

**VERSA-LOK (SRW)
SEGMENTAL RETAINING WALL UNITS**

PART 1: GENERAL

1.01 – DESCRIPTION

- A. Work includes furnishing and installing segmental retaining wall (SRW) units to the lines and grades designated on the construction drawings or as directed by the Architect/Engineer. Also included is the furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the construction drawings.

1.02 - RELATED WORK

- A. Section [_____]: Site Preparation
- B. Section [_____]: Earthwork damage.
- C. Section [_____]: Drainage Aggregate
- D. Section [_____]: Geosynthetic Reinforcement (delete if not applicable)

1.03 - REFERENCE STANDARDS

- A. ASTM C 90 Load Bearing Concrete Masonry Units
- B. ASTM C 140 Sampling and Testing Concrete Units
- C. ASTM D 698 Moisture Density Relationship for Soils, Standard Method
- D. NCMA TEK 50 A Specifications for Segmental Retaining Wall Units
- E. NCMA SRWU-1 Determination of Connection Strength between Geosynthetics and Segmental Concrete Units
- F. NCMA SRWU-2 Determination of Shear Strength between Segmental Concrete Units
- G. NCMA Design Manual for Segmental Retaining Walls
- H. Where specifications and reference documents conflict, the Architect/Engineer shall make the final determination of applicable document.

1.04 – CERTIFICATION

- A. Contractor shall submit a notarized manufacturer's certification prior to start of work stating that the SRW units meet the requirements of this specification.

1.05 - DELIVERY, STORAGE AND HANDLING

- A. Contractor shall check the materials upon delivery to assure that specified type, grade, color and texture of SRW units have been received.
- B. Contractor shall prevent excessive mud, wet concrete, epoxies, and like materials which may affix themselves, from coming in contact with the materials.
- C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated into the reinforced soil wall.

1.06 - MEASUREMENT AND PAYMENT

- A. Measurement of the SRW units is on a vertical square foot basis.
- B. Payment shall cover supply and installation of SRW units along with appurtenant and incidental materials required for construction of the retaining wall as shown on the construction drawings. It shall include all compensation for labor, materials, supplies, equipment and permits associated with building these walls.
- C. Quantity of retaining wall as shown on plans may be increased or decreased at the direction of the Architect/Engineer based on construction procedures and actual site conditions.

- D. The accepted quantities of SRW units will be paid for per vertical square foot in place (total wall height).
Payment will be made under:
- Pay Item: Pay Unit
 - Segmental Retaining Wall Units: Square Feet

PART 2: MATERIALS

2.01 - SEGMENTAL RETAINING WALL UNITS

- A. SRW units shall be VERSA-LOK Retaining Wall Units as manufactured by
R.I. Lampus Co.
816 R.I. Lampus Avenue
P.O. Box 167
Springdale, PA 15144
- B. SRW units shall meet the following architectural requirements
1. Color of SRW units shall be [_____] outside corners.
 2. Finish of SRW units shall be split face.
 3. SRW unit faces shall be of straight geometry.
 4. SRW unit shall have a maximum height of 6 inches.
 5. SRW units shall be capable of being erected with a variable bond configuration. Bond should vary between 1/4 bond to 3/4 bond.
 6. All SRW units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or significantly impair the strength or permanence of the construction. Cracking or excessive chipping may be grounds for rejection. Units showing cracks larger than 1/2" when measured along their length shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.
- C. SRW units shall meet the following structural requirements:
1. The SRW units shall be solid through the full depth of the unit.
 2. For constructability considerations, the SRW units shall provide a minimum weight of 125 psf of wall face area.
 3. Concrete used to manufacture SRW units shall have a minimum 28 days compressive strength of 3000 psi in accordance with ASTM C 90 and C 140. The concrete shall have adequate freeze/thaw protection with a maximum moisture absorption rate, by weight, of 8%. Compressive strength test specimens shall conform the saw-cut coupon provisions of Section 5.2.4 of ASTM C140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.
 4. SRW units molded dimensions shall not differ more than + or 1/8 inch from that specified, except height which shall be + or -1/16 inch.
- D. SRW units shall meet the following constructability and geometric requirements.
1. Units shall be capable of attaining concave and convex curves and 90 to 140 degree inside corners and 25 to 90 degree
 2. Units shall be positively engaged to the unit below with connection pins so as to provide a 3/4-inch horizontal setback per 6-inch-high course (a cant of 7 degrees from vertical). The installed wall cant shall not differ more than + or -2 degrees from that specified.

