

Section 02370

Specification for 8.5 / 216mm Inch ESW Used in Temporary and Permanent Erosion and Sediment Control Applications

1 GENERAL

1.1 SECTION INCLUDES

- A. Erosion control and Sediment Retention Wattles (*ESW*) or Slope Interruption Devices (*SID*) commonly known as Wattles, are elongated tubes of compacted straw and/or other fibers that are installed along contours or at the base of slopes to help reduce soil erosion and retain sediment. They function by shortening slope length, reducing runoff water velocity, trapping dislodged soil particles and ameliorating the effects of slope steepness. Wattles are used as water flow dissipaters trapping sediment when located prior to Drain Inlets (D.I.)'s, etc. Wattles are highly effective when they are used in combination with other surface soil erosion/re-vegetation practices such as surface roughening, straw mulching, erosion control blankets, hydraulic mulching and application of bonded fiber matrix or other hydraulic soil stabilizers. This specification does not apply to other types of ESW's, straw logs or fiber rolls such as rolled erosion control straw or wood fiber blankets rolled up to create a wattle type device.

1.2 RELATED SECTIONS

- A. Section 02050 - Basic Site Materials and Methods
B. Section 02100 - Site Remediation
C. Section 02200 - Site Preparation
D. Section 02300 - Earthwork

1.3 UNIT PRICES

- A. Method of Measurement: By the linear foot (or linear meter - as indicated in contract documents) including overlaps, and wastage.
B. Basis of Payment: By the linear foot (or linear meter - as indicated in contract documents) installed.

1.4 REFERENCES

- A. Salix Applied Earthcare.
B. SDSU Soil Erosion Research Laboratory
C. Accredited Independent Testing Facilities:
1. San Diego State University Soil Erosion Research Laboratory
2. Utah State Water Research Laboratory
D. California Department of Transportation - Caltrans
E. Michael V. Harding - CPESC

1.5 DEFINITIONS

- A. ESW: Erosion control Sediment retention Wattles, are machine produced straw filled tube compacted in seamless flexible netting material creating a densely filled fiber log.
B. SID: Slope Interruption Devices are ESW's placed along the contours of existing slopes to reduce the effective slope length.
C. FIBER ROLLS: Generic name for Wattles, rolled erosion control blankets and excelsior-filled tubes used as slope interrupter devices or Erosion control sediment Retention Wattles

- D. RECB: Rolled Erosion Control Blanket are generally a machine produced mat of organic, biodegradable mulch such as straw, curled wood fiber (excelsior), coconut fiber or a combination thereof, evenly distributed on or between photodegradable polypropylene or degradable natural fiber netting.
- E. WATTLES: Common name for ESW's, SID's, Straw Tubes, or Fiber Rolls.

1.6 SUBMITTALS

- A. Submit the following:
 - 1. Certification: The contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, and chemical composition of the fiber, netting and all other pertinent information to fully describe the Wattle composition. The Certification shall state that the furnished ESW meets the performance requirements of this specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.
 - 2. A certificate of weed free status shall be available from the manufacturer. The manufacturer shall use straw that is Certified Weed Free Forage under California Food and Agriculture Code Section 5101 and 5205.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturers permitted to furnish materials under this specification shall submit a written quality control program conforming to the requirements of Section 2.3 Quality Control.
 - 2. Manufacturers permitted to furnish materials under this specification shall provide documentation of field and/or laboratory testing that quantifies the erosion control and sediment retention performance of the product conforming to the requirements of Section 2.3 Quality Control.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Wattle labeling, shipment, and storage shall follow the manufactures written storage and handling procedures. Product labels shall clearly show the manufacturer or supplier name, wattle diameter and length.
- B. During storage, Wattles shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the rolls.

