Eco-Rain Tank Systems SUBMITTAL
Technical Specifications, H-25 Traffic Loading, Detention, & Infiltration Tank Installation

PART I – GENERAL

1. General Provisions
   A. The Conditions of the Contract and all Sections of Division 1 are a part of these Sections.
2. Description of Work
   A. Work Included:
      1. Provide excavation and base preparation per Engineer's recommendations and/or as shown on drawings, to provide adequate support for project design loads. Provide excavation safety in accordance with OHSA requirements. (*See Part II – Products 2. Materials)*
      2. Provide Soils Report that supports appropriate use of Eco-Rain Tanks (Infiltration or capture and reuse).
      3. Provide Eco-Rain Tank modular units only, constructed and installed per the manufacturer's instructions furnished under this section. Each unit/section shall have a minimum of two interior plates evenly spaced.
   B. Related Work
      1. Sub-grade Excavation and Preparation - Under Earthwork Section of drawings and specifications.
      2. Sub-surface Drainage Materials - Under Sub-Surface Drainage and Structures Section of drawings and specifications as needed.
1. Quality Assurance
   A. Record discussions of meeting decisions and agreements reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to installation, including the following:
      1. Review preparation and installation steps, coordinating and scheduling required with related work.
      2. Review proposed sources of materials.
      3. Tour, inspect and discuss condition of sub-grade, drainage structures, and other preparatory work.
      4. Review requirements for protecting the Eco-Rain Tank structure, including restriction of traffic during installation period and for remainder of construction period.
      5. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

6. Review installation requirements (soils report, drawings, specifications, manufacturer's recommendations about installation in this submittal) and other contract documents.
7. Review required submittals, both completed and yet to be completed.
8. Review required inspections & testing procedures.
9. Sign and date a copy of this Submittal verifying that the Installer has read and understands instructions. Send a copy of the signed Submittal to: Eco-Rain Tank Systems of America, 12400 Ventura Blvd., #167, Studio City, CA 91604; Fax: 818.501.0713; E-mail: contact@ecoraintank.com
10. Review weather and forecasted weather conditions, and procedures for coping with unfavourable conditions.
11. Review safety precautions relating to installation.

B. Installation: Performed only by skilled workers with satisfactory record of performance on pipe, chamber, or pond/landfill construction projects of comparable size and quality.

2. Submittals

A. Submit manufacturer's product data and installation instructions. Submit panels of one Eco-Rain Tank and one 20-inch x 20-inch section of geotextile fabric for product review. Return reviewed and accepted samples to the Contractor.

B. Submit material specifications for Eco-Rain Tank, Class 1 non-woven geotextile fabric, Biaxial Geogrid if required, base course, and backfill materials.

5. Delivery, Storage, and Handling

A. Protect all materials from damage during delivery and store under tarps to protect from sunlight exposure exceeding 5 days.

B. Handle with equipment appropriate to the size (height) of Eco-Rain Tanks and site conditions, which may include, hand, handcart, forklifts, extension lifts, small cranes, etc; give care to minimize damage to material. Full pallets require the use of a forklift, unloaded on flat surfaces.

C. Storage should occur on smooth surfaces, free from dirt, mud and debris.

6. Project Conditions

A. All Weather

1. Review installation procedures and coordinate Eco-Rain Tank work with other work, such as grading, excavation, utilities, construction access, and erosion control.
2. Prevent all non-installation related construction traffic around the EcoRain Tank installation.
3. **Either complete adjacent construction prior to the installation of Eco-Rain Tanks or provide detours for all traffic exceeding load rating for the structure.**
4. When installing Eco-Rain Tanks, take care against damage from other construction traffic when work is in progress.
5. Following completion of backfill, mark structure perimeter with highly visible construction tape, fencing, or other means until all site construction is complete.
6. Protect adjacent work from damage during Eco-Rain Tank installation.

7. Direct all site stormwater runoff away from the installation area. The installation area shall not receive site runoff until the runoff area is maintained with temporary erosion control device and/or site landscaping is established to completely diminish washing of silts and clays into the installation area.

B. Cold Weather
   1. Do not use frozen materials or materials mixed or coated with ice or frost.
   2. Do not build on frozen, wet, saturated or muddy sub-grade.