2.02 - SEGMENTAL RETAINING WALL UNITS CONNECTION PINS

- A. SRW connection pins which interlock the units shall meet all SRW manufacturers' specifications.

2.03 - LEVELING PAD

- A. Material for leveling pad shall consist of compacted sand or gravel and shall be a minimum of 6 inches in depth. The leveling pad should extend laterally at least a distance of 6 inches beyond the toe and heel of the lower most SRW unit.
- B. Do not run mechanical vibrating plate compactors on top of the units. Compact fill between units by running hand-operated compaction equipment just behind unit. Compact to minimum 95% Standard Proctor Density (ASTM D 698) or 90% of Modified Proctor Density (ASTM D 1557).

2.04 - DRAINAGE AGGREGATE

- A. Drainage fill materials shall be the free draining gravel, see Section [_____] – Drainage Aggregate.
- A. Vertical drainage layer behind the wall face shall be placed no less than 1 ft³ per 1 ft² of wall face.

2.05 - REINFORCED BACKFILL (INFILL SOIL)

- A. The reinforced backfill material shall be free of debris and consist of either of the following inorganic soil types according to their USCS designations (GP, GW, SW, SP, SM, ML, CL). The maximum particle size shall be 4 inches. There shall be less than 20% by weight of particles greater than 1-1/2 inches, maximum 60% by weight passing the #200 sieve and PI<20.
- B. The reinforced backfill shall be compacted in maximum 8-inch-thick compacted lifts to a minimum density of 95% of the maximum Standard Proctor Density (ASTM D 698).

2.06 - RETAINED BACKFILL OR COMMON BACKFILL

- A. Soil placed behind the reinforced backfill can be any inorganic soil with a liquid limit less than 50 and plasticity index less than 30, or as directed by the Engineer.
- B. Retained backfill shall be compacted to a minimum 90% maximum Standard Proctor Density (ASTM 698).

PART 3: EXECUTION

3.01 – EXCAVATION

- A. Contractor shall excavate to the lines and grades shown on the project grading plans. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted infill material, or as directed by the Engineer/Architect, at the Contractor's expense.
- B. Architect/Engineer will inspect the excavation and approve prior to placement of leveling pad material.
- C. Excavation of deleterious soils and replacement with compacted infill material, as directed by the Architect/Engineer, will be paid for at the contract unit prices. See Section [_____] - Excavation.
- D. Over-excavated areas in front of wall face shall be filled with compacted infill material at the Contractor's expense, or as directed by the Architect/Engineer.
- E. Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.02 - LEVELING PAD CONSTRUCTION

- A. Leveling pad shall be placed as shown on the construction drawings with a minimum thickness of 6 inches. The leveling pad should extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.
- B. Foundation soil shall be proof rolled and compacted to 95% Standard Proctor Density and inspected by the Architect/Engineer prior to placement of leveling pad materials.
- C. Soil leveling pad material shall be compacted to provide a level hard surface on which to place the first course of units. Well-graded sand can be used to smooth the top 1/2 to 1/4 inch of the leveling pad. Compaction will be with mechanical plate compactors to 95% of maximum Proctor density (ASTM D 698).
- D. Leveling pad shall be prepared to ensure intimate contact of 5KW units with pad.

3.03 - SRW UNIT INSTALLATION

- A. First course of SRW units shall be placed on the leveling pad. The units shall be leveled side-to-side, front-to-rear and with adjacent units and aligned. The first course is the most important to ensure accurate and acceptable results.
- B. Insure that units are in full contact with base.
- C. Place the front of the units side-by-side. Do not leave gaps between the front of adjacent units.
- A. Alignment may be done by means of a string line or offset from base line to the back of the units or along the pinning grooves. Lay out of curves and corners in accordance with SRW manufacturer's installation guidelines.
- D. Place and compact drainage fill between and behind units. Place and compact infill soil behind drainage fill.
- E. Clean all excess debris from top of units and install next course.
- F. Insert two connection pins for each unit through pin holes of the upper course units into receiving slots in lower course units. Pins shall be fully seated in the pin slot below. Push units forward to remove any looseness in the unit-to-unit connection and then check alignment. Check level of the units.
- G. Repeat procedures to the extent of the wall height, ensuring that pins are engaged in each successive course.
- H. SRW caps shall be glued to underlying units with manufacturer's recommended concrete adhesive. Caps shall (overhang, be flush with, or be setback from) the top course of units