CITY OF FORT WAYNE MASTER UPDATED: 03/12/2018

SECTION

NTS: This Sections covers both box type gabions and mattress style gabions. Additionally, this Section contains specific manufacture information for a double twisted, woven wire mesh style gabion. If a welded style gabion is required for project edit this Section. These structures can be used for retaining walls, sounds barriers, channel linings, slope stabilization, dams and weirs, add additional product and installation requirements based on project specific requirements.

1. GENERAL
	1. DESCRIPTION
		1. Scope:
			1. Contractor shall provide all labor, materials, equipment, and services required to provide and place gabions as shown and specified.

NTS: Insert at (--1--) below only sections covering products, construction, and equipment that a user may expect to find in this section, but are specified elsewhere. Do not list administrative and procedural Division 01 sections.

* + 1. Related Sections:
			1. Section 31 00 05 – Trenching and Earthwork.
			2. Section 31 05 19 - Geosynthetics for Earthwork.
			3. (--1--)

NTS: Edit Section “1.2” below to suit project requirements.

* 1. MEASUREMENT AND PAYMENT
		1. Gabions:
			1. Work Item Number and Title

 **31 36 10-A Gabions**

* + - 1. This item shall include costs associated with the Work including, but not limited to the gabion (wire, rock, etc.), the geotextile filter wrap, the stone base and all other labor, equipment, material, compaction, and placement of the gabions.
			2. The payment shall be on a linear foot basis.
			3. Areas included in this item are as shown on the Drawings.
		1. Revetment Mattresses:
			1. Work Item Number and Title

 **31 36 10-B Revetment Mattresses**

* + - 1. This item shall include costs associated with the Work including, but not limited to the reno mattress (wire, rocks, etc.), the grotextile filter wrap, the stone base, and all other labor, equipment, material, compaction, and placement of the revetment mattresses.
			2. The payment shall be on a linear foot basis.
			3. Areas included in this item are as shown on the Drawings.
	1. REFERENCES
		1. Standards referenced in this Section are listed below:
			1. American Society for Testing and Materials, (ASTM).
				1. ASTM A370 – Standard Test Methods and Definitions for Mechanical Testing of Steel Products
				2. ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
				3. ASTM A975 - Standard Specification for Double- Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire with PVC Coating)
	2. QUALITY ASSURANCE
		1. Manufacturer's Qualifications:
			1. Gabions manufacturer shall be a specialist in the manufacture of gabions, and have produced and successfully installed gabions on five projects.
	3. SUBMITTALS
		1. Action Submittals: Submit the following:
			1. Product Data:
				1. Submit manufacturer's product data, Specifications, installation instructions, and maintenance instructions.
				2. Submit gradation test of stone fill for Gabions and Revetment Mattresses.
	4. PRODUCT DELIVERY, STORAGE AND HANDLING
		1. Material delivery, storage and handling must conform to requirements in Contract Documents. Refer to Section 01 65 00 Product Delivery Requirements and Section 01 66 00 Product Storage and Handling Requirements.

NTS: Gabions can be utilized for bank stabilization and erosion control. Add or delete any products listed below to suit project requirements.

1. PRODUCTS

NTS: Gabions and revetment mattresses can be vegetative, if project requires vegetative gabions and revetment mattresses add the requirements below.

* 1. GENERAL
		1. Gabions shall be fabricated to be a single unit, including the base lids and sides.
		2. Mattresses shall be manufactured with all components mechanically connected at the facility with exception of the mattress lid.
		3. Steel mesh properties shall be in accordance with ASTM A975.
		4. Geosynthetic Fabric
			1. Use Non-woven geotextile fabric refer to Section 31 05 19 – Geosynthetics for Earthwork for material requirements.
	2. GABION BOX

NTS: Insert at (--1--), (--2--) and (--3--) the project specific dimension requirements.

* + 1. Gabion Box:
			1. Provide (--1--) Width by (--2--) Length by (--3--) Height Gabion Boxes, as Manufactured by:
				1. Maccaferri Inc
				2. Terra Aqua Inc.
				3. Or Equal

NTS: Edit stone fill requirements based on project specific gabion box dimensions and locally available material. Manufacturer recommends rocks sizes between 4-8 inches. Based on locally produced materials the INDOT Uniform A rip rap aligns closest to the manufacturer recommended sizes. Edit based on project specific requirements.