2. PRODUCTS

2.1 MANUFACTURER

- A. R. H. Dyck, Inc.
Earth Saver® Erosion Control Products
P.O. Box 310
Yolo, CA. USA 95697
1-866-WATTLES
1-530-662-7700
1-530-668-5140, Fax
www.earth-savers.com

2.2 MATERIALS

- A. Wattles shall be a straw-filled tube of flexible netting material exhibiting the following properties. It shall be a machine-produced tube of compacted rice straw that is Certified Weed Free Forage, by a manufacturer whose principle business is wattle manufacturing. The netting shall consist of seamless, high-density polyethylene and ethyl vinyl acetate and contain ultra violet inhibitors.
- B. Light weight rolled erosion control straw or wood fiber blankets (RECB) rolled up to create a wattle type device shall not be allowed under this specification.
- C. The Wattle shall meet the minimum performance requirements of Table 1. The product must be guaranteed to meet all numeric performance values in Table 1 under the specific conditions as stated.

TABLE 1 - TEMPORARY EROSION CONTROL AND SEDIMENT RETENTION WATTLE

Property	Test Method	Units	Min. Value
Mass per Unit Weight	Field Measured	(lbs/ft) / (kg/m)	1.9 / 2.82
Dimension	Field Measured	(Dia/Inches) / (Dia/mm)	8.5 / 216
Net Strand Thickness	Field Measured	(Inches) / (mm)	0.030 / .76
Net Knot Thickness	Field Measured	(Inches) / (mm)	0.055 / 1.39
Netting Unit Weight	Certified	(Ounces/ft) / (g/m)	0.35 / 32.55
Installed Free-Board Ht.	Field Measured	Height (in) / (cm)	6.5 / 16.51
Straw Fiber	Field Measured	Avg. Length (in) / (cm)	3.0 / 7.62
Soil Loss ¹	Rainfall Sim. ¹	% Effectiveness	62 ²
Fiber Content	Certified ³	% Rice Straw	100

¹ Minimum of three 10 year predicted storm events on 1V:3H slope with Clayey Sand type soil.

² Minimum sediment yield reduction value.

³ Certified Weed Free under Food and Agriculture Code sections 5101 and 5205.

- D. Approved Erosion Control and Sediment Retention Wattles are as follows:
- E. **Earth Saver®** - Manufactured by R.H. Dyck Inc.
 - 1. EE08.525PRL, EE08.525PRP, ES08.525PRP or ES08.525PRL
- F. Material Designation: Example ES08.525PRP-12
 E Manufacturer, S Product Style-Shrink Wrapped, 08.5 Diameter, 25 Length, P Netting Type-Photo, R Fiber Content-R Rice, P Packaging-Palletized, -12 Number of pieces per pallet.

2.3 QUALITY CONTROL

- A. Manufacturing Quality Control: Manufacturers providing materials under this specification shall provide documentation of field and/or laboratory testing that quantifies the erosion control and sediment retention performance of the product and instructions on the proper installation and maintenance of the Wattle. A certification of the testing requirement shall be provided by the manufacturer upon request. The certification shall at a minimum identify the Test Facility, Manufacturer, Product ID, Test ID and Test Date to verify conformance with manufacturers published specifications.
- B. Manufacturers providing materials under this specification shall upon request submit a written description of the manufacturer's quality control program to verify conformance with this specification. The manufacturer's quality control program shall include a guaranteed remedy for nonconforming material supplied to project.
- C. Manufacturing Quality Control: Product Performance testing shall be performed at an indoor laboratory accredited to perform such tests required for the Erosion control and sediment retention wattles. Performance testing is required for all products provided under this specification. Products must be guaranteed to perform to the minimum performance standards under the specific conditions as stated in this specification. Manufacturer's performance certifications and testing quality assurance shall be provided upon request to verify conformance with this specification.

3. EXECUTION

3.1 PREPARATION

- A. Proper site preparation is essential to ensure complete contact of the sediment retention device (Wattle) with the soil.
- B. The slope should be prepared to receive the surface mulching/re-vegetation treatment prior to installation of the Erosion control and sediment Retention Wattles.
- C. Remove all rocks, clods, vegetation or other obstructions so that the installed Wattles will have direct contact with the soil.
- D. A small trench 8-10 cm (2-3 inches) in depth should be excavated on the slope contour and perpendicular to water flow. Soil from the excavation should be placed down-slope next to the trench.

