

POMPTON LAKE STUDY AREA OPERATIONS PLAN

Pompton Lakes, New Jersey

April 2016

Prepared by:



Sevenson Environmental Services, Inc.

2749 Lockport Road
Niagara Falls, NY 14305

Prepared for:

Pompton Lakes Works

2000 Cannonball Road
Pompton Lakes, NJ 07442

TABLE OF CONTENTS

INTRODUCTION	3
SCOPE OF WORK	3
OPERATIONS PLAN COMPONENTS	4
PREMOBILIZATION, MOBILIZATION SUPPORT ACTIVITIES, & SITE PREPARATION	7
PREMOBILIZATION.....	7
MOBILIZATION	8
SITE PREPARATION	9
OFFICES AND INFRASTRUCTURE	11
CLEARING AND GRUBBING	12
WATER FLOW MANAGEMENT	12
WORK AREA ISOLATION MEASURES	13
STRUCTURAL INSPECTION PRIOR TO ISOLATION MEASURES	13
UPLANDS AND SHALLOW WATER DELTA AREA ISOLATION MEASURES.....	14
DELTA AREA, LAKE AREA A, AND ISLAND AREA.....	14
AREAS E5 AND E6 AND PORTIONS OF AREA F	16
FISH REMOVAL WITHIN CONTAINMENT SYSTEMS	16
ODOR, DUST, AIR, AND NOISE MITIGATION	17
ODOR.....	17
DUST.....	18
AIR MONITORING	19
NOISE MITIGATION	19
DEBRIS REMOVAL	20
UPLANDS SOIL AND SHALLOW WATER DELTA AREA SEDIMENT REMOVAL	21
UPLANDS BACKFILL AND SHALLOW WATER DELTA AREA ECOLOGICAL-LAYER PLACEMENT ACTIVITIES	23
LAKE AREA A & ISLAND AREA MECHANICAL DREDGING AND ECOLOGICAL-LAYER PLACEMENT	24
DELTA AREA HYDRAULIC DREDGING	26
SOLIDS PROCESSING, WATER TREATMENT, AND MATERIAL HANDLING	29
IN-SITU STABILIZATION	31
DELTA AREA ECOLOGICAL-LAYER PLACEMENT	32
METHOD FOR CONTROLLING EXCAVATION ELEVATIONS, DREDGING ELEVATIONS AND HORIZONTAL CONTROL	34
UPLANDS AND SHALLOW WATER DELTA AREA SURVEYS.....	34
DREDGING HYDROGRAPHIC SURVEYS	35
ECOLOGICAL-LAYER THICKNESS VERIFICATION FOR OPEN WATER AREAS	36
MATERIAL HANDLING AND TRANSPORT FOR OFFSITE DISPOSITION	37
ENVIRONMENTAL CONTROLS	38

RESTORATION 38

RESTORATION OF DELTA AREA, LAKE AREA A, AND ISLAND AREA 38

SHORELINE STABILIZATION – DELTA AREA AND ISLAND AREA 39

ACID BROOK 39

WETLAND AND WETLAND TRANSITION AREA RESTORATION PLANTING 40

SEEDING 40

PUBLIC OPEN SPACE 41

DEMOBILIZATION 42

APPENDICES

APPENDIX A – DRAWINGS

DRAWING 1 SITE LAYOUT

DRAWING 1A TYPICAL CONTAINMENT PAD

DRAWING 2 SOLIDIFICATION EQUIPMENT LAYOUT

DRAWING 2A 2000 GPM PROCESS FLOW DIAGRAM

DRAWING 3 UPLAND SOIL REMEDIATION ACCESS ROADS AND SHEETPILE WALL ALIGNMENT

DRAWING 4 UPLAND SOIL REMOVAL TEMPORARY ACCESS ROADS

DRAWING 5 DELTA AREA TURBIDITY CONTAINMENT SYSTEM APPROACH

DRAWING 6 EXCAVATION OPERATION PROCESS FLOW DIAGRAM

DRAWING 7 HYDRAULIC DREDGE & SOLIDIFICATION PROCESS FLOW DIAGRAM

DRAWING 8 ECOLOGICAL-LAYER LAYOUT

DRAWING 8A ECOLOGICAL-LAYER PROCESS FLOW DIAGRAM FOR DELTA AREA

DRAWING 9 SEDIMENT REMOVAL GENERAL SEQUENCE

APPENDIX B – SEDIMENT PROCESSING MASS BALANCE

APPENDIX C – CONSTRUCTION SCHEDULE

APPENDIX D – MATERIAL PRODUCT INFORMATION

INTRODUCTION

This Operations Plan presents details on the remedial measures to be implemented in the Pompton Lake Study Area (PLSA) to implement the remedy as described in the RCRA Permit Modification issued by the U.S. Environmental Protection Agency (EPA) Region 2. Severson Environmental Services, Inc. (Severson) has been selected as the Remedial Action Contractor for construction operations associated with the PLSA. The Corrective Measures Implementation Work Plan (CMI WP) presents the remedial approach, and this document provides details on the tasks to be completed by Severson to complete remediation within the PLSA.

Remediation will be performed in a portion of Pompton Lake (i.e., lake sediments) termed the “Delta” or ABD (Delta Area), the portion of Pompton Lake (i.e., lake sediments) outside of the Delta between Lakeside Avenue Bridge and the Pompton Lake Dam (Lake Area A and Island Area), and the uplands portion defined as the soils and wetland areas between Lakeside Avenue and the water’s edge along the lake (Uplands). The constituents of concern include mercury in the sediment and copper, lead, mercury, and zinc in the upland soils.

SCOPE OF WORK

The purpose of this project is to mechanically excavate soils from the Uplands, mechanically and/or hydraulically dredge sediments within the Delta Area, mechanically dredge sediments within the Island Area and Lake Area A, process removed materials for disposition, and perform restoration on these disturbed areas.

Sixteen areas have been defined for soil removal in the Uplands. Removal depths generally range from 0.5 to 9 feet below ground surface (bgs). The current total in-situ estimated removal volume is about 3,160 in-situ cubic yards (cy). These areas will be

backfilled with clean material and regraded to accommodate the restoration elements (i.e., plantings, park amenities, pathways).

Sediment will be dredged from approximately 36 acres in the Delta Area. Lake Area A and the Island Area are two smaller areas that total over 3 acres outside the ABD where sediment will be dredged. The estimated sediment volume targeted for removal in the Delta Area, Lake Area A and Island Area is approximately 133,700 cy. Hydraulic and mechanical dredging activities in the Delta Area will be performed to remove targeted material, with the dredging occurring within a containment system consisting of a three-tiered approach turbidity containment system. The two other areas will be completed by mechanical dredging within a single-curtain turbidity containment system. The dredge areas will be restored through placement of an ecological-layer consisting of naturally washed sand. Shoreline areas will be stabilized and planted and wetland areas temporarily disturbed by dredge operations will be restored through backfilling to suitable elevations and installation of stabilization material (e.g., coir logs) followed by planting and seeding.

OPERATIONS PLAN COMPONENTS

The Operations Plan includes nine major construction components.

1. Mobilization and work area isolation measures
2. Soil excavation and dredging of the designated areas
3. Stabilization and solidification
4. Soil and sediment processing
5. Material handling
6. Water Treatment
7. Transport to landfill
8. Restoration
9. Demobilization

The nine major components above can be further broken down to the tasks described below. The schedule for these major components is provided in Appendix C.

Mobilization and work area isolation measures:

- Obtaining necessary permits and utility markouts
- Conduct pre-construction meeting
- Mobilization and site preparation
- Demolition and management of existing site features (i.e. guardrail, sidewalks, park amenities, etc.)
- Installation and maintenance of turbidity curtains
- Installation and maintenance of rigid sheeting
- Fish collection and relocation
- Tree trimming and removal in areas that might interfere with work activities

Soil excavation and dredging of the designated areas:

- Mechanical removal in Uplands soil areas along the shoreline on the south side of Lakeside Avenue
- Mechanical debris removal operations as required prior to and during dredging operations
- Hydraulic and mechanical dredging to remove target sediments in the Delta Area
- Mechanical dredging of Lake Area A and Island Area
- In-situ stabilization

Soil and sediment processing:

- Mechanical solidification (filter press) of hydraulically dredged sediment
- Mixing reagent with materials mechanically dredged to promote solidification

- Staging of processed materials
- Water treatment

Material handling:

- Movement of materials into staging locations in preparation for offsite disposition
- Movement of materials onsite for ease of access due to the small staging area

Transport to landfill:

- Excavation of material from staged piles
- Loading materials into trucks
- Hauling materials to landfill

Restoration:

- Placement of an ecological-layer in the dredge areas
- Delta Area, Island Area, Lake Area A, and Uplands restoration

Demobilization:

- Demobilization of all equipment and personnel

The remainder of this Operations Plan describes in detail how the above-listed tasks will be performed.

PREMOBILIZATION, MOBILIZATION SUPPORT ACTIVITIES, & SITE PREPARATION

Premobilization

The anticipated pre-mobilization activities are:

- Develop required project plans, including this Operations Plan, the Health and Safety Plan (HASP; Appendix C to the CMI Work Plan), Contingency Plan (Appendix B to the CMI Work Plan), and Construction Quality Assurance Plan (CQAP; Appendix E to the CMI Work Plan)
- Review requirements of the following permits or agreements, which will be obtained by others with support from Sevenson:
 1. NJDEP Freshwater Wetlands (FWW) General Permit (GP) 4
 2. NJDEP Flood Hazard Area (FHA) Individual Permit with Hardship Waiver
 3. NJDEP Air Quality – Minor Facility Preconstruction Permit
 4. NJDEP Discharge to Surface Water permit, Category BGR, General Remediation Cleanup (BGR)
 5. NJDEP Treatment Works Approval (TWA)
 6. Hudson, Essex, Passaic (HEP) Soil Conservation District (SCD) Soil Erosion and Sediment Control Plan (SESCP)
 7. NJDEP issued Stormwater General Construction Permit - 5G3
 8. NJ Scientific Collection Permit – Aquatic Species Relocation¹
 9. Borough of Pompton Lakes – Agreement to conduct Soil Removal
 10. Traffic Control Plan – Concurrence by Borough of Pompton Lakes and County Engineer (included in Appendix D to the CMI WP)

¹ Sevenson specialty subcontractor to obtain.

- Identify and obtain local permits for construction operations (e.g. electrical permits for temporary facilities, building permits for temporary offices and sanitary facilities, etc.)

Mobilization

Upon receipt of the required permits and completion of pre-construction submittals, Severson will mobilize personnel and equipment to the site. Key site personnel will include a Project Manager, Site Supervisor, Quality Control Representative, Site Health and Safety Officer, operators, and laborers. A preliminary project organization chart is included in the CMI WP (Figure 6-1).

Security will be established during initial mobilization to the project/work area, and will be maintained until demobilization activities are complete. Fencing will be installed to restrict access to work areas and protect monitoring and construction equipment (see Drawing 1). During working hours, an onsite resource will inspect the fence integrity and observe the work area for the presence of non-approved individuals. School personnel will monitor student activities during the day to keep students away from the work area/fence. A visual screen will be installed on the fence separating the Lakeside Middle School from the work area as well as near Lakeside Avenue Park from the water's edge to Lakeside Avenue. There will also be no walking access on the side of the road where the gate is located, and Severson will establish new crossing areas and maintain safe walking space along Lakeside Avenue.

Additional security measures will consist of the following: signage posted indicating that site access is restricted; contractor resources positioned at the gate, thereby eliminating the opportunity for non-work personnel to enter through the gate; photographic surveillance; perimeter inspections during non-working hours at nights and on the weekends by a contracted security firm; and periodic patrols of the area at night and on the weekends by the Pompton Lakes Police Department as part of their routine activities.

Due to scheduling and sequencing of work, three separate mobilizations will be required. The first will be for general mobilization and sheeting installation. The second will be for the site preparation work. The third will be mobilization of the solidification equipment. Necessary equipment will be mobilized to the site in a safe and efficient manner to accommodate the many different operations without hampering work zone organization. The schedule for these activities is detailed in Appendix C.

Site Preparation

After mobilization, site preparation activities will be performed. Site preparation will consist of the following tasks:

- Utility clearance
- Construct temporary facilities
- Install required traffic and safety signage
- Perform site layout surveying
- As necessary to facilitate access, remove existing features (e.g., benches, plaques, lighting) identified during the pre-construction survey
- Install fencing along Lakeside Avenue (plus create walkway) and behind the Lakeside Middle School athletic fields
- Install erosion control measures
- Acid Brook by-pass pumping
- Coordination with property owners for removal of docks and storage (this work will be completed within a few weeks of starting the remediation activities adjacent to each specific property)
- Construct access roads in Rotary Park
- Construct material processing areas

The access roads and material processing area will also be constructed prior to soil removal.

The site configuration is detailed in Appendix A, Drawings 1, 1A, 2, 3, and 4. Generally, the land located within Rotary Park will be used for equipment staging during mobilization and load out of stabilized and solidified material. Note that there are elevation differences in this area to be considered during equipment layout. In addition, the area created after removal of the targeted soil and shallow water Delta Area sediments will become the staging area for the mechanical solidification equipment (see additional details below in this section and in the Uplands Backfill Activities section).

The steps necessary for completing the site configuration are:

- Installation of the fence to secure the work area and provide a physical barrier preventing accidental access to the area
- Modifications to Rotary Park for equipment staging and truck traffic
- Identification of access gates into Rotary Park
- Creation of an access ramp from the top of the bank down to the lower staging area
- Installation of liner, asphalt pads for containment and bin blocks
- Identification of conveyor system routes
- Installation of the Total Clean System (oversized screening and desanding equipment)
- Installation of eight mix tanks used for slurry storage/preparation prior to injection into recessed chamber filter presses
- Installation of eight recessed chamber filter presses
- Installation of slurry fast feed pumps to the presses
- Installation of water treatment system(s)

The area near the existing public boat ramp will be used to launch the marine equipment for the in-water containment system. Other support vessels (e.g., small watercraft, anchor handling barge, etc.) will also be launched from this location. The

hydraulic dredge will be mobilized on the shoreline adjacent to the Uplands and moved into the water via crane once the containment system is in place. Mechanical dredge equipment including an excavator mounted on sectional barges, material scows and push boats will be launched from the boat ramp.

Assembly of the hydraulic dredge pipeline will also occur at this location. Quality control of fusion welding the high-density polyethylene (HDPE) pipeline together will be accomplished by using a data logger. The data collection device records the heater temperature and fusion pressure profile over time. Data is recorded and transmitted to the handheld computer where the joint report can be stored, viewed, printed or transferred to a desktop computer for archiving.

Offices and Infrastructure

Sevenson will place office and tool trailers at the PLW site. One break trailer for the trades will be located at Rotary Park due to the space restrictions at the lakeshore. Sevenson will utilize buses to shuttle workers to the PLSA in the morning and back to the PLW site in the afternoon. Decontamination areas will be provided as needed for workers to use prior to returning to vehicles. Workers will park cars at a designated location at the PLW site.

Sevenson will install a floating pier along the edge of the sheetpiling installed in the shallow water adjacent to Rotary Park, as shown on Drawing 2 in Appendix A. The pier will be used for tying vessels off to at night and as an access point to the dredging work area. Equipment and boat fueling will be performed from the pier. It will be necessary to fuel support equipment on the water during the day, and a fuel transfer boat will be used to refuel the dredge, capping barge, debris barge, and excavator. Proper containment and spill prevention techniques will be used at all times during fueling activities. Spill kits will be located in this area at all times.

Clearing and Grubbing

Clearing and grubbing will only take place where vegetation may inhibit the construction or restoration and will not extend into the buffer zones identified behind the Lakeside Middle School athletic fields (see Drawing 1). Clearing will be performed where staging areas and access roads will be constructed. Debris (e.g., brush, trees, stumps, roots, and rocks) will be disposed in an appropriate manner.

The areas that are cleared will only be grubbed if the rooting systems and stumps of the cleared vegetation will interfere with the temporary infrastructure and restoration design. The stumps and root systems within the above areas and the excavation areas will be removed as they are encountered and during excavation activities.