PART II – PRODUCTS

1. Availability

A. Manufacturer: Eco-Rain Tank Systems of America
12400 Ventura Boulevard #167
Studio City, CA 91604
+ 1.818.501.0424
contact@ecoraintank.com

B. Supplier: Request a list for your area.

2. Materials

*Specifications herein are minimum requirements for installations subject to repetitive **AASHTO H25** wheel loading. When installed in competent soil conditions the **AASHTO H25** loading allows a total load of 50,000 lbs as shown in test data. Backfill material, geotextile fabric and Biaxial Geogrid may vary depending upon surface loading conditions, infiltration requirements, soil conditions and soil gradation. **Always follow Engineer's requirements to address these concerns.***

A. **Base Excavation:** Shall be smooth soil, level and free of lumps or debris. Compact as required by **Soils** Engineer. Structural fill material may be used to amend the structural capacity of the soil **or six to eight inches of gravel or sand may be used as a structural base as determined by the Soils Engineer.** Geogrid and/or geotextile fabric may be required to achieve the minimum saturated bearing capacity in the base soils.

B. **Geotextile:** Shall be non-woven Class 1, wrapped around all sides, top and bottom of the tank assembly, with a minimum six-inch joint overlap. *(See Geotextile Fabric Specifications Sheet)*

C. **Geogrid:** Where required, use a Biaxial Geogrid (Tensar BX1200, Terragrid B120 or Synteen SF12 or equivalent) or Eco-Rain 2" Drainage Cell (405 psi) layer for structural support. Eco-Rain Systems recommends using Biaxial Geogrid or a layer of Eco-Rain 2" Drainage Cells in traffic rated installations. Follow Geogrid manufacturers or Eco-Rain Tank Systems recommendation for 2" Drainage Cell layers as to placement.

D. **Eco-Rain Tank:** Injection moulded recycled polypropylene plastic units, 1.34' wide by 2.25' long and from .79' to 7.12' deep **as specified by the Engineer**, assembled from flat interlocking panels. Each unit shall have a minimum of two interior panels equally spaced plus two end panels for landscape applications and a minimum of three interior panels equally spaced plus two end panels for vehicle load applications. Assemble units into vertical structures as shown

in the plan, **maximum five units tall**. *(For taller Eco-Rain Tanks, contact the manufacturer – Eco-Rain Tank Systems or consult a qualified Geotechnical Engineer.)*

E. **Bedding Layer**: Layer a minimum of **two inches** of clean sand, gravel materials or a mix of both, free from lumps and debris or any other sharp materials - must be properly compacted as in A. above.

F. **Placement:** Place the Eco-Rain Tanks vertically into excavation per manufacturer's recommendations. Abut assembled Tanks in the excavation and wrap in Class 1 non-woven geotextile fabric to create one structure.

G. **Pipes:** Connect pipes, if any, before backfilling.

H. **Filters:** All water entering the Tank structure must be filtered, either through a rock/sand/soil profile or if water is directed via pipe, use of a manufactured filter that will not allow any debris to bypass the filter must be installed on all inlet pipes.

I. **Side Backfill:** Side backfill must be completed before top backfill is started. Fill with clean sand or gravel (¾" or less – no limestone) materials or a mix of both, free from lumps and debris or any other sharp materials to backfill along the sides of the Tank. During compaction with powered mechanical compactor, cover the side of the Tank with a sheet of plywood to protect fabric and Tank from the compactor. Move the plywood sheet as the compactor moves. Compact side fill in lifts that do not exceed 12 inches as required by a **Soils** Engineer, to provide a settlement free surface of the sides of the structure. Verify by meter during progression.

I. Top Backfill for Parking Lots and Heavy Load Applications:

1. **Use a minimum of five ET-1507 Small Plates in each unit of Double, Triple, Triple + Half, Quad, Quad + Half, and Pent Tanks for parking lots and heavy load applications.**
2. Use minimum 24 inches fill material as required by approving agency for parking lots or driveways (please contact us if project calls for less or more depth – specification will change depending on design and may include the use of additional Small Plates instead of traffic load five Small Plates per unit and/or Drainage Cells). All fill materials shall be compacted for parking lots or heavy load application **as specified by a Soils Engineer**. The use of an Eco-Rain 2" Drainage Cell layer or Biaxial Geogrid layer **between the top of the Tank structure and finished grade** is recommended – follow manufacturer recommendation for placement.
3. After the side backfill is fully in place and compacted, backfill top in lifts of 12-inch depths and compact each layer, including self-compacting fill, with low-pressure tire or track vehicles, walk-behind vibratory plate compactors, or approved equipment. Do not use vibratory rollers at any time, even after full backfill. ***(See Equipment Sheet for approved compactors.)***
4. Top backfill will not exceed four feet in depth without prior review and written approval from the manufacturer.

