

ATLANTIS D-RAINTANK INSTALLATION SPECIFICATION

PART 1: TECHNICAL SPECIFICATIONS

1.01 DESCRIPTION OF WORK

- a. Work Included
 - 1. Provide excavation and base preparation according to authorised designers' recommendation and as shown on drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse.
 - 2. Provide Atlantis system products including Tank Modules, geo-textiles, cells, filtration units, inlet and outlet pipes with connections and installations as per instructions.
- b. Associated Work
 - 1. Sub-grade excavation and preparation.
 - 2. Sub-surface materials and structures as required.

1.02 QUALITY ASSURANCE

- a. Skilled and experienced work people will perform installation with suitable record in the construction of channels, chamber, or pond/ landfill projects, landscaping, waterworks and plumbing of similar size.

1.03 SUBMISSIONS

- a. Submit product data and installation instructions.
- b. Submit a section of Atlantis product for review. Products will be returned to the contractor after review and acceptance.
- c. Submit certificates for geo-textile, Atlantis cells, Atlantis eco-soil, and Atlantis modules.

1.04 DELIVERY, STORAGE AND HANDLING

- a. When time from delivery to installation exceeds one week, protect Atlantis products from damage during delivery and store under canvas to shield from sunlight. The products should be stored on smooth, clean surface, free of dirt, mud and waste.
- b. Handling is to be performed with the appropriate equipment depending on the size of the Tank Modules and site conditions. Equipment may include hand, forklifts, extension lifts, small cranes, etc.

1.05 PROJECT CONDITIONS

- a. Review installation procedures and coordinate Atlantis installation with other related work, such as grading, excavation, utilities, construction access, erosion control to prevent all non-installation related construction over the completed installation, especially with loads greater than design loads.
- b. Cold Weather
 - 1. Do not use frozen materials or materials mixed or coated with ice or frost.

2. Do not build on soils saturated with water, reactive clays or muddy sub-grade, unless is covered with a minimum layer of clean sand to about 4" inches or more and reactive clays are removed.
 3. Care must be taken when handling Atlantis cells when air temperature is 40°F or less.
- c. Protect partially completed installation against damage from other construction traffic when work is in progress, and following the completion of backfill, with highly visible construction tape, fencing, or other means until construction is complete to prevent area being used as a storage, vehicle parking or temporary traffic area.
 - d. Protect adjacent work from damage during installation.

PART TWO: PRODUCTS

2.01 MATERIALS

- a. Base of Excavation: Should be smooth soil, flat and free of lumps or debris. Compact as required by Engineer.
- b. Atlantis Tank Modules: Injection moulded plastic units 16.06" x 26.97" x 17.72" inches each or multiple stacked modules nested into vertical cell structures of variable height (custom for each project) Basic Unit weight=13.98 lbs. Approximately volume of plastic = 6% solid.

Note: When placing cells into the excavated area, the Tank Modules should be installed 16.06" x 26.97" inches on the horizontal plane for maximum strength.

- c. Side Backfill: sand materials, free from lumps and debris or any other sharp materials to backfill along the sides of the cellular structure, taking care to compact with water, using manual or powered mechanical compactor, side backfill thickness should be greater than 4" inches.
- d. Top Backfill on roads: use 20" inches minimum of $\frac{3}{4}$ " inch minus sandy / gravel road base material. If backfill mixture must be custom mixed, use a ratio of 2 parts clean $\frac{1}{2}$ " inch drainage rock to one part clean sand.
- e. Utility Marker: use metallic tape at corners of install to mark the area for future utility detection.

PART 3: EXECUTION

3.01 INSPECTION

- a. Examine prepared excavation and conditions for smoothness, compaction and level. Do not start installation until satisfactory conditions are met. Check for presence of high water table, which must be kept at levels a minimum of 3' feet below the bottom of the Atlantis structure at all times.
- b. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Project Manager for resolution.

3.02 PREPARATION

- a. Cut the filter fabric to the required dimension and place in excavation ensuring a minimum of 8" inch overlap on all joints.

3.03 INSTALLATION OF ATLANTIS TANK MODULES

- a. Atlantis Tank Modules should be installed on a firm base, compacted up to 90 to 95%. The base should be covered with 4"-6" inches of clean, coarse, permeable sand.
- b. The sides of the Tank Modules should have a clearance of a minimum of 8"-12" inches, to be filled with clean, coarse, permeable sand.
- c. Between Tank Modules and the fill materials there should be permeable geo-textile material; this should cover the whole system.
- d. The filling material beside the Tank Modules should be water or machine compacted.

3.04 INSTALLATION OF ATLANTIS MODULES

- a. Place Atlantis Tank Modules in excavation over the filter fabric and butt the modules together.
- b. After placement of Atlantis Tank Modules, bring filter fabric up the sides and over the top of the structure, connecting joints as recommended. Fold excess fabric at corners to lay flat against the structure and secure using tape.
- c. Identify locations of inlet, outlet, inspection points, and any other penetrations of the geotextile, securing pipe into prefabricated boots. Support pipe in trenches and during backfill operations to prevent damage to geotextile or pipe.
- d. Use a powered mechanical compactor to conduct backfill operations on structure sides with care to avoid damage to geotextile while providing required compaction forces to the top level of the structure.
- e. On trafficable areas, place the biaxial geo-grid layer over the top of the structure, extending beyond the edge of the structure at least 15" inches and up to 80" inches, or over the entire side backfill area, whichever is greater. Any joints must be overlapped by a minimum of 12" inches.
- f. Place a sandy gravel backfill material over geo-grid, in 6" inch lifts, compacting with vibrating roller compactor to a minimum of 95%, to a minimum depth of 12" inches and a maximum of depth of 35" inches. Take care to place backfill on top of structure and avoid damage to structure or geotextile, using low-pressure tire of track vehicles.
- g. Place surfacing materials, such as groundcovers or shrubs (do not plant trees above the system), or concrete paving material over the structure with care.

3.05 TOP COVER

- a. Manufacturer recommendations allow covering safely to 12” inches of sand or granular material. If the usage of the surface is used for traffic, then additional filling material of granular nature should be added.
- b. Expert and qualified engineers should design the job.
- c. While in some locations , the Atlantis system has been buried more than 35” inches deep, successfully, some caution should be taken. Cover material should be free flow, clean sand or granular material. Soil that can absorb large quantities of water such as clay or similar products should not be used.
- d. Atlantis systems under traffic areas can be safely designed, specifically on light traffic roads and car parks with no less than 18” inches cover, and no more than the safety factor determined by an engineer, unless some special conditions require different design. Reinforce cover with biaxial tensor and / or use heavy duty Tank Modules to spread point load impact, if required
- e. An expert in geo-technologies should be consulted when working under special condition.

3.06 CLEANING

- a. Perform cleaning during the installation of work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

3.07 SIGNS

- a. During construction the area where the Atlantis systems are located must be clearly marked to prevent damage from heavy machinery and construction plant. After completion of the project, the area should be marked with a sign to indicate that there is a Atlantis system underneath and that it should only be used for pedestrian access, if it is not designed for traffic or dynamic loads.