Water Flow Management

Flow from Acid Brook, storm sewer outfalls, and groundwater/surface water will need to be managed prior to work commencing in the Uplands and Delta Area. Severson will develop a collection sump at the most northern end of Uplands Area A within Acid Brook. A small dam made of sand bags and stone will be constructed to intercept the flow from the brook. Poned water will be transferred using two 12-inch Godwin type pumps into a HDPE line. The discharge line will head towards Uplands Area B, pass through Area B, and discharge into the ABD area. Small swales may need to be cut to allow positive drainage to the discharge point. The average base flow is 0.7 cubic feet per second (cfs; approximately 300 gallons per minute [gpm]) and the maximum flow is 1.4 cfs (approximately 600 gpm). Each Godwin pump is capable of pumping 2,000 gpm. The two pumps will be capable of handling storm water flow events. Once Uplands Areas A and C have been remediated, the pumping operation will stop, and instead gravity flow through two HDPE pipes will be used. Should a storm event overwhelm the two gravity drainage pipes, water will flow around the pipes and across the staging area and not cause flooding upstream of Lakeside Avenue.

If the storm water from Acid Brook needs to be released into Pompton Lake when the Delta Area turbidity containment system is not in place, Severson will install separate permeable turbidity curtains in the lake near the discharge point from Acid Brook.

Surface runoff and storm sewer outfalls from staging areas will be directed towards a collection area within the Uplands work area. Pondered “contact” water (water that comes in contact with the soil or sediment dredged and/or excavated) collected within the Uplands work areas and staging pad will be pumped to the water treatment system and treated prior to discharge, whereas “non-contact” water will be managed as stormwater from the general construction site and will be diverted to Acid Brook or the ABD.

WORK AREA ISOLATION MEASURES

One rigid structure (i.e., steel sheeting) will be installed near Rotary Park to help create and stabilize the access location and staging area. Turbidity containment systems will be installed around the Delta Area, Lake Area A, and Island Area prior to dredging and ecological-layer placement operations. The curtains will provide adequate control of sediment resuspension during dredging and ecological-layer placement such that turbidity is controlled below corrective action levels. The curtains will be actively managed and maintained to allow equipment to move in and out of the contained areas.

Structural Inspection Prior to Isolation Measures

Before commencing construction activity that could cause vibration (i.e., sheetpile barrier installation), Severson will retain a professional structural engineer to perform pre- and post-construction inspections for structures such as residential structures, garages, retaining walls, and pools within 100 feet of sheetpile work activities. Based on an initial review, there are a total of 4 structures across Lakeside Avenue that fall within 100 feet

of the sheetpile installation location. The number of structures will be verified in the field.

Uplands and Shallow Water Delta Area Isolation Measures

Sevenson will use a rigid containment structure to isolate the Uplands and shallow water Delta Area work areas from the remainder of the Delta Area. The rigid containment structure will also provide additional stability for the pad where the work and processing area will be located. The structure will be composed of steel sheeting (AZ19-700). Each sheet will be on average of 25 feet long and capable of supporting an unbalanced height of 3 feet. A MOVAC vibratory hammer attached to a Komatsu PC300 (or equivalent) backhoe will be used to install the sheets.

Access will be constructed along the perimeter of the interior of the sheeting (northwest side) to facilitate installation of the sheetpiling. A 30-foot-wide access-haul road will be constructed and the reinforced access roads will be comprised of a non-woven geotextile overlain by Tensar triaxial geogrid. Approximately 12 inches of crushed stone will be placed on top of the geotextile/geogrid. This access area will also serve two other functions. The first is an access road into the Uplands for soil excavation and into the shallow water Delta Area for sediment dredging. The second will help support a work platform/staging area for the processing equipment detailed in Appendix A, Drawing 2. Drawing 3 in Appendix A shows the location of the access roadway for sheeting installation. In addition, at the sheetpile wall installed in the shallow water area near Rotary Park, Sevenson will install a bulkhead to facilitate on-water operations.

Delta Area, Lake Area A, and Island Area

The turbidity containment systems will be installed prior to initiation of in-water activities. The curtains will be loaded onto a barge or flexi-float from the on-shore boat ramp staging area. The barge will be moved to the location where the turbidity curtains will

be installed using towboats. The turbidity containment system for the Delta Area will be a three-tiered approach (Drawing 5, Appendix A), which will include in series:

- An oil/debris boom installed outside of the dredge area in non-targeted sediment. This curtain will be a “top-down” (i.e., the top edge of the curtain will be above the water surface) with the oil boom attached on the inside edge (i.e., closest to the dredge area), and will extend approximately 1.5 feet below the water surface.
- A bedload baffle installed outside of the oil/debris boom. The bedload baffle will be installed “bottom-up” curtain such that the top of the bedload baffle is approximately two feet above the sediment surface.
- A traditional permeable turbidity curtain installed outside of the bedload baffle. This curtain will be top-down and will be installed such that the fabric extends to within one foot above the sediment surface.

To install the first two rows of curtain (i.e., the bedload baffle and oil/debris boom), an excavator on the flexi-float barge will move the curtain into position and the curtain tension cable will be attached to a mooring buoy, which will be attached to a manta ray type anchor to affix the curtain to the sediment bed and/or shoreline. Trip line buoys will also be attached to the Danforth type anchors. To install the third row (i.e., the traditional turbidity curtain), the skirt of the curtain will be raised such that it is bunched up against the floats, an excavator on the flexi-float barge will move the floats and curtain into position in the river, the skirting will be dropped to the desired depth (approximately one foot from the sediment surface), and the curtain tension cable will be attached to a mooring buoy, which will be attached to a manta ray type anchor to affix the turbidity curtain to the sediment bed and/or shoreline. Trip line buoys will also be attached to the Danforth type anchors and lighted buoys will be attached to the turbidity curtain floats. The curtain will be removed from the perimeter curtain first then work into the innermost dredge curtain near the dredge zone.

The turbidity containment system for Lake Area A and Island Area will be a single curtain similar to the third row of the Delta Area system. The curtain will be installed such that the fabric extends to the sediment surface. Installation of the curtain for the two smaller areas will be performed in a similar manner as described above for the Delta Area.

Areas E5 and E6 and Portions of Area F

Areas E5 and E6 and portions of Area F are isolated from the other Uplands removal areas (i.e., outside of the shallow water sheetpile barrier installed near Rotary Park). Soil removal within these areas will be accomplished using the same steel sheeting selected for installation adjacent to the Uplands area, with the sheeting offset approximately 10 feet from the footprint of excavation, as shown on Drawings 3 and 4 (Appendix A). Three-sided sheeting will be driven in a “U” shape around each of the work areas to isolate each discrete area. Sheeting will be installed from the shoreline using an excavator with a vibratory sheetpile installation/extraction attachment. Once the sheeting is in place, removal will occur from land and then the areas will be backfilled from land. Following backfill placement, the sheeting will be removed.

FISH REMOVAL WITHIN CONTAINMENT SYSTEMS

Following turbidity containment system installation along the eastern perimeter of the Delta Area and turbidity containment system installation around Lake Area A and Island Area (effectively isolating each area from the remainder of the lake), fish within the areas will be removed and placed outside of the containment systems in accordance with the Fish and Wildlife Scientific Collection Permit. Fish removal will be accomplished using two small Jon boats and approximately five biologist/technicians. Electrofishing gear will be used to stun the fish and allow for their collection and relocation.

Other collection techniques will be used (e.g., seine nets, trap nets) to supplement the electrofishing to collect fish and turtles. Severson will collect as many fish and turtles as possible over a 5-day period. Information related to fish species will be collected, but length or weight measurements will not be collected. Severson will use proper handling and transfer procedures during the fish relocation effort.

ODOR, DUST, AIR, AND NOISE MITIGATION

Odor

Should odor become a problem during open operations, Severson can implement engineering and operational controls such as a foaming agent on an open material surface to provide a barrier to contain the odor. An example of a type of foaming agent that could be applied during stabilization and stockpiling activities includes Rusmar Foam Technology (product sheet provided in Appendix D). Other technologies, such as odor neutralizers (which are not “deodorizers”), may be used if foaming agents are not effective. An example of this type of technology is the Piiian Flexi~Fog System (product sheet provided in Appendix D). If a foaming agent or technology other than those listed above is utilized, product information will be provided to EPA.

Stabilized material piles will be covered nightly. Due to the limited working space, very little processed material will be kept onsite and therefore odors will be limited. During Uplands remediation operations, Severson will also expedite backfilling-accepted areas to minimize exposed soils to the surrounding environment. Excavated materials will be trucked to Rotary Park where materials will be mixed with a reagent in watertight roll off boxes.

Hydraulic and mechanical dredging will be used in the Delta Area. Hydraulically dredged sediment will be transferred via a slurry line for transport to the solidification equipment. Sediment remains within a contained system until the sediment is mechanically treated; therefore, odors are not expected from this process. Filter cake

will be staged in piles and transported offsite on a daily basis. Due to the limited working space, very little filter cake will be kept onsite and therefore odors will be minimized. Whatever material piles are left onsite each day will be covered nightly to limit odors.

Mechanical dredging operations will require sediment transport in open scows and sediment stabilization in stockpiles at the processing area. Odors will be continuously monitored during mechanical dredging operations. If odors related to remediation activities are detected, measures will be applied to minimize and prevent further odor nuisance. Odor monitoring activities and mitigation measures are described in Section 2.7 of the CMI WP.

Dust

Materials mechanically removed from the Uplands and shallow water Delta Area will be stabilized using a reagent material at a mix ratio of 5 to 10 percent by weight. The reagent sacks will be loaded directly into the mixing container and mixed mechanically. Therefore, the materials will be wet and unlikely to release dust. However, if materials dry out, Severson will wet the materials using onsite water sprayers to prevent dust releases.

Trucks hauling processed sediment or soil will be inspected for materials on the exterior of the truck, cleaned as necessary, and covered prior to leaving the site. Plastic sheeting will be used to prevent spillage of material on the sides of the trucks. The sheeting will act as a bib. Severson will have a roadway sweeper on standby as necessary in the event that it is required on the roadway.

Severson does not anticipate dust issues associated with hydraulic dredging. Backfilling and ecological-layer placement activities will be monitored for dust generation as described in Section 2.7 of the CMI WP, and water will be available to wet material if needed.

Air Monitoring

Sevenson will also perform air monitoring related to worker safety. The Sevenson worker safety air monitoring activities are detailed in the HASP (Appendix C to the CMI Work Plan). Work area perimeter air monitoring will be completed as outlined in Section 2.7 of the CMI Work Plan.

Noise Mitigation

Sevenson will comply with applicable Pompton Lakes noise ordinances. Sevenson will do the following, at a minimum:

- Use a vibratory method of driving sheetpile. This method will produce less noise than using a drop hammer to drive the sheetpile.
- Maintain construction equipment in good working order to prevent loud or intrusive noises.
- Ensure insulation around the dredge engine is intact and new.
- Install hospital grade mufflers on the dredge.
- Maintain trucks in good working order and remind truck drivers to gently accelerate and not use engine breaks or unnecessarily slam tailgates.
- Hold routine meetings with staff about the importance of keeping conversations on the water to a normal conversation level and eliminate the use of foul language.

Overall noise levels from construction should be similar to noise from routine truck traffic in the area.

Noise monitoring and control measures are described in Section 2.7 of the CMI WP. Sevenson will take adequate measures for keeping noise levels to safe and tolerable limits as set forth by OSHA, EPA, and/or local requirements. In the event of a noise

complaint, the noise level will be monitored and contingencies will be implemented as necessary.

DEBRIS REMOVAL

Prior to mechanical excavation or during mechanical and hydraulic dredging, Severson will perform debris removal operations as needed to safely continue operations. The containment systems described above will be in place prior to initiation of debris removal operations. Severson will perform a pre-dredge debris survey. Multiple survey methods will be used including visual and probing. Submerged aquatic vegetation (SAV) that would impact dredging operations will be removed using the hydraulic dredge and sorted using a mechanical shaker screen. SAV will be loaded into trucks for offsite disposition. As a contingency Severson may implement a weed harvester to remove the SAV if it is too much for the mechanical shaker screens.

An excavator with a perforated bucket on a flexi-float barge will be used to perform debris removal activities (debris includes boulders, large rocks, and other large objects that would hinder dredging operations). The perforated bucket will allow sediments to “pass through” the bucket while the oversized materials will remain in the bucket for removal. Severson may also utilize a specialized rake and grapple, depending upon the type of debris encountered for removal.

Debris will be removed and placed in a shallow-draft, material scow. The scow will be moved to the access pier and bulkhead in the vicinity of the processing area using a work boat. The debris will be removed from the scow using a backhoe or crane stationed on shore, placed in transport trucks, and sent offsite to a permitted facility licensed to receive the removal debris for final disposition.

UPLANDS SOIL AND SHALLOW WATER DELTA AREA SEDIMENT REMOVAL

Conventional mechanical techniques (excavator and bucket) will be used to remove material from the Uplands and the shallow water Delta Area. Severson estimates that 3,160 cy of Uplands materials will need to be excavated and 4,400 cy of shallow water Delta Area sediment will need to be dredged. In order to provide heavy equipment access to this area, a reinforced road will be constructed along the interior of the sheetpile wall (Appendix A, Drawing 3). The roadway will also be used for access to install the required sheeting. A 30-foot-wide haul road will be constructed and the reinforced access roads will be comprised of a non-woven geotextile overlain by Tensar triaxial geogrid. Approximately 12 to 18 inches of crushed stone will be placed on top of the geotextile/geogrid. Some locations may require more materials due to the soft nature of the underlying soil.

As needed, “fingers” of crushed stone will provide access into the work areas that cannot be reached from the perimeter roadway. The finger roadways will be placed then removed as the excavator works its way out of a work area. Drawing 6 in Appendix A shows the Uplands soil and shallow water Delta Area sediment removal operation process flow diagram. It is anticipated that work will begin in Area A, move to Area E7, and then progress to Area B. Following removal of material in Area B, work will continue east addressing Areas C, D, F and all E areas towards Area E6 as the final removal location.

A Komatsu PC300 (or equivalent) excavator with a long stick will be used to remove the soils and sediments. The excavator will move temporary piles and stockpile the soils or sediments within the footprint of the excavation areas to allow gravity draining. Severson intends to employ a conveyor to transfer the drained material to the processing area; however, a Komatsu PC220 (or equivalent) backhoe may load the drained material into Moxy trucks for hauling to the processing area if the conveyor is not optimal. The processing area will be located within the existing Rotary Park. Work

will be performed on top of a containment pad. Details of the pad are shown on Drawing 1A in Appendix A.

Sevenson also understands that there are utilities adjacent to Lakeside Avenue. Utilities will be marked out and located prior to intrusive work. Sevenson will take precautions when working around utilities. Excavation adjacent to utilities will be performed using hand tools until lines are observed and protected. Sevenson will ensure that these lines are protected and service will not be interrupted during remedial activities.

In areas where deep excavation is required (i.e., greater than 6 feet) slopes will be cut back at a safe angle of repose to allow access into the area. Groundwater encountered in the work areas will be removed using a Godwin dri-prime type pump. Sevenson will use a tank and bag filter to remove suspended solids from the groundwater prior to discharge through a rock type trickle filter back into the Delta Area.

Uplands soil and shallow water Delta Area sediment materials will be processed within watertight containment boxes (i.e., roll off dumpsters). Existing and/or anticipated weather conditions, as well as material characteristics, may impact the solidification process. Therefore, the reagent application volume may require adjustments on a day-to-day basis.

Upon completion of the mixing, a grab sample of the processed material will be obtained and a paint filter test conducted. If a batch of processed material fails the paint filter test, the soil and/or sediment will be subjected to additional treatment with reagent material at a mix ratio of 5 to 10 percent by weight until the passing results are obtained. Materials that pass the paint filter test will be transferred to the staging/loading pad for transport and offsite disposition. Drawing 6 (Appendix A) shows the Uplands soil and shallow water Delta Area sediment removal operation process flow diagram. Stabilized materials within the boxes will then be loaded into trucks for offsite disposition.

**UPLANDS BACKFILL AND SHALLOW WATER DELTA AREA ECOLOGICAL-LAYER
PLACEMENT ACTIVITIES**

Backfilling the sixteen Uplands areas will be accomplished using materials from a permitted/licensed facility backfill source, such as the Tilcon Riverdale quarry. The backfill will be bank run material meeting the specification criteria provided below. An adequate volume of fill will be placed to meet the final grade.

Sieve	Percent Passing
3 inch	100
No. 200	10-30

Once the mechanical dredging is complete in the shallow water Delta Area, Severson will install a 6-inch ecological-layer over top of the shallow water Delta Area, using the same general process as described above. An estimated quantity of about 900 cy of clean materials will be placed. That quantity includes material anticipated to be required for over placement or loss of materials into the mixing layer. The materials will be consistent with specifications provided in Section 2.8.2 of the CMI Work Plan with testing performed to confirm compliance per the CQAP (Appendix E of the CMI WP).