5. Do not operate AASHTO H-25 load rated equipment over the Eco-Rain Tank structure until a properly compacted approved minimum cover and pavement is in place. *(See Part III - Execution, 3. Installation, F.)*

J. Top backfill for Non-Vehicle Load Applications:

1. Use 18-inch minimum of porous top fill to allow infiltration into the Eco-Rain **Tanks as specified by the Soils Engineer** for non-vehicle load bearing swales and landscapes above the Eco-Rain Tanks. Please contact us if project calls for less than 18-inches or more than 48-inches depth – specification will change depending on design and may include the use of additional Small Plates and/or Drainage Cells.

PART III – EXECUTION

1. Inspection

A. Examine prepared excavation and conditions for level smoothness to within ½" or as specified, and compaction. Correct unsatisfactory conditions before start of EcoRain® Tank installation. **Check for presence of high water table**, which must be kept at levels below the bottom of the Eco-Rain Tank structure at all times (a layer of Eco-Rain 2" Drainage Cells can be used as the underdrain medium - contact manufacturer for details).

B. **Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.** If existing conditions are found unsatisfactory, contact the Engineer for resolution. Saturated sub-base soils shall have a minimum allowable bearing value of **35 psi**.

2. Preparation

A. Keep all construction traffic away from the limits of excavation until the project is complete and final surface materials are in place by delineating with high visibility tape or other means.

B. Following OSHA requirements, excavate site to proper depth, accounting for 2-inch bedding and specified height of Eco-Rain Tank and specified depth of cover over Eco-Rain Tanks. Smooth the subgrade, free of lumps, roots, & debris.

C. If it rains after excavation, but before installation of Tanks, the base must be dry and levelled before installation begins.

D. Place a minimum 2-inch thick layer of clean sand or gravel materials, free from lumps and debris or any other sharp materials over prepared sub-grade. Screed a 2-inch thick layer to ensure level surface to within ½" or as shown on plan.

E. Where an impervious liner is specified to harvest rainwater or prevent groundwater intrusion, install in accordance with the plans, and Engineer's or other professional's specifications. If recommended by the Engineer/designer, place a layer of geotextile fabric in the bottom and sides of the excavation to protect the outside of the liner. Place and unfold the liner on top of the geotextile fabric. If recommended by the Engineer, on the inside of the liner, place six inches of

clean sand in a footprint size of the Eco-Rain Tank structure. Screed the surface. Chalk or paint lines for layout in the excavation are recommended.

F. Inside the liner, place and stretch smooth Class 1 non-woven geotextile fabric over the entire base area and sides of the excavation in strips with sufficient amount to encase the completed Eco-Rain Tank structure. Create minimum 6-inch joint overlaps.

G. Assemble Eco-Rain Tank units as indicated in assembly directions provided by manufacturer or distributor. Assembled unit panels shall be firmly interlocked. Place tall elevation on the vertical plane. Place narrower side in the horizontal plane. Each unit shall have a minimum of two interior Small Plates in landscape/non-traffic areas and three interior Small Plates in vehicle traffic areas. Do not use cracked or broken plates – replace with intact plates.

H. ***Inspection Ports are not required with the Eco-Rain Tank System if all debris is filtered out prior to water entering the Eco-Rain Tanks. However, if the designing Engineer desires to install maintenance/inspection ports, Eco-Rain requires that they are installed in the outside perimeter of the tank structure where a 6 - 12" diameter pipe can be angled downward to a partial or full channel (See ET-1210 & ET-1210A) unless specific approval is gained by designing Engineer.***

3. Installation of Eco-Rain Tanks

A. Place assembled interlocked vertical Tank units in position on top of the Geotextile fabric in the excavation. Chalk lines for layout in the excavation are recommended. Abut vertically stacked Tank units side by side. Keep geotextile fabric on bottom, sides, and top clear of construction activity, and ensure adequate length is available to wrap the completed Tank size. **Orient** all Tanks so that the **Large Plate** is on the perimeter of the installation. This means that two ends of the structure will have a row of Tanks placed perpendicular to all the other Tanks. See ET-1211 drawing of Typical Eco-Rain Tank Assembly Layout. If not possible to place Tanks perpendicular on the ends, reinforce ends with either Eco-Rain 1" or 2" Drainage Cell layers. In structures that are using Eco-Rain Triple, Triple + Half, Quad, Quad + Half, or Pent Tanks, ***perpendicular rows must be placed between every six rows or less***. See Eco-Rain drawing ET-1212B.