* + 1. Fill Material
			1. Gabion box shall be filled with clean, hard, dense, durable stone, rounded and angular shape that shall not disintegrate on exposure to water of weathering during the life of the structure.
			2. Provide INDOT Uniform A rip rap in accordance with INDOT Section 904.04(d), with the following gradation requirements:

|  |
| --- |
| Gradation Requirements (Percent Smaller) |
| Size, in | Uniform A |
| 8 | 100 |
| 6 | 35-80 |
| 3 |  |
| 1 | 0-20 |

Table Based on INDOT Standard Specification Section 904.40(f).

NTS: Insert at (--1--), (--2--) and (--3--) the project specific dimension requirements.

* 1. REVETMENT MATTRESS
		1. Revetment Mattress:
			1. Provide (--1--) Width by (--2--) Length by (--3--) Height Revetment Mattress, Manufactured by:
				1. Maccaferri Inc
				2. Terra Aqua Inc.
				3. Or Equal

NTS: Edit stone fill requirements based on project specific mattress dimensions and available local material. Manufacturer recommends mattress rocks shall range between 3 inches and 5 inches for units with heights of 6 inches and 9 inches, and 4 inches to 8 inches for units with a height of 12 inches. Based on locally produced materials the INDOT Uniform B rip rap aligns closest to the manufacturer recommended sizes. Based on, the City Standard Detail for bank stabilization, stone shall be between 2 inches and 6 inches. Edit as required for project.

* + 1. Fill Material
			1. Mattress shall be filled with clean, hard, dense, durable stone, rounded and angular shape that shall not disintegrate on exposure to water of weathering during the life of the structure.
			2. Provide INDOT Uniform B rip rap in accordance with INDOT Section 904.04(d), with the following gradation requirements:

|  |
| --- |
| Gradation Requirements (Percent Smaller) |
| Size, in | Uniform B |
| 8 | - |
| 6 | 95-100 |
| 3 | 35-80 |
| 1 | 0-20 |

Table Based on INDOT Standard Specification Section 904.40(f).

NTS: Gabions typical wire mesh type is 8 cm by 10 cm. Revetment mattresses typical mesh type is 6 cm by 8 cm. Gabions normally have a larger mesh wire diameter, selvedge wire diameter, and mesh opening compared to revetment mattresses.

* 1. WIRE MESH
		1. Wire Mesh
			1. Gabions shall be fabricated to be a single unit, including the base lids and sides.
			2. Mesh shall be hexagonal woven mesh with joints formed by twisting each pair of wires through 3 ½ times.
			3. Steel wire shall have a maximum tensile strength of 75,000 psi, in accordance with ASTM A641.
			4. Steel wire elongation shall not be less than 12 percent, in accordance with ASTM A370.

NTS: In aggressive environments gabions mesh and lacing shall be coated with polyvinyl chloride. Edit Paragraph “C.” below for project requirements.

* + 1. Coating
			1. Wire mesh shall be coated in zinc conforming to ASTM A641, Class III soft temper coating.
			2. Utilize the same coating for lacing wire and stiffeners as the wire mesh.
1. EXECUTION
	1. PREPARATION
		1. Gabions and revetment mattresses shall be placed on properly graded and dressed subgrades in accordance with lines and grades shown on the drawings or as required by Engineer.
	2. INSTALLATION
		1. Gabions and revetment mattresses shall be designed and installed per manufacturer’s recommendations.
		2. No stone shall pass through gabions and revetment mattresses mesh.
		3. Gabions and revetment mattresses shall be laid over 6” thick #2 stone base.
		4. Place a porous heavy duty geosynthetic fabric between interface of gabions and revetment mattresses and the subbase interface. The unexposed sides of gabions shall also be wrapped using a geosynthetic. Refer to section 31 05 19 – Geosynthetics for Earthwork for material requirements.
		5. Filling
			1. Place stone fill in the gabion box or revetment mattresses to minimize voids.
			2. Over fill the gabions and/or mattresses by 1 inch to allow for settlement.
			3. Stone filling shall not exceed 24 inch vertical drop.

NTS: Lacing wire or bracing wire can be used as internal connecting wires when a project requires gabions to be stacked on top of each other.

* + 1. Lacing and Bracing Wire
			1. Lacing wire shall be secured at the corner of the gabion or mattress and the lacing wire shall be laced alternating with single and double loops every other opening at intervals of not more than 6 inches. Rings may be used in lieu of lacing wire.
		2. Lid Closing
			1. Once the gabions and mattresses are filled, the lid shall be pulled tight until the lid meets the perimeter edges. Lid shall be tightly laced and/or fastened along all edges, ends and tops of diaphragms.
	1. MAINTENANCE
		1. Gabions and mattress linings shall be maintained per manufacturer’s recommendations.
		2. Inspect gabions and revetment mattresses for settlement, scour, damaged wire mesh, or wire corrosion.

+ + END OF SECTION + +