Materials will be trucked to the site and placed within the backfill and ecological-layer placement areas. The backfill materials will be spread and compacted with several passes of a bulldozer working from the shoreline out towards the sheeting along the perimeter of the Uplands. A bulldozer will advance the backfill and ecological-layer materials. Materials below the waterline or in deep holes in the Uplands will be placed using an excavator until the materials rise above the water surface or to a level that will be placed with a dozer. Once the elevation/grade is reached in the Uplands, a geotextile will be laid down (lower liner). Fill material (ecological-layer materials) will then be added as necessary to raise the Uplands to create a working surface for processing equipment that will be used during hydraulic dredging. An impermeable

liner (upper liner) will then be placed over the fill material to separate equipment from the working surface. The geotextile will delineate the two zones of materials (backfill and ecological-layer materials added for staging area build up) and the impermeable liner will delineate between the equipment and added ecological-layer materials. The material processing operation will be completely contained with a lined staging area and surrounded by berms to protect Uplands backfill and ecological-layer material.

Following dredging and demobilization of solidification equipment, this additional material between the geotextile and impermeable liner will then be reused as part of the ecological-layer to be hydraulically spread within the Delta Area. Materials that were compacted from the overburden will be tilled or raked using an excavator attachment to loosen the soil for habitat development. Additional clean ecological-layer material will be stockpiled near the shoreline outside of the processing area, and contained with silt fence to prevent material migration into the Delta.

LAKE AREA A & ISLAND AREA MECHANICAL DREDGING AND ECOLOGICAL-LAYER PLACEMENT

Sevenson will mechanically remove the sediment from these areas and will have to transfer material and equipment between the work areas and the upland staging area. Sevenson will use a CAT 345 (or similar) excavator mounted on a shallow draft floating barge platform. The estimated volume of targeted sediments to be dredged from these two areas is 19,300 cy. The excavator will be fitted with a hydraulic level cut clamshell grab bucket, which is capable of excavating a level bottom cut. The excavator will remove sediments from the dredge areas and place them into 100 cy material scows. Once full, a push boat will replace the full scow with an empty scow and push the full scow back to the upland shore area for unloading. This shuttling of full and empty scows will continue until completion of the mechanical dredging operations. Sevenson anticipates using three scows; one being loaded, one in transit and one being unloaded. Prior to unloading a full scow, free water will be decanted from the scow and pumped to the water treatment system(s).



Cat 345 with Hydraulic Bucket Loading a 100 cy Material Scow

An asphalt containment pad will be constructed in the southern corner of the upland staging area to receive the dredged material. The pad will be fully contained collecting runoff water from the sediment and precipitation. Water collected from the pad will be pumped to the water treatment system for treatment prior to discharge. The unloading excavator will be a CAT 345 with a long front boom placed between the sheetpile wall and the containment pad. The material scow will be moored to the sheetpile wall during unloading. A spill pan stretching between the scow and containment pad will catch sediment that falls from the excavator bucket during unloading.

Equipment will be properly decontaminated prior to use for ecological-layer placement operations. Two scows will be deconned; placing remaining sediment into the third scow. Shovels, brushes and power washers will be used to remove excess sediment from the outside of the excavator bucket into the third scow. Remaining sediment and water will be transferred from the scow using the excavator bucket until the scow is clean. The inside of the bucket will then be cleaned overtop a contained area. Residual material will be properly disposed and water used during the process will be collected and sent to the water treatment system(s).

Sevenson will essentially reverse this operation to install a 6-inch ecological-layer over top of Lake Area A and Island Area. The same equipment will be used after it is properly decontaminated. The approved ecological-layer material will be loaded into the scows and transported to the work areas where the excavator will place it to the final design grades. An estimated quantity of about 4,000 cy of clean materials will be placed in these two areas. That quantity includes material anticipated to be required for over placement or loss of materials into the mixing layer. The materials will be consistent with specifications provided in Section 2.8.2 the CMI Work Plan with testing performed to confirm compliance per the CQAP (Appendix E of the CMI WP).

Lateral and vertical control during excavation and ecological-layer placement will be provided by use of a state of the art Real Time Kinematic Differential Global Positioning System (RTK DGPS) mounted on the dredging excavator. The RTK DGPS combined Dredgepack software, inclinometers and the level cut clamshell buckets will help eliminate over or under excavating sediments by accurately positioning the excavator's bucket with every bite.

DELTA AREA HYDRAULIC DREDGING

Hydraulic dredging within the open water Delta Area will be performed using a Dredging Supply Company, 8-inch Moray dredge. The estimated volume of targeted sediments to be hydraulically dredged is approximately 110,000 cy from the Delta Area. The actual dredge volume removed will be reported on the project website (see Section 1.4 of the CMI WP) as soon as a thorough quality control/quality assurance check is completed and no later than on a monthly basis. The dredge will be launched from the marina ramp adjacent to the Uplands following final enclosure of the Delta Area. The hydraulic dredge will then remain within the containment system for the duration of the Delta Area removal activities.

This dredge is capable of removing 50 to 120 cubic yards per hour (cy/hr) on average. The hydraulic dredge can be operated in relatively shallow water depths (drawing 2 feet 9 inches of water) and ranging up to water depths of 17 feet. Also the dredge can dig its way into shallow water creating enough water to operate. Pipeline transport of the slurry using HDPE pipe will be used as a direct route from the hydraulic dredge to the processing area.

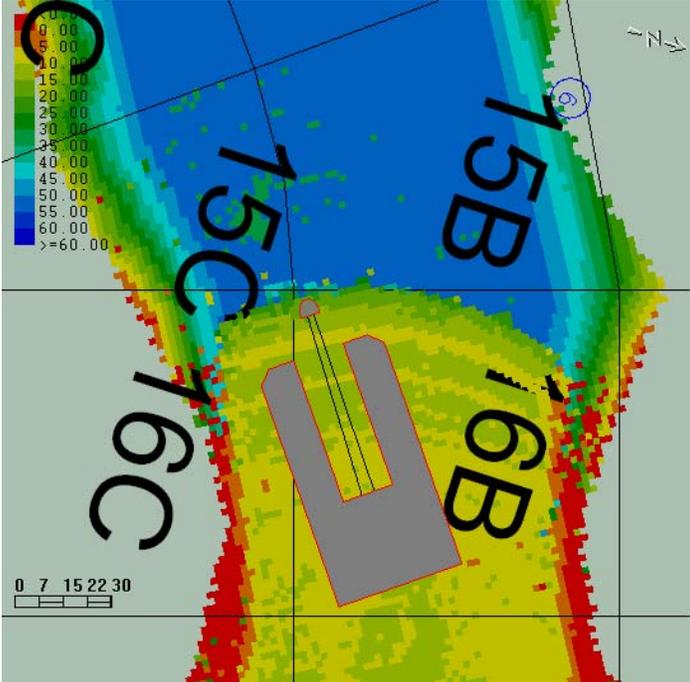
The details of the 8-inch Moray dredge are as follows:

- Overall length 42 feet and 10 inches
- Mean operating draft (with fuel) 2 feet 9 inches
- Fuel capacity 500 gallons
- Nominal pump capacity of 2,000 gpm
- Suction diameter 8 inches
- Discharge diameter 8 inches
- Impeller diameter 19 ¾ inches
- Maximum particle clearance 3 ½ inches
- Primary Mover - Caterpillar C7 ACERT industrial diesel engine, radiator cooled with residential grade silencer rated 275 bhp @ 2,200 revolutions per minute (rpm). EPA and California Air Resources Board (CARB) Tier III compliant

Positioning of the dredge will be accomplished using a RTK DGPS system (Trimble 461 with heading). The positioning software used will be the Dredgepack system designed for a hydraulic dredge. The proposed contour surface will be programmed into the Dredgepack system giving the operator a heads up display of target removal depths/elevations.

The dredge will be operated in a manner so as to minimize the re-suspension of sediments at the cutter head. The operator will visually monitor turbidity in the vicinity of the dredge head while experimenting with various cutter speeds, pumping rates, depths

of cut, and forward movement of the dredge to determine which combinations are appropriate for the site conditions and provide a reasonable rate of production with minimal loss of sediments to the water column. Sediment resuspension at the edge of a cut where sloughing may occur will be minimized by overlapping dredge passes. Dredging will begin in the southeastern corner of the site. Work will initially progress towards the south to create working space for the dredge. Once a small area is deep enough for the dredge to maneuver, dredging will generally progress towards the north and west. Drawing 9 in Appendix A shows an approach to the sequence of the dredging work. The figure below shows the screen that the dredge operator will view during sediment removal operations.



View of Dredge Operator Screen

SOLIDS PROCESSING, WATER TREATMENT, AND MATERIAL HANDLING

The proposed hydraulic dredging operation is expected to generate slurry at a rate of 1,500 to 2,500 gpm containing 7 to 15 percent solids by weight on average.

The hydraulic dredging and solidification operation will be staffed 12 hours per day, 5 days per week. The sixth day will be reserved for make-up of production or equipment repairs. The dredged slurry will be pumped through a vibrating shaker screen with 1 to 0.5-inch screens. The screens will remove debris, stones, large wood chips, and gravel from the slurry. Screenings will be discharged onto the staging pad for transport to stockpiles. The screened dredge slurry will then gravity feed into a V-bottom tank and be drawn off the bottom and sent through the desanding units. The underflow from the desanders will then be directed over dual vibrating linear motion shakers with 200 mesh screens (74 microns) for further sand removal.

Sediment processing will be performed in a manner to allow segregation of coarse and sand materials from the fines (less than number 200 sieve) and debris.

The over flow from the desanders will be pumped to a gravity thickener to thicken (concentrate) the silt fraction of the sediments. The thickened sediments will be pumped into eight 20,000 gallon agitated mix tanks. Filter press fast feed centrifugal pumps will draw from the agitated mix tanks to fill the eight 219 cubic foot filter presses. Each filter press will have a dedicated centrifugal fast feed pump. In addition, one stand-by fast feed centrifugal pump will be available to service the eight presses, if need be.

Upon transfer from the eight 20,000 gallon agitated mix tanks, polymer will be added to the dredge slurry, through a flow meter, static mixer, and polymer injection system. The addition of polymer to the dredged slurry will be used to improve the filterability of the solids. Polymer will be fed from a tote (250 gallons) via a PolyBlend system through an

in-line static mixer. The tote will be placed within a contained pad area to provide secondary containment. The amended slurry will be pumped to one of eight 219 cubic foot recessed filter presses. Drawing 7 in Appendix A shows the process flow for the hydraulic dredging and solidification.

Filtrate will be discharged to the filtrate tank. At the end of each filter run, a core blow will be conducted on the press to remove residual solids from the press feed lines. Discharge from this process will be returned to the agitated mix tanks.

Sevenson will install a water treatment system(s) that will handle decontamination water, rain water coming in contact with the stored sediments, and filtrate from the filter presses. Water will be collected in the filtrate tank that will serve as a wet well for the settling tank feed pumps. These pumps will pump the filtrate water through a static mixer to add polymer (if necessary) into two large settling tanks. The anticipated process flow diagram for the 2,000 gpm water treatment system is provided in Appendix A, Drawing 2A.

The process water will then flow into two settling tanks that are configured in parallel. These tanks are designed to allow the solids to floc together until they become denser than water, thus giving them the ability to settle out in the bottom chambers of the tanks. Clarified water will then gravity flow into a pump tank at the other end of the settling units. Sevenson will install a pump that will periodically pump the underflow settled solids back to one of the eight agitated mix tanks, which feed the filter presses.

The effluent from the two clarifier tanks will discharge into a downstream pump tank that will pump the clarified water through a bank of 0.5 to 5 micron bag filters for polishing before it is discharged through a totalizing magnetic flow meter and auto sampler, to the final discharge point of a rock filter.

Sevenson has based its design on an 85% operating efficiency for the project. To ensure maximum production with minimum downtime, the process system includes redundancy for pumps, chemical systems, and process equipment. Supporting calculations for the mass balance are provided in Appendix B.

Daily reporting to the PLW Site Representative will include:

- Estimated daily dredge production in CYs
- Gallons of lake water pumped through solidification system and returned to lake
- Gallons of polymer used
- Cycle time of filter cake solidification process
- Routine sampling of dry cake to verify water content

IN-SITU STABILIZATION

Areas within the Uplands and Delta Area where the lead concentrations require in-situ treatment will be treated using in-situ treatment methods to stabilize the sediment areas. The in-situ treatment will be applied by a chemical injection system through a specialized mixing head for in-situ stabilization. The mixing head will be attached on a hydraulic excavator that will be placed on a flexifloat type barge to access the sediments requiring in-situ stabilization. MAECTITE will be the additive used to stabilize the sediment areas (additional information on MAECTITE is provided in Appendix D).

Sevenson has proven that metals successfully meet TCLP standards with their in-situ treatment technology. There is one soil area (one boring; see Figure 2-1 in the CMI WP) and four sediment areas (6 borings; see Figure 2-3 in the CMI WP) that require treatment. The footprint of the areas that will require in-situ treatment for lead is estimated to be a 20-foot by 20-foot by 4-foot deep area surrounding each of the seven borings identified. The total volume to be treated will be 500 cy. Soil/sediment samples

will be collected post treatment to verify that the TCLP standards have been met prior to excavation/dredging.

DELTA AREA ECOLOGICAL-LAYER PLACEMENT

An ecological-layer will be hydraulically placed within the Delta Area dredge area following sediment removal. The materials will be consistent with specifications provided in the CMI Work Plan. An estimated quantity of about 42,400 cy of clean materials will be placed. That quantity includes material anticipated to be required for over placement or loss of materials into the mixing layer. The following sections describe Severson's means and methods for ecological-layer placement and verifying the thickness of the installed ecological-layer.

The hydraulic spreader system consists of a feed hopper, oversized screening, and slurry system that will pump the sand hydraulically through a pipeline for placement through a diffuser system on a barge. The pump used to convey the sand slurry is a booster type pump commonly found on dredging projects.

The spreader barge will be set up on a 4-cable winch system. The operator, using a single joystick, will control the winch system. The flow monitoring system will be tied into modified Dredgepack software.

It is anticipated that the 30-foot by 60-foot diffuser/spreader barge will be attached to the slurry system by 16SDR11 HDPE pipe. The spreader system will be attached to the 30-foot side of the barge. This barge will have a waterfall type discharge apparatus (steel plate angled towards the water) fabricated on the deck. The angled discharge plate will act to dissipate the energy in the material slurry delivered to the placement barge via the floating line. Therefore, the sand cover will enter the water in a controlled fashion with minimal fall velocity. Materials will be placed in two layers targeting two inches for the first pass and four inches for the second pass, for a total of six inches. An additional

three inches has been accounted for over placement or loss of materials into the mixing layer.

The pump system is composed of a 900 HP dredge pump with a 38-inch-diameter impeller and one 18-inch-diameter Godwin pump to deliver the slurry make up water into the mixing tank located next to the stockpiles at each potential staging location.

Appendix A, Drawing 8 shows the ecological-layer system layout and Appendix A, Drawing 8A shows the ecological-layer process flow diagram. Ecological-layer placement will begin after dredging has been confirmed to be complete (see the CQAP [Appendix E] for additional details). Note that placement of the first lift of the ecological-layer may be performed at the same time as the dredging. The two areas will be separated by a turbidity curtain to eliminate cross contamination. This curtain will be installed prior to capping in order to provide sufficient time for solids settling. The curtain will be removed after dredging in the adjacent area is complete and turbidity is less than 180 NTUs above upstream levels. Placement of the final lift of the ecological-layer will be performed after dredging activities are complete.

Sevenson's anticipated production rate calculated for ecological-layer placement is based on the pumping distance to the site from the shoreline and inefficiencies associated with moving anchors, maintenance, shift changes, weather delays, fueling, and material stockpiling logistics. An anticipated production rate of approximately 1,000 cubic yards per day (cy/day) was developed based on safe operating speeds of the placement barge, equipment limitations of safe winching speeds, and feeding the slurry system with a consistent feed to minimize overspreading materials and minimize barge "jerking" through the water with the automation system.

Characteristics and efficiencies for pumping the ecological-layer materials are:

- Velocity in the pipeline to pump a medium sand will be 14 to 18 feet per second.

- Flow rate will be approximately 6,000 to 7,500 gpm.
- Pump RPMs will range from 500 to 700 depending on pumping distance.
- Pump horsepower (HP) used will range from 500 to 900 depending on pumping distance.
- Keeping barge movement limited to less than 15 feet per minute.
- Ecological-layer materials placement sequence will generally follow the same path used for dredging as shown in Drawing 9 (Appendix A). The barge will need to be rotated 180 degrees as it approaches the eastern boundary containment system and shoreline (i.e., spreader system will point towards turbidity containment system or towards shoreline to ensure materials reach these limits).