B. Identify locations of filters and inlet pipes, outlet pipes, inspection ports, and/or cleanout portals, if any. Secure pipe connections to geotextile fabric using stainless steel pipe clamps, zip ties, and/or fully securing with HDPE Tape so that no soil can enter the structure. Connect pipe as follows: For side mounted inlet/outlet pipes exceeding six inches in diameter, place a layer of Eco-Rain 2" Drainage Cells vertically next to the Large Plate side only, where the pipe aligns with the Tank. In a second layer of 2" Drainage Cells, cut a hole the size of the pipe, place this layer next to the first layer, pull the geotextile fabric over the layers, and mark and cut an X in the fabric at the pipe opening in the 2" Drainage Cell layer. Cut a fabric collar with an X cut for the pipe, pull over end of pipe. Then place the pipe end in the cut layer of 2" Drainage Cells, push the collar into the fabric layer surrounding the Tanks, pull the ends of the fabric over the pipe and secure so that no soil/sand can enter the Tank. (See ER-1216 for Pipe Collar detail). Support pipe in trenches and during backfill operations to prevent damage to pipe or liner if used. **Connect pipes prior to backfilling.** See Eco-Rain drawing ET-1207 or ET-1215 for pipe connections. Proceed as outlined in C. below.

C. When the Eco-Rain Tank modular structure is fully in place, stretch geotextile fabric up the sides and over the top of the structure, smooth wrinkles in the fabric, overlap seams by at least six inches and seal joints, fully securing with HDPE Tape so that no soil can enter the structure. (See ET-1216 for Pipe Collar detail.) Trim and fold excess geotextile fabric at corners to lay flat against sides of structure, securing folds and seams with HDPE Tape. If an impermeable liner is installed, follow the Liner manufacturer's recommended instructions to secure the liner around the structure. Follow the Liner manufacturer's instructions to cut and seal holes in the liner.

D. Install 2-foot lengths of metallic underground locator tape on each top corner of the Tank structure.

E. Place backfill carefully to avoid shoving or damage to tanks and geotextile fabric. Excavator equipment shall remain clear of the excavation, and material shall not be dropped vertically on the tank from a distance greater than one foot. Backfill on opposite sides of the structure at the same time, compacting material in maximum 12-inch lifts. Keep compactor equipment clear of tank structure and cover the side of the tank with a sheet of plywood to protect the fabric, tank (and liner if used) from the compactor. This plywood sheet must be moved as the compactor moves, as it acts as a temporary cover to protect the side of the structure from the compactor to avoid any possible damage to the side of the Tanks, fabric and liner.

F. After sides are completely backfilled, check for broken plates on the top of the structure, if any they MUST be replaced. Then place backfill material over top of structure (see E. above). Place a minimum of 12 inches of cover to protect the Tank and fabric. Compact 12-inch lift as specified by a Soils Engineer, using low-pressure tire or track vehicles, light-weight vibratory plate compactors, walk behind rollers or approved equipment (Do not use equipment exceeding 6,000 lbs.). ***Equipment shall not make turning movements on top of the Tank. For parking lots or heavy-duty installations as specified by the Engineer, place a layer of Eco-Rain 2" Drainage Cells or Biaxial Geogrid covering entire excavation (top of Tank plus 3-foot overlap of the structure, pinning the edges into solid ground). Provide 12 inches compacted fill under Biaxial Geogrid if used. Place additional cover backfill in 12-inch lifts (or as approved) and compact with low-pressure tire or track vehicles, lightweight vibratory plates, walk-behind rollers, or approved equipment***Do not use vibratory rolling compactors at any time*.

G. Place surfacing materials, such as groundcovers or shrubs, or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

4. Site 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.

Disclaimer: All information provided in this publication is correct to the best knowledge of the company and is given in good faith. This information is intended only as a general guide, no responsibility can be accepted for any errors, omissions or incorrect assumption. As each project is unique, and as Eco-Rain Tank Systems and its distributors and agents worldwide have no direct control over the methods employed by the user is specifying, installing or supervising of its products hence no responsibility is accepted by Eco-Rain Tank Systems of America, distributors, and agents world-wide. Users should satisfy themselves as to the suitability of the product for their purpose.

Sign and date a copy of this page verifying that the Installer has read and understands these instructions. Send a hard copy of this signed page to:

- Eco-Rain Tank Systems of America 12400 Ventura Blvd., #167, Studio City, CA 91604
- Fax: 818.501.0713 Email: contact@ecoraintank.com

_____

Name of Project City & State

_____ _____

Signature of Installer Date