3.2 INSTALLATION

- A. Install the Wattles in the trench, insuring that no gaps exist between the soil and the bottom of the Wattle. The ends of adjacent Wattles should be tightly abutted so that no opening exists for water or sediment to pass through. Alternately, Wattles may be lapped, 15.24 cm (6") minimum to prevent sediment passing through the field joint.
- B. Wooden stakes should be used to fasten the Wattles to the soil. When conditions warrant, a straight metal bar can be used to drive a "pilot hole- through the Wattle and into the soil.
- C. Wooden stakes should be placed 15.24 cm (6") from the Wattle end angled towards the adjacent Wattle and spaced at 1.2 meter centers (4 feet) leaving less than 3-5 cm (1-2 inches) of stake exposed above the Wattle. Alternately, stakes may be placed on each side of the Wattle tying across with a natural fiber twine or staking in a crossing manner ensuring direct soil contact at all times. (see staking details).
- D. Terminal ends of wattles may be dog legged up slope to ensure containment and prevent channeling of sedimentation.
- E. Backfill the upslope length of the Wattle with the excavated soil and compact.
- F. Care shall be taken during installation so as to avoid damage occurring to the Wattle as a result of the installation process. Should the Wattle be damaged during installation, a wooden stake shall be placed either side of the damaged area terminating the log segment.
- G. Field monitoring shall be performed to verify that the placement does not damage the Wattle.
- H. Any Wattle damaged during placement shall be replaced as directed by the Engineer, at the contractor's expense.

3.3 INSTALLATION WITH EROSION CONTROL BLANKETS

- A. Trench and prepare slope per blanket manufacturer's recommendations.
- B. Prepare wattle installation trench at intermediate slope location (see entrenchment detail).
- C. Install blankets using manufacturer's recommended anchoring procedure.
- D. Anchor blanket in prepared wattle anchor trench.
- E. After blanket installation is complete, install Wattles as recommended in section 3.2, excluding sub-section 3.2 D.

3.4 INSTALLATION IN CONJUNCTION WITH TRACKWALKING

- A. Track-walk slope in accordance with Resident Engineer's instruction and/or plan specifications producing track indentations parallel to the horizon up the surface of the slope.
- B. After track-walking procedure is complete, install Wattles as recommended in section 3.2.
- C. Care shall be taken to minimize damage to track-walked area.

3.5 INSTALLATION IN CONJUNCTION WITH HYDROSEEDING

- A. Install Wattles as recommended in section 3.2.
- B. Hydroseed per manufacturer's recommendations after wattle installation is complete.

3.6 INSPECTION AND MAINTENANCE

- A. The Wattles shall be inspected after installation to insure that they are trenched-in and that no gaps exist under the wattles or between adjacent ends of the wattles.
- B. Wattles shall be inspected after significant rainfall events. Rills or gullies upslope of the wattle and any undercutting is to be repaired.
- C. Sediment deposits that impair the filtration capability of the wattle shall be removed when the sediment reaches one-third of the wattles functional freeboard height. Removed sediment shall be deposit within the project in such a way that the sediment is not subject to erosion by wind or water, or as directed by the Engineer.
- D. Installed Wattles shall be removed and/or replaced as required to adapt to changing conditions.

3.7 WATTLES IN A TEMPORARY EROSION CONTROL APPLICATION

- A. When no longer required for the intended purpose, as determined by the Engineer, temporary wattles shall be removed from the site. As an option, the straw wattles may be slit down the length of the netting, and the straw may be used on slopes or other areas, as designated by the Engineer. The netting shall be gathered and disposed of in regular means as it is non-hazardous, inert material.
- B. Trenches, depressions or any other ground disturbances caused by the removal of the temporary straw wattles shall be backfilled and repaired with the excess sediment captured by the wattle, prior to spreading the straw or other final erosion control protection.

3.8 WATTLES IN A PERMENANT EROSION CONTROL APPLICATION

- A. Leave wattles as installed to photodegrade or biodegrade over time as native and applied vegetation ultimately stabilize the repaired site.

END OF SECTION