METHOD FOR CONTROLLING EXCAVATION ELEVATIONS, DREDGING ELEVATIONS AND HORIZONTAL CONTROL

Sevenson will hire a local land surveyor (NJ Profesional Land Surveyor) to establish control points around Pompton Lake. Surveys to verify soil/sediment removal and establish grades/cut elevations will use a combination of RTK DGPS, hydrographic survey techniques, and conventional total station techniques. These survey methods will be used to track the progress of removal.

Uplands and Shallow Water Delta Area Surveys

Uplands areas will be surveyed prior to removal, during and after removal, and after backfilling/ecological-layer placement with RTK DGPS or conventional land survey instruments to determine the existing elevations. Survey spot elevations will be performed as defined in the CQAP (Appendix E in the CMI Work Plan). To control horizontal and vertical accuracy of the surveys, the surveyor will check in to a known benchmark at the beginning and end of the survey. Volume computations will be performed to determine the amount of material that lies within the template and/or how much has been removed to date. Topographic data will be imported to Autodesk Civil

3D software and used to compile a Digital Terrain Model (DTM) surface. A second DTM three-dimensional surface will be developed within Autodesk Civil 3D using the excavation template. Volumes will be calculated using a surface-to-surface comparison to determine quantities that have been removed.

Dredging Hydrographic Surveys

Hydrographic surveys will be conducted within the Delta Area, Lake Area A and Island Area prior to and following dredging. Severson will also perform routine surveys, as needed, to track sediment removal volumes for progress payments and reporting.

The survey system on board the survey vessel will consist of:

- RTK DGPS – Trimble SPS461 GPS Heading and Positioning Receiver
- Fathometer – ODOM MKIII single-beam dual-frequency (nominal 200/24 kHz) echosounder for water depth measurements or equivalent
- A PC computer running Hypack for data collection and post processing
- A dual frequency transducer

Quality control lines will consist of a mixture of repeated bidirectional lines and lines running perpendicular to the standard line direction. The actual line locations may be selected in the field as environmental factors dictate. Severson will also run survey lines outside of the dredging area as a check of vertical accuracy. A water level gage/transducer will also be installed for daily verification of elevation.

Generally, lines will be run on a grid pattern in the dredging areas with a spacing of 50-feet (horizontal and vertical).

Twice daily bar checks will be performed prior to and immediately following each day's worth of collection to eliminate speed of sound and transducer draft errors.

Upon completion of the hydrographic survey, data will be edited and processed using HYPACK software utilities. During processing, corrections for vessel motion and water surface variation will be applied, and errant soundings will be removed from the database. The output file will be an ASCII file that will be used for development of bathymetry maps and volume computations.

Volume computations will be performed to determine the amount of material that lies within the template and/or how much has been removed to date. Sounding data will be imported to Autodesk Civil 3D software and used to compile a DTM surface. A second DTM three-dimensional surface will be developed within Autodesk Civil 3D using the dredging template. Volumes will be calculated using a surface-to-surface comparison to determine quantities that have been removed.

For areas where the survey vessel cannot access, the surveyor will use the RTK DGPS rover system. The surveyor will collect survey shots on 50-foot grid spacing. These shots will be used to supplement the hydrographic survey data.

Ecological-Layer Thickness Verification for Open Water Areas

Two relatively thin lifts are proposed for the ecological-layer placement. During placement, cores will be used to monitor the lift thickness of the ecological-layer. The layer's final thickness will be verified with four cores per acre evenly spaced within each acre at a minimum of ten feet inside the footprint of the acre. The cores will be located in the field using an RTK rover for positioning. Severson may collect intermediate cores in both the initial lift and second lifts to monitor the performance of placement. Those cores will be used to gauge the thickness of the second layer, per acre, along with placed material weight verification. The four cores that will be used for verifying final thickness will not be collected until the one acre is complete. Those four cores will be evaluated based on minimum thickness and average thickness. The

cap aerial extent will be measured with real-time monitoring during material placement and recorded for documentation using RTK DGPS.

In addition, the weight and volume of material placed per acre (e.g., using a conveyor belt fitted with a weight meter to keep track of the total tonnage delivered to the hopper bin over a given period of time or by scow ullage readings or by truck weight tickets) will also be monitored. The weight of material placed and the area covered will be documented in the daily QC reports. Weigh tickets will be submitted for materials used in the construction for comparison with material placed and for confirmation of quantity placed.

The final surface, following both layer placements, will be surveyed using a combination of hydrographic survey techniques and RTK DGPS backpack.

MATERIAL HANDLING AND TRANSPORT FOR OFFSITE DISPOSITION

Sevenson will temporarily stockpile material produced by the shaker screen, desanding, filter press units and mechanical dredging on the processing pad in the staging area. Piles will be covered with tarps and/or poly.

Trucks for hauling will be staged offsite at the trucking company yard. No trucks will be staged in the Borough of Pompton Lakes. Trucks will be ordered for just in time arrival to minimize the impact on the community. Specifically, trucks awaiting entrance to the project work area will be staged outside the boundaries of the Borough of Pompton Lakes and communication via radio or telephone will be used to indicate approval to mobilize to the project work area. Trucks hauling materials from the site will be inspected for soil/sediment on the exterior of the truck and cleaned as necessary, and covered (i.e., tarped) prior to leaving the site. A bib will be used between the loader and the truck so materials do not fall on the trucks. Drawing 2 in Appendix A shows the location where trucks will be loaded, inspected, and cleaned as needed. If a roadway

sweeper is required on the roadway, Severson will have one on standby as needed. Processed soil/sediment leaving the site will have to pass the paint filter test. There will be no free water transported to the offsite licensed facility.

The offsite facility is located in Morrisville, Pennsylvania. The haul route to the offsite facility is provided in the Traffic Control Plan (Appendix D to the CMI WP). Severson plans to use two waste management disposal facilities listed in Morrisville, PA for non-hazardous waste: 1) Grows North Landfill and 2) Tullytown Landfill.

ENVIRONMENTAL CONTROLS

Severson will place an oil boom around the dredge during fueling activities. Severson will use gasoline-powered boats to supply personnel, fuel, and consumables to the dredge. The dredge will have additional oil booms on board in the unlikely event that a spill does occur. Severson will protect against fuel or oil spills when refueling or servicing equipment and immediately correct fuel or oil leaks in waterborne equipment. Wherever possible, biodegradable hydraulic oil will be used. These items are discussed in greater detail in the Contingency Plan (Appendix B to the CMI Work Plan).

Turbidity curtains will be used to separate the dredging area and the ecological-layer area during ongoing operations within the Delta Area, Lake Area A, and Island Area, and will remain in place as needed based on monitoring results.

RESTORATION

Restoration of Delta Area, Lake Area A, and Island Area

The disturbed open water areas of the PLSA will be restored with the placement of the ecological-layer of sand. Additional substrate material will be placed in the Island Area as part of reestablishing elevations suitable for wetland restoration and planting.

Sevenson will use minimally invasive equipment to get the materials placed and secured. These operations will take place during optimal construction time periods.

Shoreline Stabilization – Delta Area and Island Area

Sevenson will install the required restoration features for shoreline stabilization.

Shoreline stabilization activities will consist of the following:

- Installation of single and multiple rows of premium coir logs (12-inch and 16-inch diameter/12-feet long)
- Coir logs will be trenched into the subgrade and staked at frequencies in keeping with material specifications (e.g., 24-inch intervals using 2-inch x 2-inch x 4-foot stakes). Stakes will be inserted into the coir netting and cinched with coir twine.
- Installation of dormant live stakes intermeshed with the coir logs. Live stakes will be set roughly evenly spaced two feet apart and alternating between the land and the water sides of the log. Live stakes will be installed as per the final restoration drawing details.

Acid Brook

The pipeline used for stormwater runoff in the Acid Brook will be removed. The stream channel will be restored with natural enhancements and with dimensions, pattern, and profile suitable to convey sediment load and flow as per the final restoration plans. The streambed shall be restored using amended subgrade cobble/gravel/sand mixture; grade control structures will also be installed, in keeping with final restoration designs. Stream banks will be established at stable 3:1 slopes and protected with erosion control matting, coir logs, bank toe protection, and riparian plantings per final design.

Wetland and Wetland Transition Area Restoration Planting

Wetland resources in the Acid Brook and Island Areas will be re-established and restored in-kind. The wetland and transition area/upland backfill final grading and topsoil will be installed and prepared for planting in accordance with the restoration plan and specifications. Severson will install plant materials in accordance with the regulatory requirements and restoration plans issued for the project.

Plant material will include installation of emergent, herbaceous, shrub, and tree species as presented on the final restoration plans. Larger trees will be saucer mulched with shredded hardwood mulch. Shrubs will be mulched individually or as contiguous planting beds.

Seeding

Seeding will be conducted in planting zones identified in the final restoration plans by Hydroseeding using a Finn T90 HydroSeeder. Areas not accessible to hydroseeding equipment (i.e., slopes, roadsides, etc.) will be hand broadcast seeded. Areas that were tracked or backfilled and have been compacted, will be tilled to loosen the soil in accordance with project specifications.

Severson will conduct seeding in accordance with the following specifications:

- Seed mix specified in the final restoration plans for planting zones applied at a rates per acre consistent with the final planting schedule
- Straw mulch applied at a rate of two to three tons per acre
- Mulch binder consisting of earth bond polymer based liquid mulch binder

Restoration activities may be completed over two growing seasons due to the sequence of work and timing for specific plant species.

Public Open Space

The public open spaces will be enhanced with additional access and plantings. Restoration of these areas will include excavation/grading/backfill and planting to create a low open space terrace adjacent to Pompton Lake; removal and replacement of former sidewalks with expanded porous pavement paths; restoration and replacement of existing turf areas via seeding and/or sod, as necessary; replacement and expansion of existing irrigation system; removal, storage, and/or replacement/installation of select trees and shrubs from existing planting beds. Public space restoration will also include removal and storage of park benches, signage/commemorative plaques, and other amenities prior to project implementation and then subsequent installation of retained and new park amenities.

In accordance with the restoration plans, the following sequence of activities will be conducted to reestablish sod:

- Drag the area to be sodded to level out inconsistencies with a Toro Pro fine grader
- Apply starter fertilizer at a rate of 50 pounds (lbs) of nitrogen per 5,000 square feet
- Lay sod parallel and tightly together
Thoroughly water sod immediately after installation (using water supplied by others)

Public open space restoration will also include re-establishment / enhancement of stormwater outfalls, pedestrian street crossings, and repair of the public boat ramp area in Lakeside Park to pre-remediation activity conditions.

DEMOBILIZATION

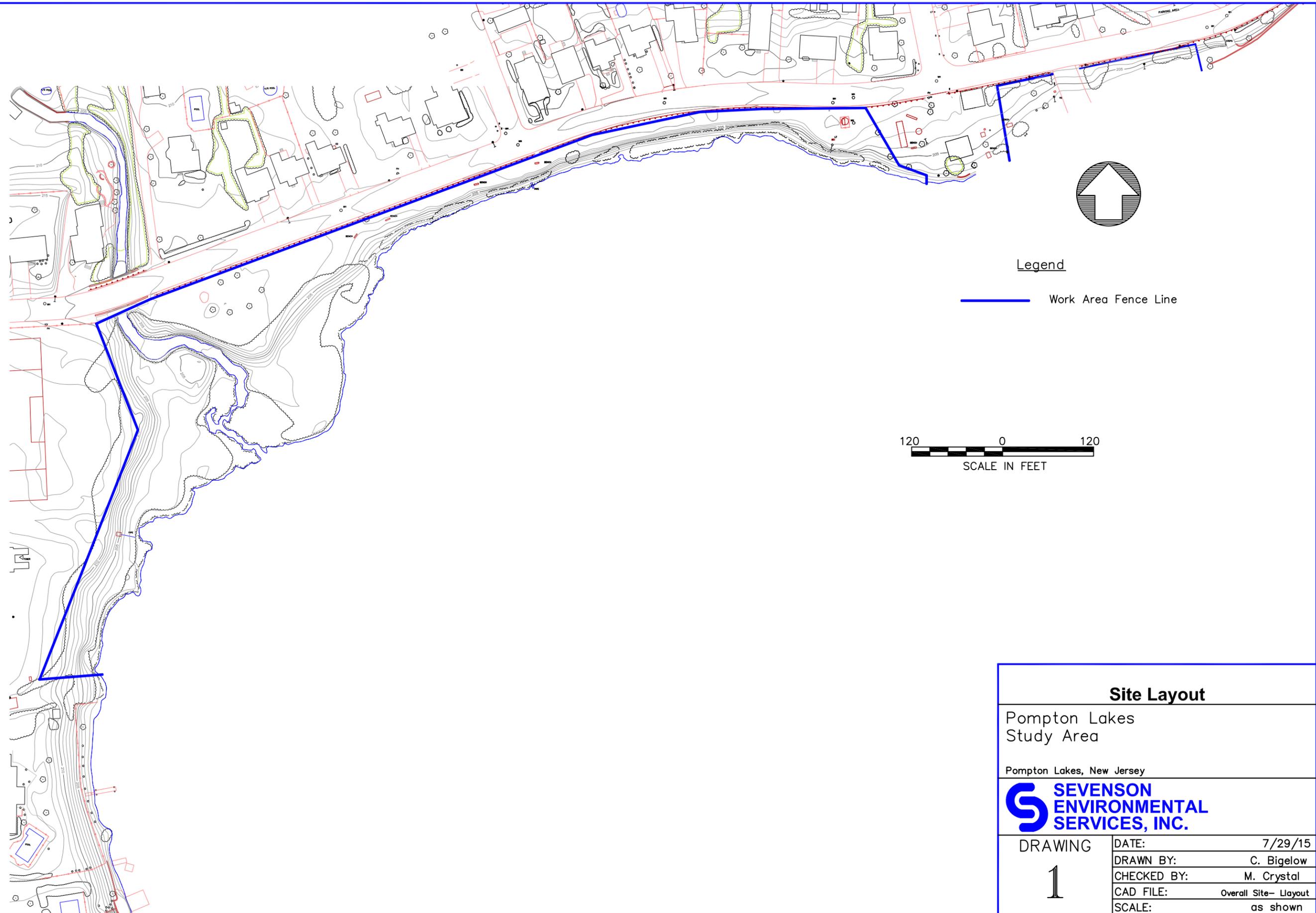
Upon completing remedial work, Severson will demobilize equipment. Demobilization will include the following:

- Removal of office, break, storage, and tool trailers
- Removal of heavy equipment including, excavators, dozers, loaders, forklifts, skidsteer, pumps, filter presses, tanks, filters, shakers desanders, dredge, marine debris removal equipment, cranes, barges, and scows
- Breakdown and removal of the desanding, solidification, and water treatment equipment
- Removal of turbidity curtains and sheeting
- Removal of the asphalt processing and staging area and disposal of the berm material, stone, geotextile, liner and asphalt
- Decontamination of equipment, as necessary
- Erosion control measures remain or re-established

Work will also include restoration of areas disturbed to support construction activities that are not specifically identified as part of the restoration plan provided in the CMI Work Plan. An example would be at the offsite trailer complex located at the PLW facility where site grading might be required.

