gabion, into equal cells whose length does not exceed the horizontal width. Diaphragms shall be secured in the proper position on the base section such that no additional tying will be required at this juncture.

.3 Gabions and gabion mats shall be supplied in the sizes and to dimensions indicated in the contract documents.

3.3 CERTIFICATION

.1 Gabions shall be accompanied by a certified report of tests showing that the products to be supplied meet the requirements of this specification, and by a statement of the system to be used in identifying the various sizes of gabions to be supplied.

.2 These requirements may be waived for subsequent supply, provided the supplier certifies that the gabions to be furnished are of the same specific material and manufactured as that covered by a certified report of the tests previously submitted and approved.

3.4 INSPECTION AND TESTING

.1 Notwithstanding the acceptance of certification, the Owner reserves the right to make inspections and tests, and at such times as the Owner may consider necessary to ensure that the materials supplied are in accordance with this specification.

.2 All materials failing to comply with the requirements of this specification shall be rejected.

.3 Rejection shall constitute automatic withdrawal of the Owner's approval. Applications for re-approval shall be substantiated by an up-to-date test report as required for certification.

3.5 SHIPPING AND MARKING

.1 Gabions shall be shipped folded flat in bundles each containing a uniform number of one size only, except as necessary to complete an order, and weighing not more than 230 kg.

.2 Bundles shall be clearly marked to show the size and number of gabions. In addition, each gabion shall be clearly coloured coded, or otherwise suitably identified, to indicate the size.

.3 Gabion mats shall be shipped in rolls of 30 m long, 2 or 3 m wide with ends, sides and dividers attached to base.

PART 4 EXECUTION

4.1 SITE PREPARATION

.1 All stumps, roots, debris, and loose boulders in excess of 100 mm in maximum dimension shall be removed and disposed of off the right-of-way prior to placing of gabions. The necessary grading and excavation for gabion structure shall be carried out to such lines and grades as indicated in the contract and as required to provide a smooth uniform gradient.

4.2 INSTALLATION

.1 Install gabions to lines and grades indicated or as directed by Owner. Follow manufacturer's instructions in assembling baskets.

.2 The foundation shall be excavated to an even finish and to the required grade.

.3 Place geotextile on prepared surface in accordance with Section 02897 – Geotextile (Filter Fabric) and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.

.~~2~~.4 The contractor shall assemble gabions according to the manufacturer recommendations.

.~~3~~.5 The contractor shall unfold each gabion to the open position. The four corner edges shall be wired to secure the gabion shape. The edges of the diaphragms shall be wired to the gabions walls in the correct position.

.~~4~~.6 Each assembled gabion shall be securely wired to the adjacent gabions along the top and the vertical edges prior to placing of stone.

.~~5~~.7 In assembling individual units, the selvedges at the corners shall be bound together and the selvedges of diaphragms shall be bound directly to the fabric with binding wire. The binding wire, throughout the length of the selvedged, shall be tightly looped around every other mesh opening in such a manner that single and double loops are alternated. Loops shall be separated by a distance not greater than 100 mm.

.~~6~~.8 To achieve better alignment and finish, the contractor shall stretch gabions before filling.

.~~7~~.9 Where gabion units are grouped together in whatever configuration is called for in the contract, each unit shall be secured to adjoining units by binding along and throughout the length of each contacting selvedged edge, in a manner similar to that described for assembling individual units.

.~~8~~.10 Gabions shall be assembled so as to leave no wire ends projecting outside the basket on any exposed surface.

4.3 FILLING BASKETS

.1 On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce a satisfactory alignment and appearance. The remaining rock is to be placed randomly by hand.

.2 After the first gabion in a row has been filled to provide the necessary weight, the remaining rock shall be placed only after the baskets have been stretched taut by means of a standard fence stretcher or by other means approved by the Owner and adjusted to proper alignment. Four or five gabions in a row may be stretched simultaneously.

.3 In order to prevent local deformation, when 0.91 m gabions or 0.46 m gabions are placed in rows, they shall be filled in stages. When the first basket has been filled, the second shall have been filled two-thirds of its depth and the third basket shall have been filled to one-third of its depth.

.4 Fill basket cells in lifts of 300 mm and connect opposite walls with two tie wires after each lift.

4.4 PLACING OF CONNECTING WIRES

.1 When a gabion has been filled to a depth of 0.23 m in the case of 0.46 m gabions or to a depth of 0.30 m in the case of 0.91 m gabions, two horizontal connecting wires, one in each direction, shall be placed. In the case of 0.91 m gabions, an additional horizontal connecting wire shall be placed in each direction at the end 0.60 m mark when the basket has been two-thirds filled. Connecting wires shall be looped around two adjoining mesh openings and shall be pulled hand tight.

.2 Where 0.46 m depth gabions are used for channelling or revetment, connecting wires are not necessary.

4.5 PLACING GABIONS

.1 Place baskets in position prior to filling with stones.

.2 Wire adjacent baskets together at corners so that joints are as strong as mesh.

.3 For underwater placement, gabions may be prefilled. Provide special devices to handle filled baskets without distortion and to place gabions in position. Connect adjacent basket together when in place using a diver.

4.6 SECURING LIDS

.1 When the basket has been filled, the lid shall be bent over by hand and with the use of a pinch bar, if necessary, inserted at intervals between the selvedges of the lid and the selvedges of the top and sides. The lid shall be pulled until the selvedges coincide and shall be secured to the front and ends by binding wire in a manner in accordance with subsection 4.2 Installation of this specification.

PART 5 PAYMENT

5.1 MEASUREMENT FOR PAYMENT

.1 Gabions of the size and type specified will be measured in cubic metres of stone filled wire mesh baskets incorporated into the work based on the nominal dimensions of the gabion units used.

.2 Measurement for volume of the gabion structure shall be the sum of the volumes of the individual rows of gabions.

.1 The volume of a row of gabions shall be calculated as the product of : the mean length of a row, times the mean height of the row

measured along the face of the row, times the mean depth of the row measured perpendicularly to the exposed face.

~~.2~~.3 Only gabions placed within specified lines and grades will be measured for payment.

~~.3~~.4 Where excavation required for gabions overlaps excavation required for other work, then payment for excavation will be made in accordance with the specification for the other work as though no excavation were required for gabions.

5.2 BASIS OF PAYMENT

.1 All costs associated with the work outlined in this specification shall be deemed to be included in the appropriate unit and lump sum prices quoted as outlined in the Measurement for Payment subsection of this section and as included in the MERX Schedule of Quantities and Prices.

.2 Mass excavation and backfill, if required, shall be paid in accordance with Section 02224 – Roadway Excavation, Embankment & Compaction.

~~.2~~.3 Geotextile Filter Fabric will be paid in accordance with Section 02897 – Geotextile (Filter Fabric).