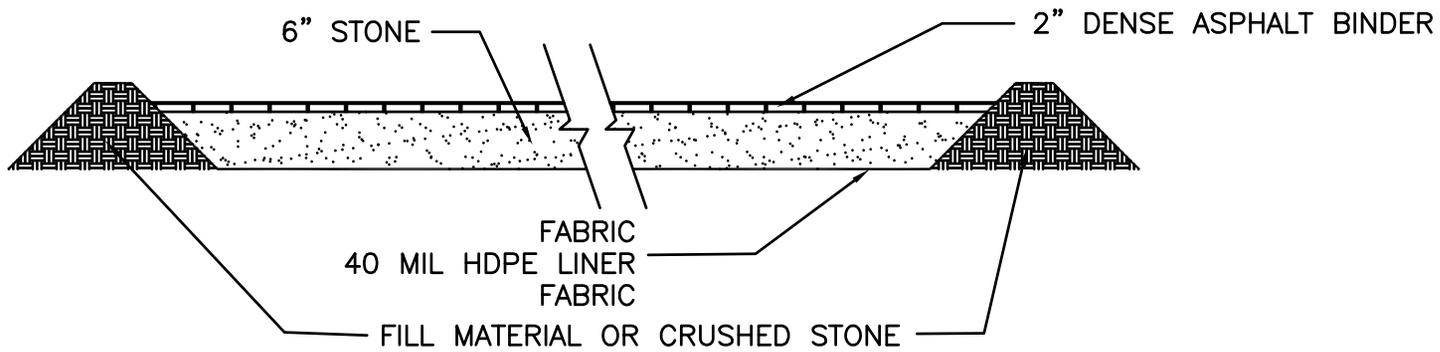
APPENDIX A

Drawings



Lakeside
Middle
School
Athletic
Field

Site Layout	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
1	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Overall Site- Layout
	SCALE: as shown



Typical Containment Pad

Pompton Lakes
Study Area

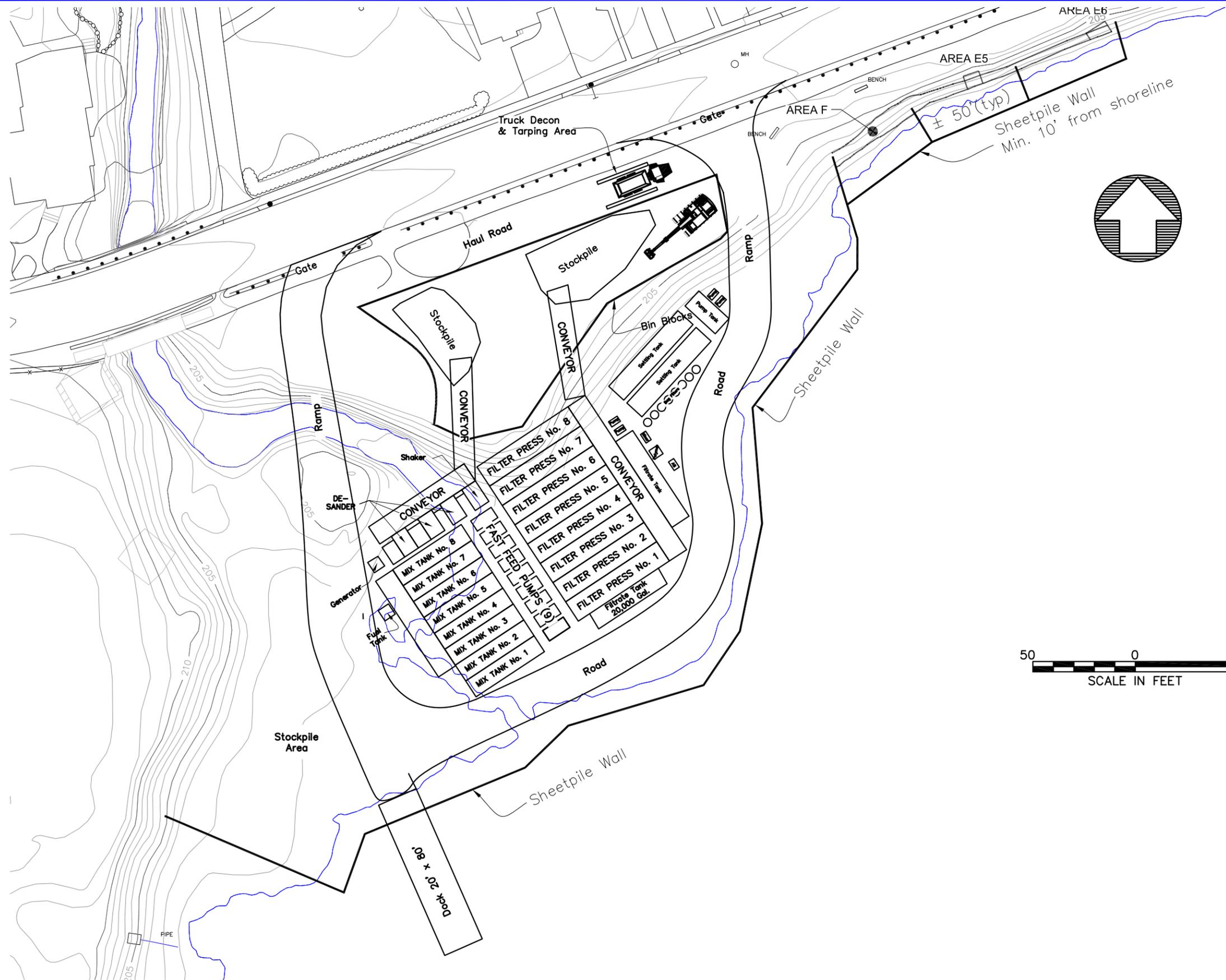
Pompton Lakes, New Jersey

S SEVENSON
ENVIRONMENTAL
SERVICES, INC.

DRAWING

1A

DATE:	7/29/15
DRAWN BY:	C. BIGELOW
CHECKED BY:	
CAD FILE:	CONTAINMENT
SCALE:	NONE



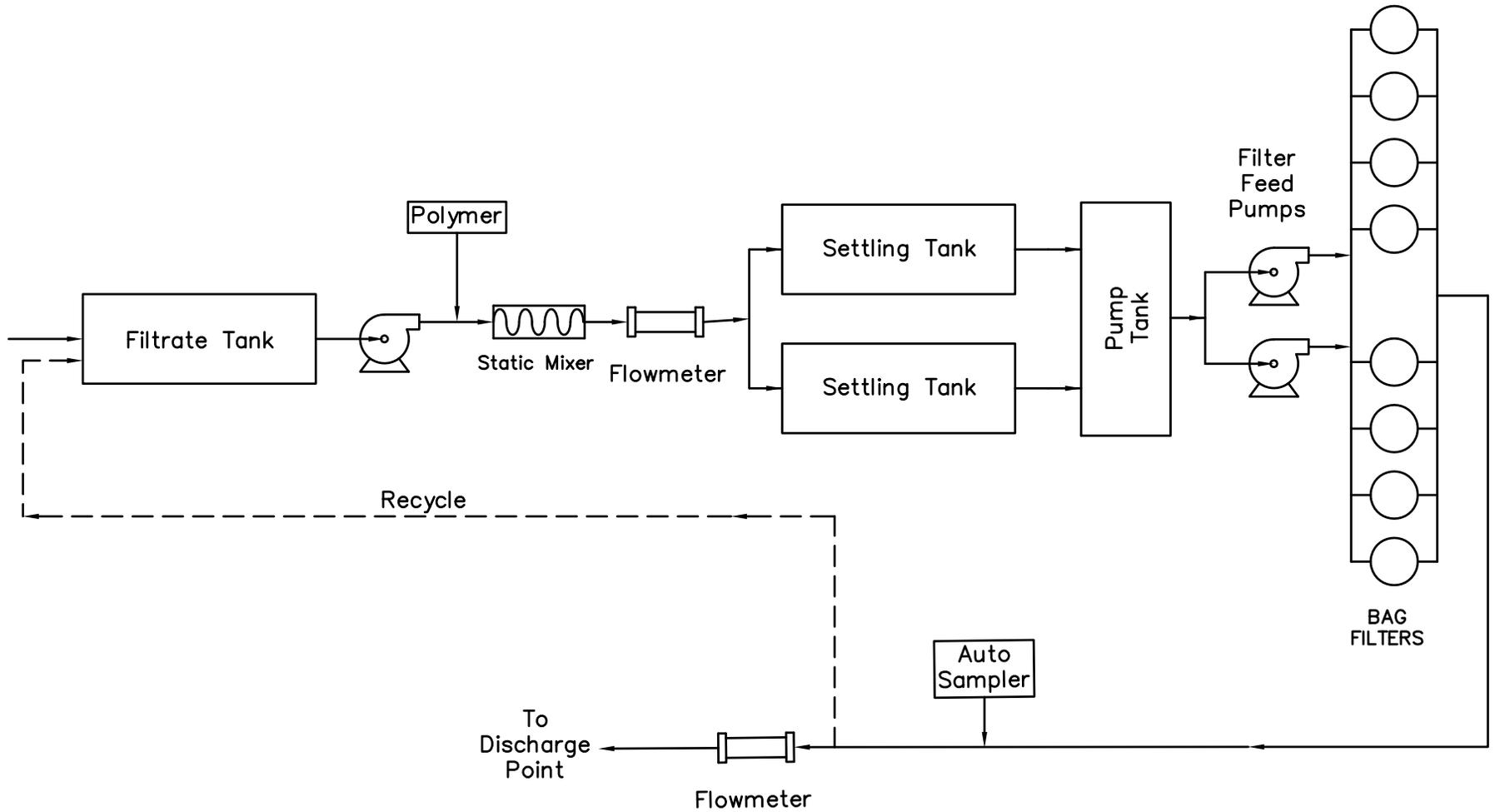
Solidification Equipment Layout

Pompton Lakes Study Area

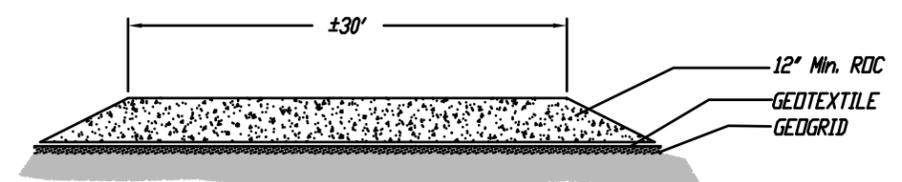
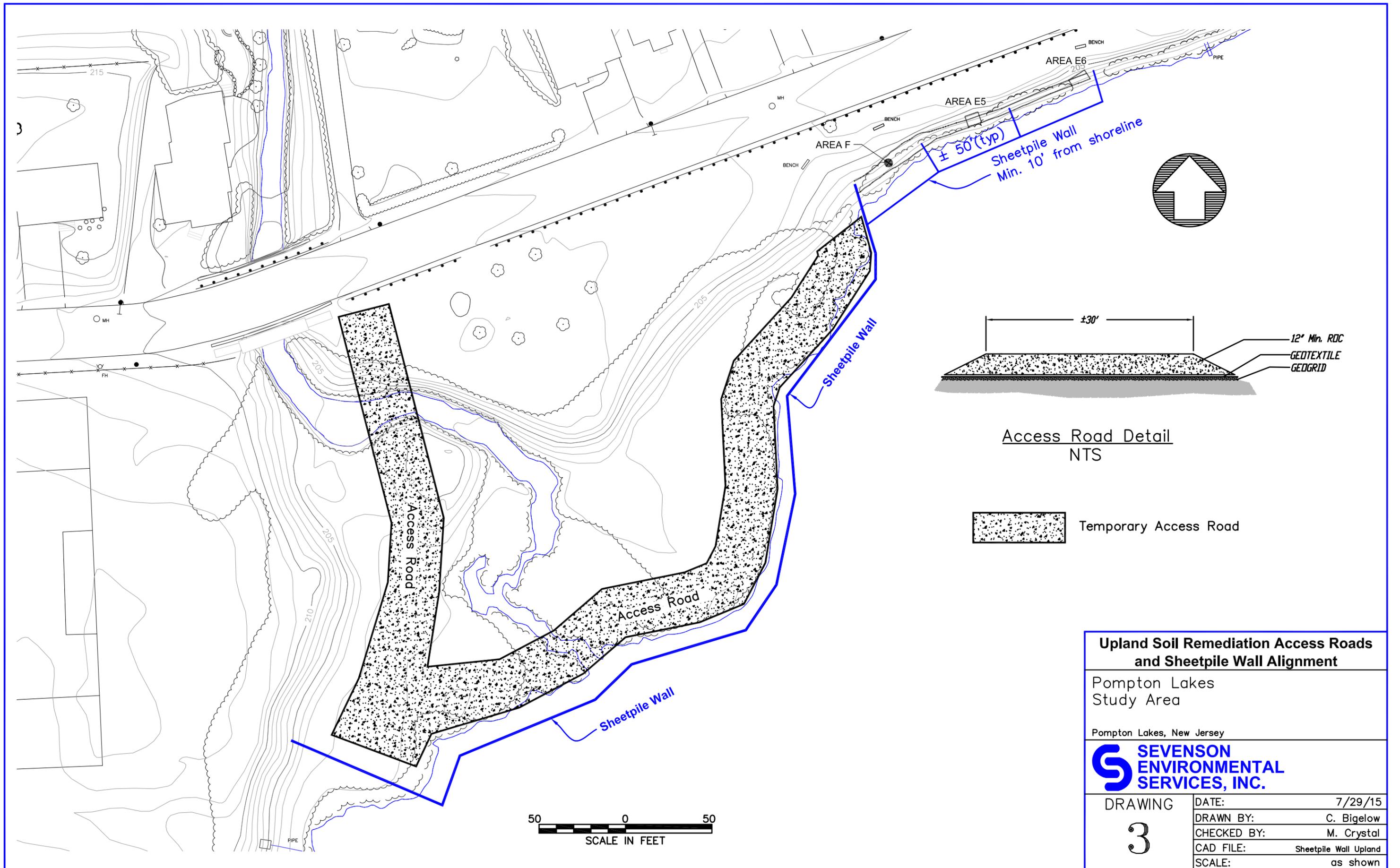
Pompton Lakes, New Jersey



DRAWING 2	DATE:	9/15/15
	DRAWN BY:	C. Bigelow
	CHECKED BY:	M. Crystal
	CAD FILE:	Solidification Equipment—Layout—2
	SCALE:	as shown

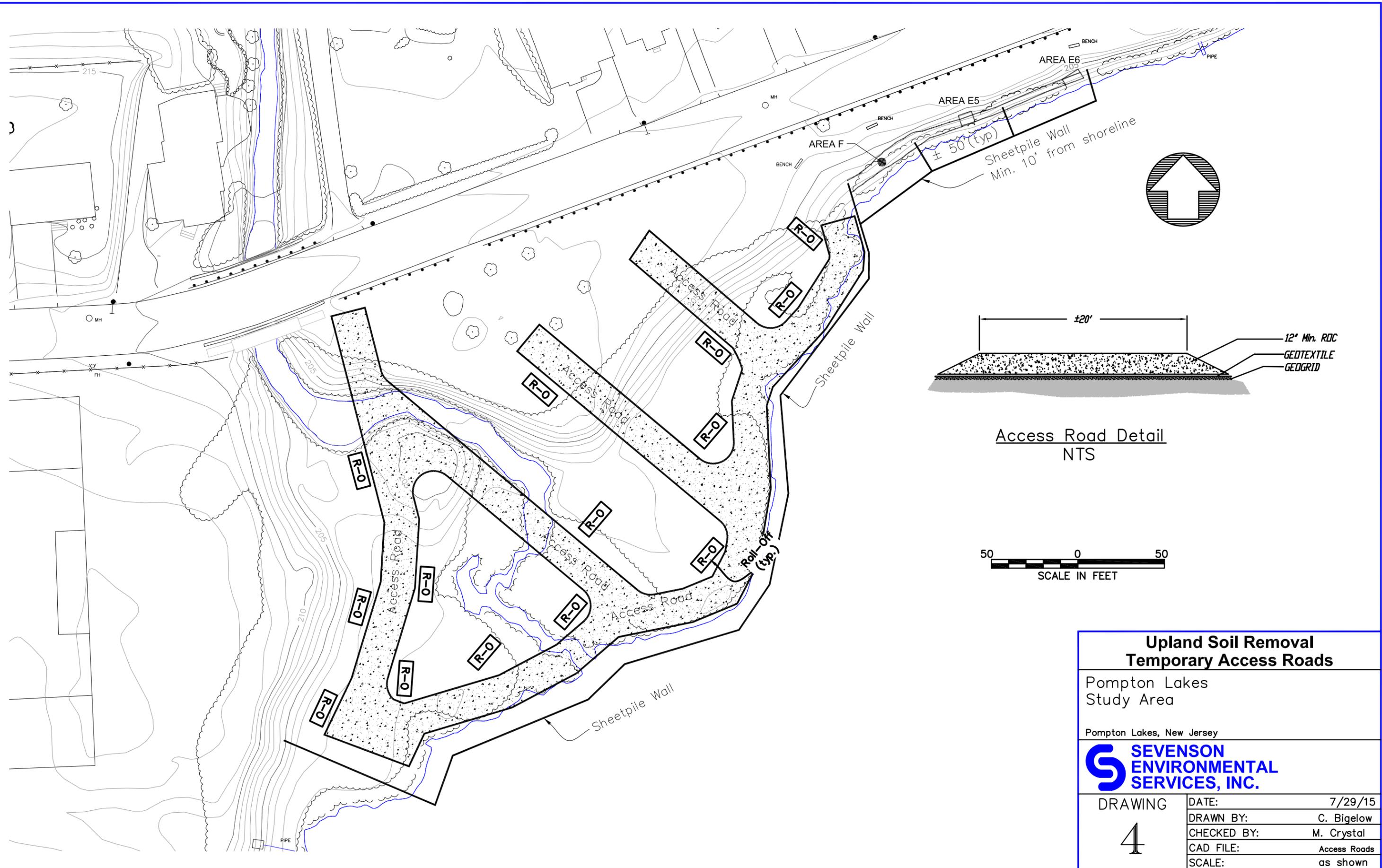


2000 GPM Process Flow Diagram	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
 SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
2A	DRAWN BY: C. Bigelow
	CHECKED BY: M. Walker
	CAD FILE: 2000-gpm-WWTP-PFD
	SCALE: None



 Temporary Access Road

Upland Soil Remediation Access Roads and Sheetpile Wall Alignment	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
 SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
3	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Sheetpile Wall Upland
	SCALE: as shown

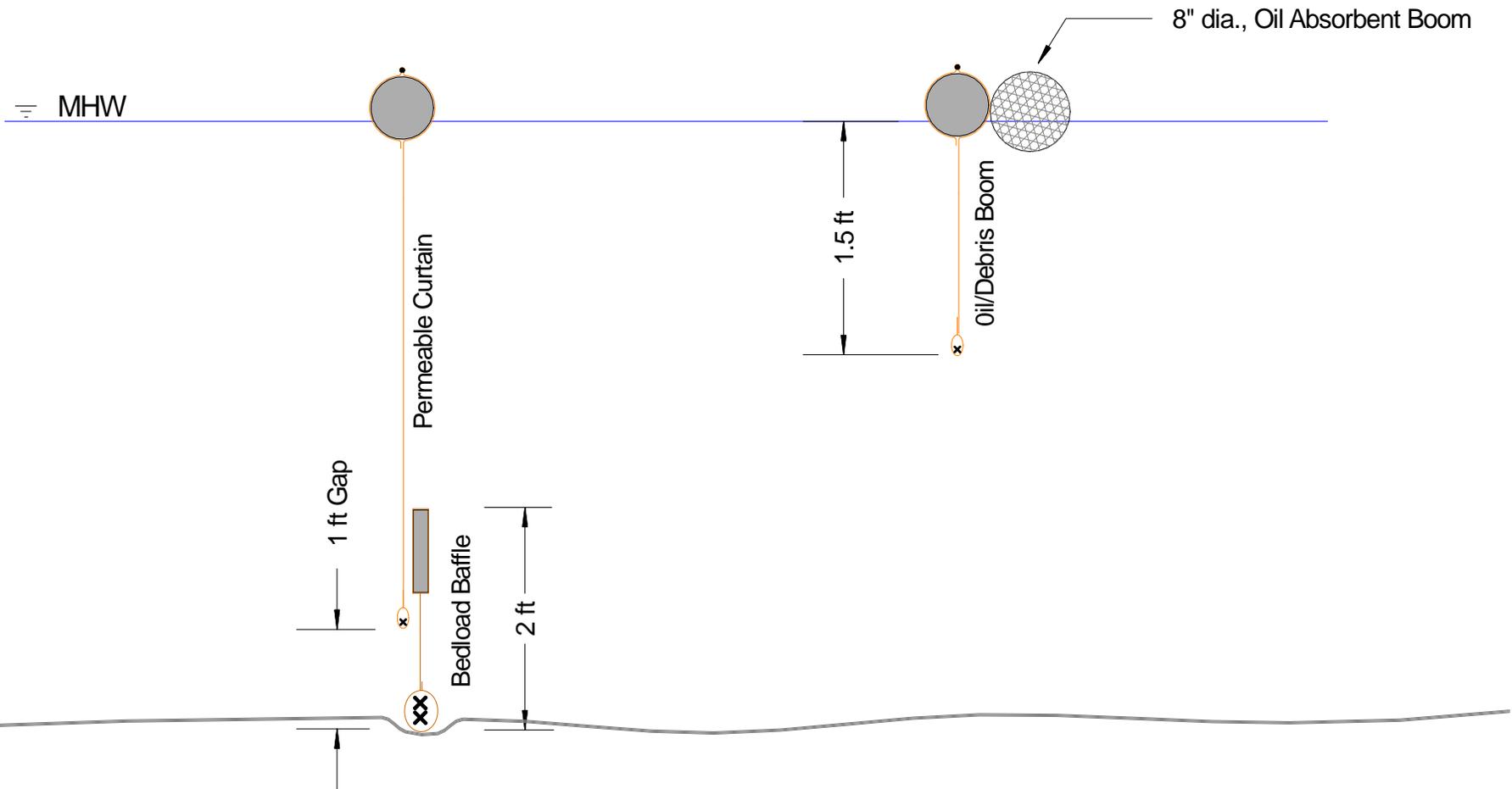


Upland Soil Removal Temporary Access Roads	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
4	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Access Roads
	SCALE: as shown

Drawing 5: Delta Area Turbidity Containment System Approach

POMPTON LAKE

REMEDIATION AREA



Preliminary design, not for construction. The manufacturer makes no guarantee of the suitability of the representative components for any intended use. The manufacturer shall not be liable for damages of any kind resulting for the use of this drawing or it's concepts.

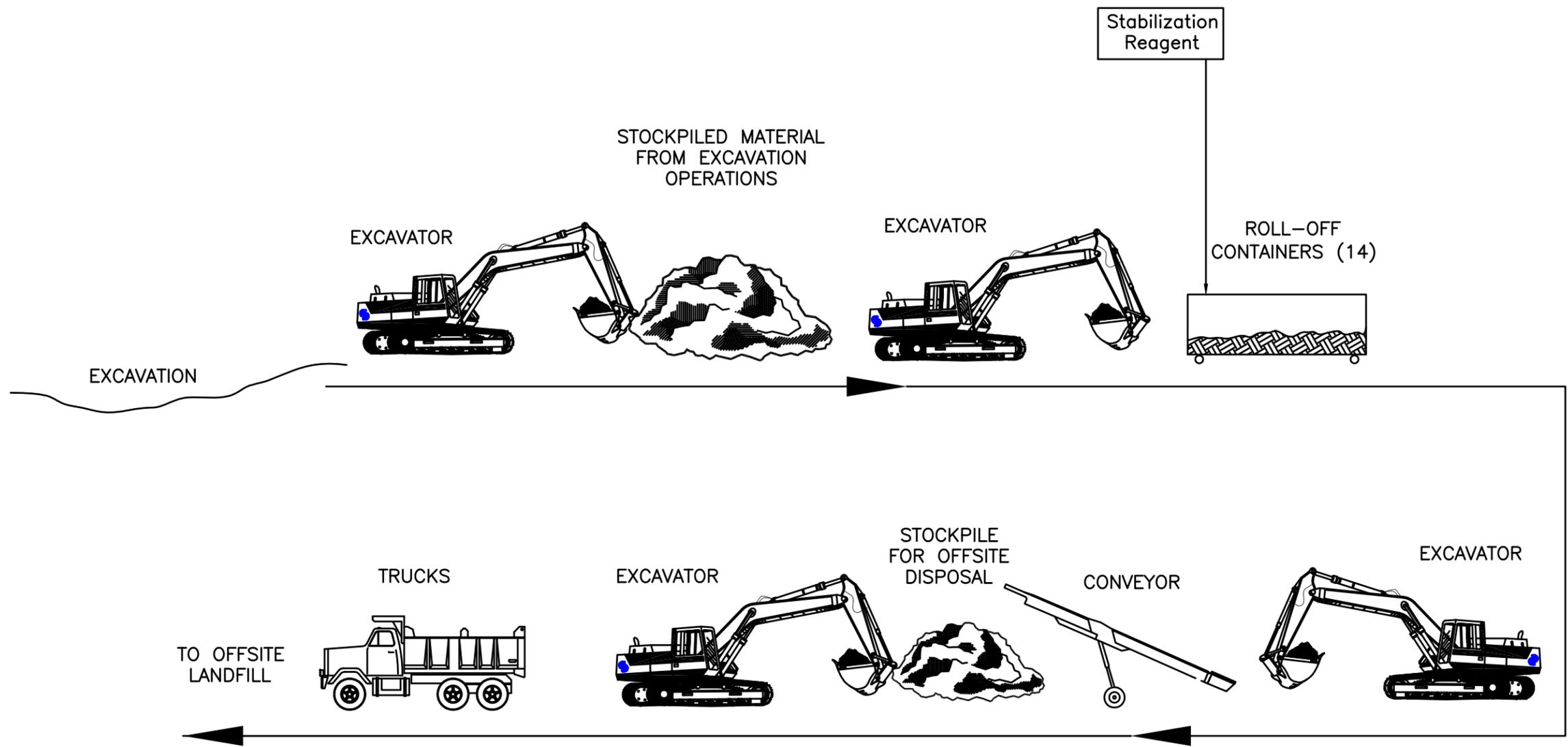
THIS DRAWING MAY CONTAIN PROPRIETARY INFORMATION BELONGING TO SPILLDAM ENVIRONMENTAL INC AND SHOULD NOT BE COPIED OR REDISTRIBUTED WITHOUT EXPRESS WRITTEN PERMISSION FROM SPILLDAM ENVIRONMENTAL INC.



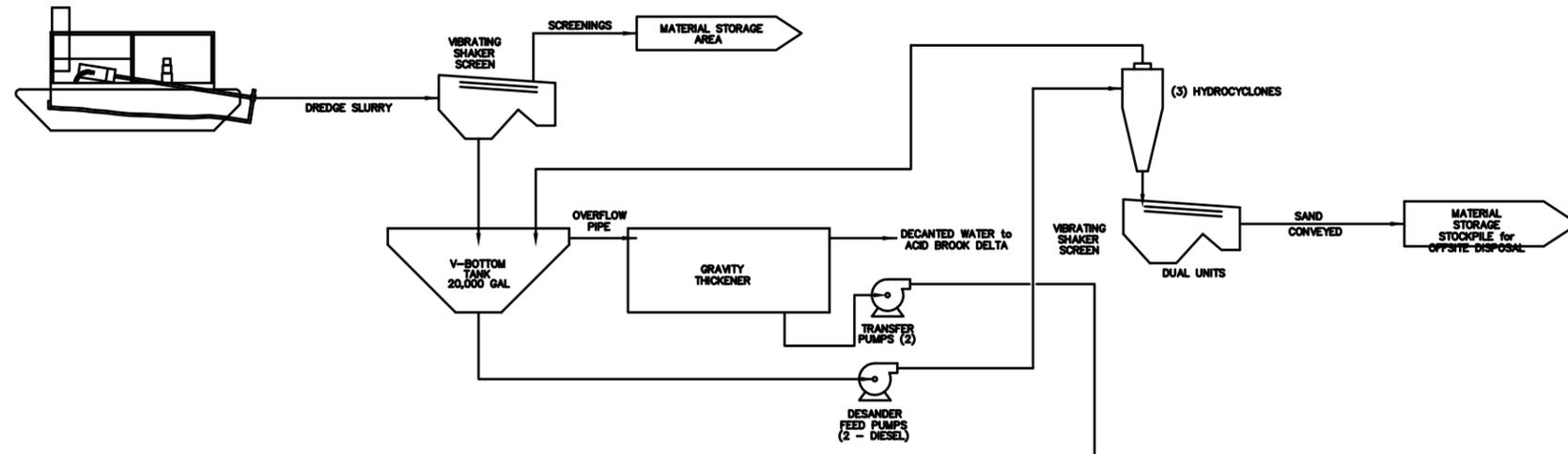
IWT/ Cargo-Guard
 "Protecting The Environment"
 PO Box 454
 Waretown, NJ 08758
 609-971-8810 Fax 609-971-8805
 www.iwtcargoguard.com

NO.	REVISION	DATE

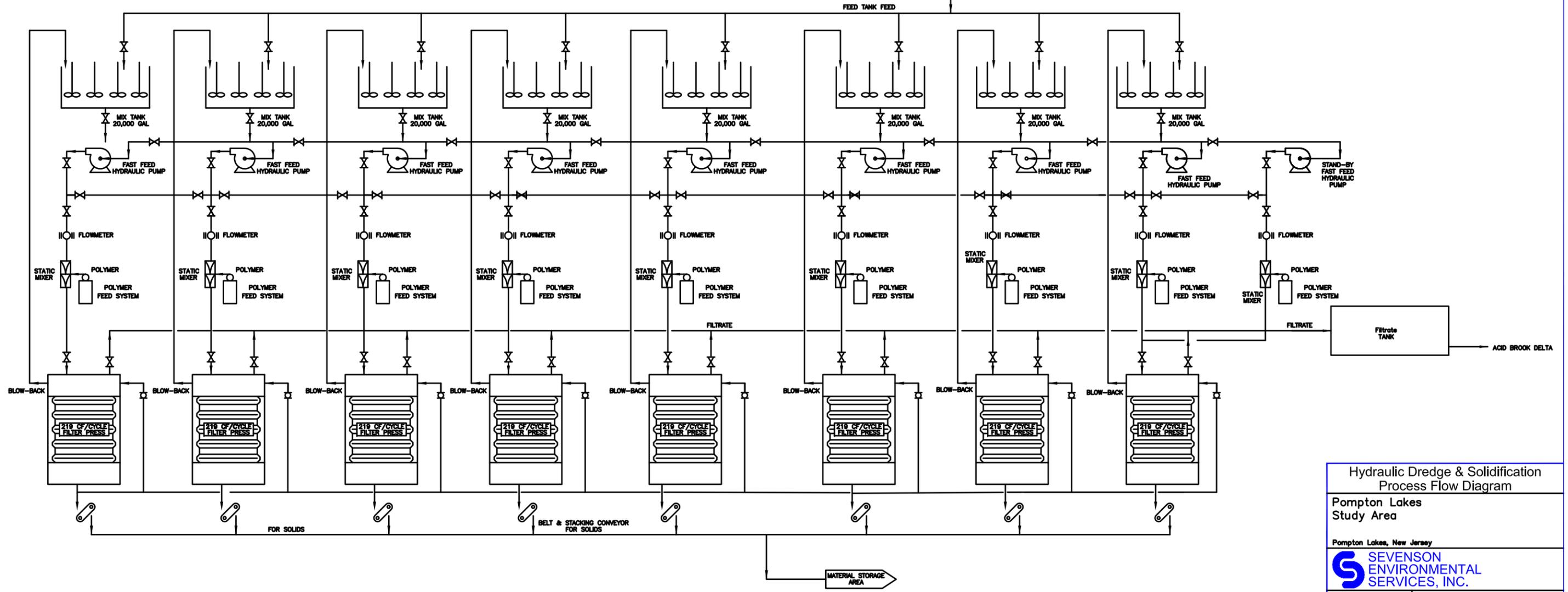
PREPARED FOR: Severson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	DATE: 09/10/2015	DRAWN BY: TJP
PROJECT: Dupont Pompton Lakes Works Pompton Lakes NJ	SCALE: N.T.S.	REVIEWED BY:
	DRAWING NO. 005	



Excavation Operation Process Flow Diagram	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
 SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
6	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Solid-PFD
	SCALE: NONE



LEGEND	
X	BUTTERFLY VALVE
□	BALL VALVE



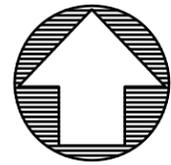
Hydraulic Dredge & Solidification
Process Flow Diagram

Pompton Lakes
Study Area

Pompton Lakes, New Jersey

SEVENSON
ENVIRONMENTAL
SERVICES, INC.

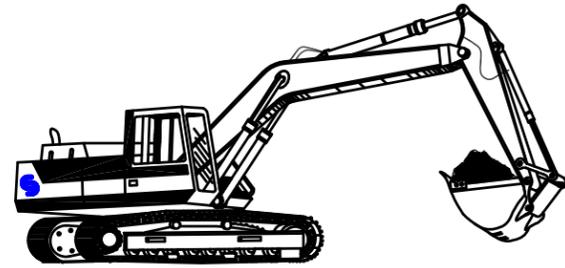
DRAWING	DATE:	9/15/15
7	DRAWN BY:	C. Bigelow
	CHECKED BY:	M. Crystal
	CAD FILE:	Solidification-PDF-7
	SCALE:	none



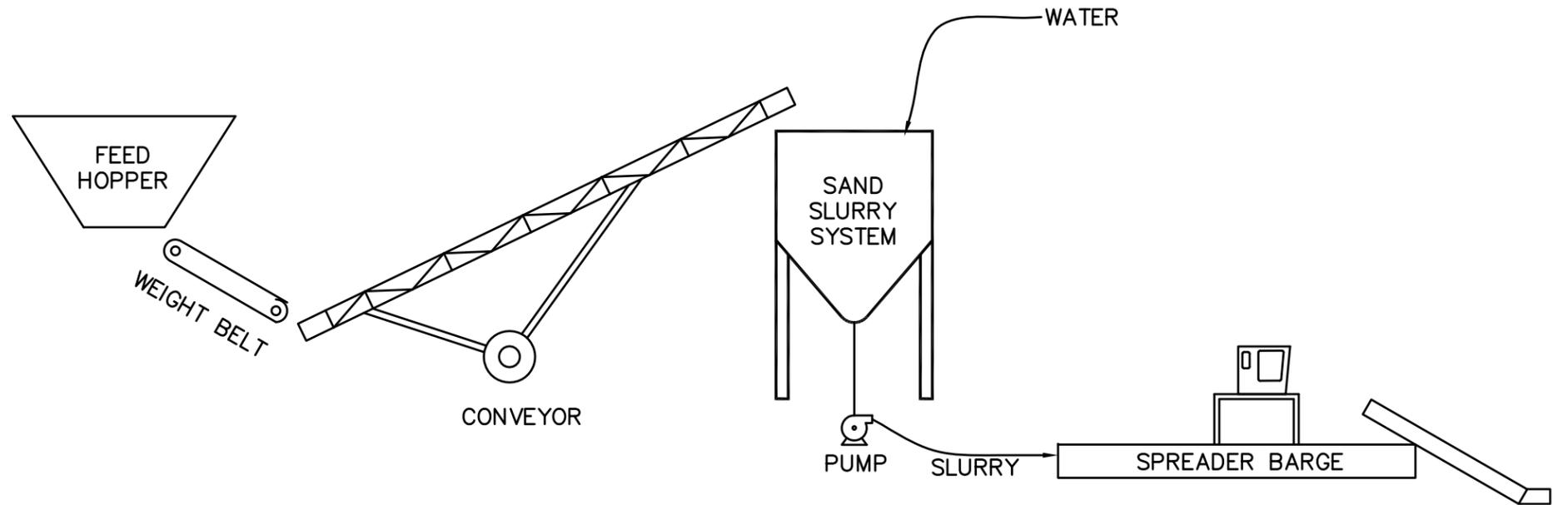
Ecological Layer Equipment Layout for Delta Area	
Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
 SEVENSON ENVIRONMENTAL SERVICES, INC.	
DRAWING	DATE: 7/29/15
8	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Eco-Layer Layout
	SCALE: as shown



ECOLOGICAL LAYER



EXCAVATOR WILL PLACE SAND INTO FEED HOPPER



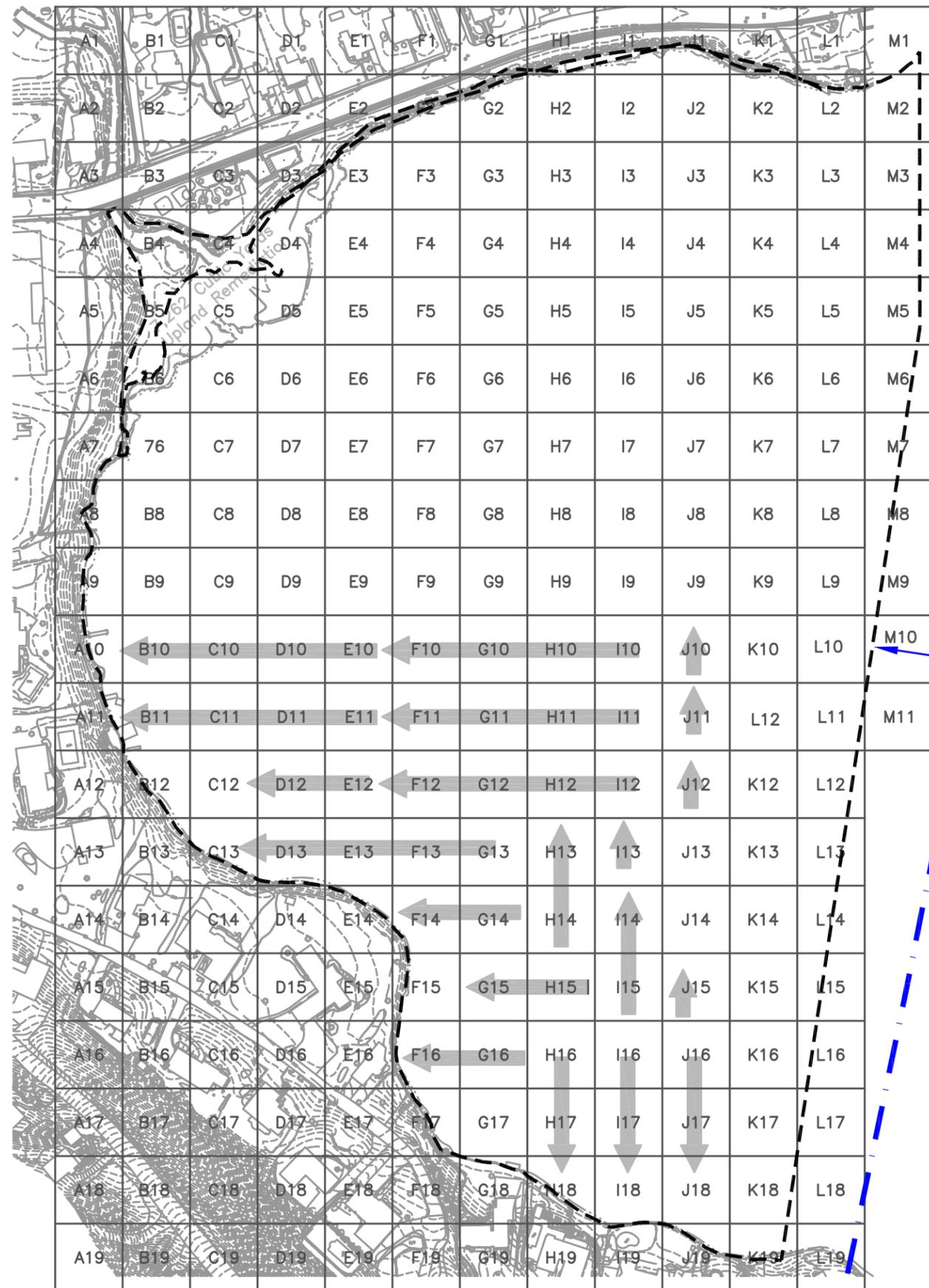
Ecological-Layer
Process Flow Diagram for Delta Area

Pompton Lakes
Study Area

Pompton Lakes, New Jersey



DRAWING 8A	DATE:	7/29/15
	DRAWN BY:	C. Bigelow
	CHECKED BY:	M. Crystal
	CAD FILE:	Capping-PFD
	SCALE:	none



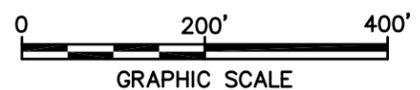
20' Min.

Legend

- Sediment Removal Limit
- ← Example Dredge Sequence And Cap Sequence
- - - - Turbidity Containment System

Sediment Removal General Sequence

Pompton Lakes Study Area	
Pompton Lakes, New Jersey	
Figure 9	DATE: 7/29/15
	DRAWN BY: C. Bigelow
	CHECKED BY: M. Crystal
	CAD FILE: Sediment Remova Grid
	SCALE: as shown



APPENDIX B

Sediment Processing Mass Balance

SEVENSON ENVIRONMENTAL SERVICES, INC. MASS BALANCE Sediment Processing of Acid Brook Delta Using De-sanders Followed By Filter Presses

Project Name: Pompton Lakes
Date: 5/21/2015
Revision: 5 DuPont's Volume w/ 2" overcut

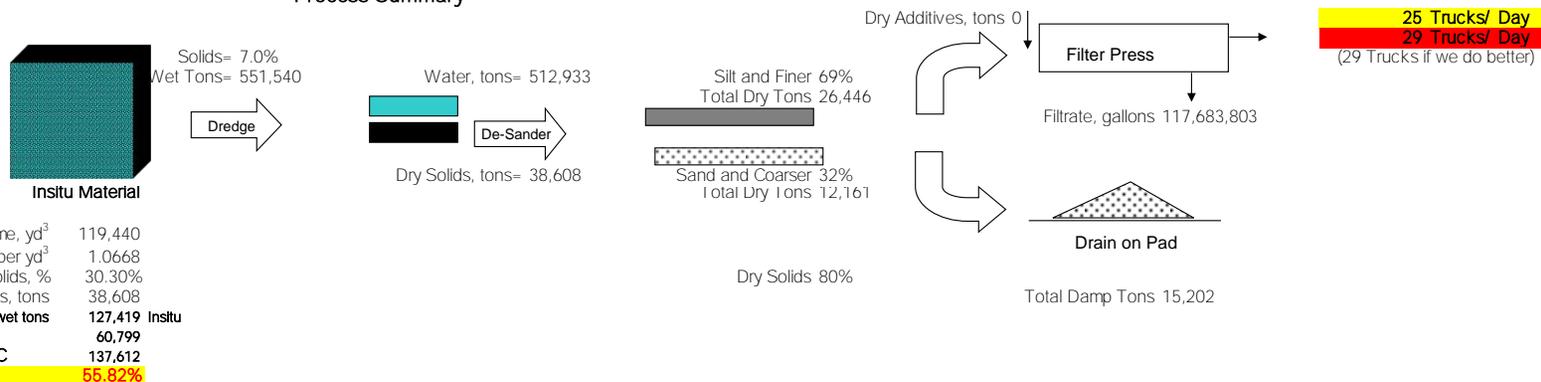
Insitu Material	2" Overcut	DuPont's Volume
Volume, cubic yards	119,440	9,440
Oven Dry Solids, %	30.30%	110,000
Specific Gravity	1.27	
Density, tons per cubic yard	1.07	
Silt and Finer Mass, dry weight	68.50%	
Sand and Coarser Mass, dry weight	31.50%	

Filter Press Inputs	
Silt and Finer Mass, Dry tons	26,446
Cake Oven Dry Solids, %	58.00%
Cake Density, tons per cubic yard	1.20
Cycle Time, minutes	110
On-Line Factor, %	90%
Press Size, cubic feet per drop	219
Number of Presses	8.00
Feed Oven Dry Solids, %	7.00%
Available Operating Hours, hours/ day	10
Available Operating Days, days/ week	5
Dry Additives, lbs per gallon	0
Filtrate Solids, ppm	50

Process Calculations		
De-sander Material Removal, dry tons	12,161	
Gravity Drained Sand Dry Solids, %	80%	
De-sander Material Removal, wet tons	15,202	127.44
Filter Cake Production, total wet tons	45,597	382.25
Filter Cake Production, tons/ operating day	382	509.70
Operating Days, days	119	5.96
Job Production Duration, weeks	23.86	Months
Filtrate+Drain Water Prod, gallons per day	986,578	
Filtrate+Drain Water Production total gallons	117,683,803	
Average Filtrate+Drain Water Prod (gpm)	1,827	
Designed WWT Water Production (gpm)	2000	
CY / Day Insitu	1001	
Dry Tons / Day	324	

T&D Sediments 60,799 Tons

Process Summary



APPENDIX C

Construction Schedule

Pompton Lakes Sediment Removal Project

ID	Task Name	Duration	Start	Finish	Predecessors	September 2015		May 2017		January 20
						5/24	10/18	3/13	8/7	1/1
1	Pompton Lakes Sediment Removal Project	641 days	Fri 4/1/16	Thu 10/11/18						
2	Potential Tree Clearing	45 days	Fri 4/1/16	Fri 6/3/16						
4	Uplands Remediation	60 days	Mon 6/6/16	Tue 8/30/16						
5	Offsite Mobilization	10 days	Mon 6/6/16	Fri 6/17/16	3		6/6		6/17	
6	Mobilization to Rotary Park	10 days	Mon 6/20/16	Fri 7/1/16	5		6/20		7/1	
7	Clearing & Grubbing	5 days	Mon 6/27/16	Fri 7/1/16	6SS+5 days		6/27		7/1	
8	Site Preparation & Staging Area Construction	5 days	Wed 6/29/16	Thu 7/7/16	7SS+2 days		6/29		7/7	
9	Install Access Roads & Site Grading	5 days	Wed 6/29/16	Thu 7/7/16	8SS		6/29		7/7	
10	Install Silt Curtains for Uplands Containment	2 days	Wed 6/29/16	Thu 6/30/16	8SS		6/29		6/30	
11	Install Upland Sheet Piling & Access Road Behind Wall	16 days	Fri 7/1/16	Tue 7/26/16	10SS+2 days		7/1		7/26	
12	Install & Operation of Acid Brook Bypass	12 days	Fri 7/22/16	Mon 8/8/16	13SS-3 days		7/22		8/8	
13	Upland Area Material Removal & Access Road "Fingers" As Needed - 7,953 cys	22 days	Wed 7/27/16	Thu 8/25/16	11		7/27		8/25	
14	Uplands Surveying	22 days	Wed 7/27/16	Thu 8/25/16	13SS		7/27		8/25	
15	Upland Material Stabilization	22 days	Wed 7/27/16	Thu 8/25/16	13SS		7/27		8/25	
16	Upland Material T & D - 12,883 tons	22 days	Thu 7/28/16	Fri 8/26/16	15SS+1 day		7/28		8/26	
17	Backfill Upland Area	20 days	Wed 8/3/16	Tue 8/30/16	13SS+5 days		8/3		8/30	
18	Area A & Island Area	71 days	Wed 8/31/16	Wed 12/14/16						
19	Build Containment Pad for Mechanical Dredging	5 days	Wed 8/31/16	Wed 9/7/16	17		8/31		9/7	
20	Mobilize/Setup Mechanical Dredging/Eco Layer Placment Equipment	5 days	Wed 8/31/16	Wed 9/7/16	17		8/31		9/7	

Project: Pompton Lakes Sediment Date: Thu 3/31/16 Planning Schedule - Preliminary	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	



Pompton Lakes Sediment Removal Project

ID	Task Name	Duration	Start	Finish	Predecessors	September 2015		May 2017		January 2018	
						5/24/15	10/18/15	8/7/17	1/1/18	5/28/17	10/23/17
21	Install Containment Curtain Around Area A	1 day	Thu 9/8/16	Thu 9/8/16	20			9/8			
22	Install Containment Curtain Area Island Area	2 days	Fri 9/9/16	Mon 9/12/16	21			9/9	9/12		
23	Mechanically Dredge Area A - 4,234 cys	12 days	Fri 9/9/16	Mon 9/26/16	21			9/9	9/26		
24	Mechanically Dredge Island Area - 14,672 cys	35 days	Tue 9/27/16	Tue 11/15/16	23			9/27	11/15		
25	Decontaminate Scows	2 days	Wed 11/16/16	Thu 11/17/16	24			11/16	11/17		
26	Mechanically Place Eco Layer Area A	4 days	Fri 11/18/16	Mon 11/28/16	25			11/18	11/28		
27	Mechanically Place Eco Layer Island Area	12 days	Tue 11/29/16	Wed 12/14/16	26			11/29	12/14		
28	Remove Turbidity Curtains	4 days	Tue 11/29/16	Fri 12/9/16	26			11/29	12/9		
29	2016 Winter shutdown Preparation & Demob	4 days	Mon 12/12/16	Thu 12/15/16	28			12/12	12/15		
30	2016/2017 Winter Shutdown	61 days	Fri 12/16/16	Mon 3/20/17	29			12/16	3/20		
31	Acid Brook Delta Remediation	182 days	Tue 3/21/17	Wed 12/6/17							
32	2017 Remobilization	5 days	Tue 3/21/17	Mon 3/27/17	30			3/21	3/27		
33	ABD turbidity Curtains	5 days	Mon 3/27/17	Fri 3/31/17							
34	Install Turbidity Curtains in ABD	5 days	Mon 3/27/17	Fri 3/31/17	32FS-1 day			3/27	3/31		
35	Fish Relocation	5 days	Mon 4/3/17	Fri 4/7/17	34			4/3	4/7		
36	ABD Dredging	173 days	Mon 4/3/17	Wed 12/6/17							
37	Build Solidification & Water Treatment Containment Pads	5 days	Mon 4/3/17	Fri 4/7/17	34			4/3	4/7		
38	Mob & Install Solidification Plant Equipment	21 days	Mon 4/10/17	Tue 5/9/17	37			4/10	5/9		
39	Mob & Install Water Treatment Plant	21 days	Mon 4/10/17	Tue 5/9/17	37			4/10	5/9		
40	Mob & Install Hydraulic Dredge and Dredge Line	10 days	Wed 5/10/17	Tue 5/23/17	38			5/10	5/23		
41	Solidification and Water Treatment System Tests	2 days	Wed 5/24/17	Thu 5/25/17	40			5/24	5/25		

Project: Pompton Lakes Sediment Date: Thu 3/31/16 Planning Schedule - Preliminary	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	



Pompton Lakes Sediment Removal Project

ID	Task Name	Duration	Start	Finish	Predecessors	September 2015			May 2017			January 2018		
						5/24	10/18	3/13	8/7	1/1	5/28	10/23	18/8	12/1
42	Hydraulic Dredging ABD - 119,440 cys	119 days	Fri 5/26/17	Tue 11/14/17	41				5/26			11/14		
43	Sediment Solidification	120 days	Fri 5/26/17	Wed 11/15/17	42SS				5/26			11/15		
44	Material Handling	123 days	Fri 5/26/17	Mon 11/20/17	43SS				5/26			11/20		
45	Sediment T & D - 60,799 tons	125 days	Tue 5/30/17	Thu 11/23/17	44SS+1 day				5/30			11/23		
46	Decon & Demobilize Solidification Equipment	15 days	Thu 11/16/17	Wed 12/6/17	43						11/16	12/6		
47	2017/2018 Winter Shutdown	82 days	Thu 12/7/17	Fri 3/30/18	46						12/7	3/30		
48	Ecological Layer Placement	99 days	Mon 4/2/18	Thu 8/16/18										
49	Mob & Install Ecological Layer Placement Equipment	10 days	Mon 4/2/18	Fri 4/13/18	47						4/2	4/13		
50	Place Ecological Layer Within ABD - 6" in 2 layers	84 days	Mon 4/16/18	Thu 8/9/18	49									
51	Place Initial Layer - 2" layer	33 days	Mon 4/16/18	Wed 5/30/18	49						4/16	5/30		
52	Place Remaining Layer - 4" layer	51 days	Thu 5/31/18	Thu 8/9/18	51						5/31	8/9		
53	Demob Ecological Layer Placement Equipment	5 days	Fri 8/10/18	Thu 8/16/18	52						8/10	8/16		
54	Remove Upland Sheet Piling	15 days	Fri 8/17/18	Thu 9/6/18	53						8/17	9/6		
55	Remove ABD turbidity Curtain	5 days	Fri 9/7/18	Thu 9/13/18	54						9/7	9/13		
56	Restoration	30 days	Fri 8/17/18	Thu 9/27/18										
57	Upland Site Restoration	15 days	Fri 8/17/18	Thu 9/6/18	53						8/17	9/6		
58	Wetland Restoration	30 days	Fri 8/17/18	Thu 9/27/18	53						8/17	9/27		
59	Remove Upland Work Areas	5 days	Fri 9/14/18	Thu 9/20/18	55						9/14	9/20		
60	General Demobilization	15 days	Fri 9/21/18	Thu 10/11/18	59						9/21	10/11		

Project: Pompton Lakes Sediment Date: Thu 3/31/16 Planning Schedule - Preliminary	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	



APPENDIX D

Material Product Information



BELTON INDUSTRIES INC.

Post Office Box 127
Highway 76 at Hamby Road
Belton, South Carolina, USA 29627
864-338-5711 • 1-800-845-8753
FAX 864-338-5594
www.beltonindustries.com

Style 1696

Demarcation Fabric - High Visibility Orange

Product Specifications

March 2009

Material:	Polypropylene
Construction:	24 x 8 Plain weave
Color:	Natural / Orange

<u>Physical Property</u>	<u>Test Method</u>	<u>Typical</u>	<u>MARV</u>
Mass per Unit Area	ASTM D-3776	2.6 oz/yd ²	N/A
Grab Tensile	ASTM D-4632	170 x 80 lbs	150 x 65 lbs
Elongation at Break	ASTM D-4632	18.5 x 17.5%	N/A
Apparent Opening Size	ASTM D-4751	0.425 mm	N/A
Water Flow Rate	ASTM D-4491	20.0 gpm/ft ²	N/A

Available printed every 8 feet "Danger - Do Not Dig" in English and/or Spanish

Proudly Made it U.S.A.

The foregoing is believed to be an accurate representation of information compiled from inside and/or outside sources, however, because test values, statistical data, and other information presented may be based solely on results of unverified tests made on random samples, information presented may relate only to tested samples and because the conditions in which such information may be used are beyond the control of Belton Industries, Inc., Belton does not guarantee either the accuracy or reliability of the information or the suggestions and recommendations contained herein. Belton assumes no responsibility for the use of information presented herein and hereby disclaims all liabilities which may arise in connection with the use of information herein presented. All specifications, properties, values, statistical data and applications listed herein are provided as information only, without charge or obligation to the recipient or user, and in no way either makes or creates any warranty with respect to any product or modifies, amends or enlarges any warranty made with respect to any product. Final determination of the suitability, reliability and accuracy of the information and suggested uses is solely the responsibility of the user.

SuperGeo™ LL Smooth LLDPE Average Product Specifications

Properties	Test Method	Frequency	Minimum Average Values				
			12 mil	20 mil	30 mil	40 mil	60 mil
Thickness, mil Lowest individual reading	ASTM D5199	Per roll	12 10.2	20 18	30 27	40 36	60 54
Density, g/cm ³ (max)	ASTM D1505	200,000 lb	.939	.939	.939	.939	.939
Tensile Properties (Each Direction) Strength at Break, lb/in width (N/mm) Elongation at Break, %	ASTM D6693, Type IV	20,000 lb	43 (7) 800	76 (13) 800	114 (20) 800	152 (27) 800	228 (40) 800
Tear Resistance, lb (N)	ASTM D1004	45,000 lb	6 (26)	11 (50)	16 (70)	22 (100)	30 (133)
Puncture Resistance, lb (N)	ASTM D4833	45,000 lb	16 (70)	28 (124)	42 (190)	56 (250)	80 (356)
Carbon Black Content, % (Range)	ASTM D1603	20,000 lb	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0	2.0-3.0	2.0-3.0
Carbon Black Dispersion	ASTM D5596	45,000 lb	Note (1)	Note (1)	Note (1)	Note (1)	Note (1)
Standard Roll Dimensions							
Roll Length ⁽²⁾ , ft			1,850	1,330	1,210	910	600
Roll Width ⁽²⁾ , ft			19	19	22	22	22
Roll Area, ft ²			35,150	25,270	26,620	20,020	13,200

⁽¹⁾9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.

⁽²⁾Roll widths and lengths have a tolerance of $\pm 1\%$

*Custom material thicknesses also available

This data is provided for informational purposes only. Brawler Industries, LLC makes no warranties as to the suitability of the fitness for a specific use or merchantability of products referred to, no guarantee of satisfactory results upon contained information or recommendations and disclaims all liability from resulting loss or damage. This information is subject to change without notice, please check with Brawler Industries, LLC for current updates.



MILES CITY, MT
 184 Hwy 59 N
 Miles City, MT . 59301
 800.488.3592
 406.234.1680

MIDLAND, TX
 11701 Co. Rd. 125 W
 Midland, TX . 79711
 800.583.6005
 432.563.4005

PLEASANTON, TX
 4300 S Hwy 281
 Pleasanton, TX . 78064
 830.569.4005

HOUSTON, TX
 8615 Golden Spike Ln
 Houston, TX . 77086
 800.364.7688
 281.272.1660



© 2014 Brawler Industries, LLC

SE HABLA ESPAÑOL

www.brawler.com



RUSMAR INCORPORATED

PRODUCT SELECTION GUIDE

Compatible Products (can be fed from same machine, sequentially without machine being flushed clean)	Product	Most Common Use	Duration	Recommended Depth	Most Common Dilution	Coverage per 450lb Drum at Recommended Depth	Color	Scent
	AC-645	Active excavation and short-term emission control	12-17 Hours	3 Inches	6.5 : 1	4,500 ft ²	White	<ul style="list-style-type: none"> • Unscented • Wintergreen* • Vanilla*
AC-904	Medium-Term Emission Control & Sealing	15-30 Days	2 Inches	Direct Use	800-900 ft ²	<ul style="list-style-type: none"> • Black • Red* • Green* • Brown* 	<ul style="list-style-type: none"> • Unscented • Wintergreen* • Vanilla* 	
AC-912	Long-Term Emission Control & Sealing	60-90 Days	2 Inches	Direct Use	800-900 ft ²	<ul style="list-style-type: none"> • Black • Red* • Green* • Brown* 	<ul style="list-style-type: none"> • Unscented • Wintergreen* • Vanilla* 	
AC-920	Extreme-Term Emission Control & Sealing	90-180 Days	2 Inches	Direct Use	800-900 ft ²	<ul style="list-style-type: none"> • Black • Red* • Green* • Brown* 	<ul style="list-style-type: none"> • Unscented • Wintergreen* • Vanilla* 	
AC-667SE	Landfill Daily Cover	24-48 Hours 72 Hours	3 Inches 6-7 Inches	6.5 : 1 4 : 1	4,500 ft ² 1,830 ft ²	White/Tan	Cinnamon	

*Indicates a Special Order item

RUSMAR INCORPORATED • 216 Garfield Avenue • West Chester, PA 19380

Toll Free: 1.800.SEE.FOAM • P: 610.436.4314 • F: 610.436.8436 • www.rusmarinc.com



EQUIPMENT SELECTION GUIDE

Pneumatic Foam Unit	Self-Contained?	Freeze-Protected?	Throw Range	Coverage/min. at 3" Depth	Tank Capacity	Approximate Coverage per Tank with 600 Series	Approximate Coverage per Tank with 900 Series	Compatible with all Products?	Self-Propelled?
NTC/8	No. Requires compressed air supply.	No	25 Feet	86 ft ² /min.	Varies. Customer Supplied	Varies.	Varies.	No. Not compatible with AC-667SE	No. Skid Mounted
PFU 400/25	Yes	Yes	35 Feet	267 ft ² /min.	400 Gallon	4,500 ft ² @3" depth	5,600 ft ² @2" depth	Yes	No. Trailer Mounted
PFU 1600/40	Yes	Yes	60 Feet	428 ft ² /min.	1,600 Gallon	18,000 ft ² @3" depth	22,400 ft ² @2" depth	Yes	No. Trailer Mounted
PFU 2500/60	Yes	Yes	80 Feet or Spray Manifold	642 ft ² /min.	2,500 Gallon	28,000 ft ² @3" depth	35,000 ft ² @2" depth	Yes	Yes



REMEDATION PRODUCT DATA SHEET

PNEUMATIC FOAM UNIT NTC / 8



Our most compact and portable foam generating system designed for small remediation applications. The NTC/8 can be mounted on the tongue of most standard air compressors and can be drum or auxiliary tank fed.

This system is completely air driven and comes equipped with pump, foam generator, hose and pick-up tube. The unit requires a source of compressed air.

FEATURES

- Simple to operate
- Remote control for one person operation
- Electrical system is powered by a 12 volt battery
- Minimal clean-up after use
- Durable, rugged construction
- Minimal preparation

SPECIFICATIONS

Coverage Rate.....90 Sq. Ft./Min. @3" depth
Compressed Air Required.....120 CFM @ 100 PSI
Size.....36"L x 23"W x 26"H
Weight..... 375 Pounds
Hose.....100 Feet of 1" Diameter
Products.....AC-645 and All AC-900 Series Long Duration Foam Products



REMEDATION PRODUCT DATA SHEET

PNEUMATIC FOAM UNIT 400/25



A completely self-contained and portable foam generating system designed to withstand the rugged demands and harsh elements found at remediation sites. Quick start-up time means that emission control is available when you need it. Recommended for small to medium size remediation projects, dredging operations and hazardous waste sites. Can be towed around site with a pick-up truck. Foam is applied using a hand-line.

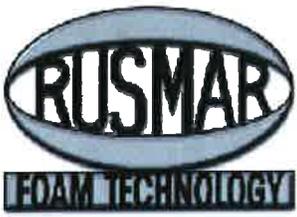
System includes air compressor, pump, hoses, nozzles, solution storage tank and proprietary foam generating technology. Unit has freeze protection for outdoor storage year-round.

FEATURES

- Simple to operate
- Durable, rugged construction
- No clean-up necessary
- Can be filled and placed aside until needed

SPECIFICATIONS

Solution Storage Tank..... 400 Gallons
Coverage Rate.....270 Sq. Ft./Min. @3" depth
Coverage Area per fill.....2,000 - 6,000 Sq. Ft.
Size.....16'8" L x 8'6" W x 7'8" H
Dry Weight.....6,880 Pounds
Hose..... 200 Feet of 1-1/2" Diameter
Products.....All Long Duration and Soil Equivalent Foam Products
Freeze Protection System.....120V or 230V, 30 amp, single phase



RusScent Odor Neutralizing Liquids

RusScent Liquid Concentrates

Rusmar uses scientific findings of the workings of our olfactory system to reduce or eliminate nuisance odors. With environmentally safe essential oils, Rusmar neutralizes unpleasant smells without masking, without causing potentially toxic chemical reactions and without the need to handle caustic and volatile chemicals. Odor Neutralizing Liquids can be applied through a misting system, a drip feed system or sprayed directly onto the odor source.



Facts about the RusScent Liquid Concentrates:

- RusScent Liquids are safe for the environment, humans and animals.
- RusScent Liquids can be atomized through any suitable misting system.
- RusScent Liquids can be sprayed directly on the malodorous materials to create a barrier between the public and the malodors.
- RusScent Liquids are cost effective due to the high dilution rate.
- RusScent Liquids are water soluble.
- RusScent Liquids are available in a variety of scents – cinnamon, vanilla, apricot and evergreen.
- RusScent Liquids are biodegradable, non-toxic, non-hazardous and non-flammable.
- Dilution range is from 1:100 to 1:150 depending on scent.
- RusScent Nozzles are available to create a misting system.
- RusScent Nozzles use dilute liquid at the rate of .04 gallons per hour.
- RusScent Nozzles spray in a cone shaped pattern measuring up to 200 feet in diameter.



Rusmar Incorporated

216 Garfield Avenue, West Chester, PA 19380
1-800-733-3626, 610-436-4314 office, 610-436-8436 fax



RusScent Odor Neutralizing Granules



RusScent Granules

Rusmar uses scientific findings of the workings of our olfactory system to reduce or eliminate nuisance odors. With environmentally safe essential oils, Rusmar neutralizes unpleasant smells without masking, without causing potentially toxic chemical reactions and without the need to handle caustic and volatile chemicals. Odor Neutralizing Granules are small dry pellets containing odor neutralizer that vaporizes at a slow, steady rate. They do not require utilities or equipment.



Facts about the RusScent Granules:

- The granules are small pellets that vaporize our odor controlling neutralizers at a slow steady rate.
- They can be used to create a barrier between the public and the malodors.
- They are heavy enough so as not to blow away under normal wind conditions.
- The granules effectiveness intensifies when wet- they do not dissolve.
- They are available with no scent or in a variety of scents- cinnamon, vanilla, apricot and evergreen.
- RusScent granules will last approximately 90 days.

Usage Rates:

- When creating a barrier between a malodor and the public, put a pound of granules in a RusScent Sleeve and hang one every 10 feet.
- When sprinkling granules on a malodorous area, use one ounce for every 270 square feet.
- When applying granules to a container, sprinkle 1-2 ounces weekly for every 80 cubic yards.
- To intensify the odor controlling properties of a sleeve during its life, occasionally shake and moisten.
- Usage may vary with the intensity of the malodor.



RUSMAR

Rusmar Incorporated

216 Garfield Avenue, West Chester, PA 19380
1-800-733-3626, 610-436-4314 office, 610-436-8436 fax



Recognized Globally
For Superior Odor And Emissions Control

RusScent Odor Neutralizing Sleeves



RusScent Sleeves

Rusmar uses scientific findings of the workings of our olfactory system to reduce or eliminate nuisance odors. With environmentally safe essential oils, Rusmar neutralizes unpleasant smells without masking, without causing potentially toxic chemical reactions and without the need to handle caustic and volatile chemicals. Ideal for temporary project sites, RusScent Sleeves do not require power or plumbing.



Facts about the RusScent Sleeves:

- Fabric RusScent Sleeves are made to hold up to a pound of our odor neutralizing granules, about twice the amount of our RusScent Socks.
- Each sleeve is 3 feet long by 2.5 inches wide
- They have a small hole, surrounded by a metal grommet at the top, ready for hanging
- Occasionally, shake and moisten to intensify the sleeve's odor controlling effectiveness.
- Constructed with Velcro, sleeves can easily be emptied and refilled from the opening at the top.
- RusScent Sleeves are reusable; granules can be changed when odor-controlling properties are depleted.
- Versatile because different odor neutralizers can be substituted at will.
- User can control the amount of granules to insert.

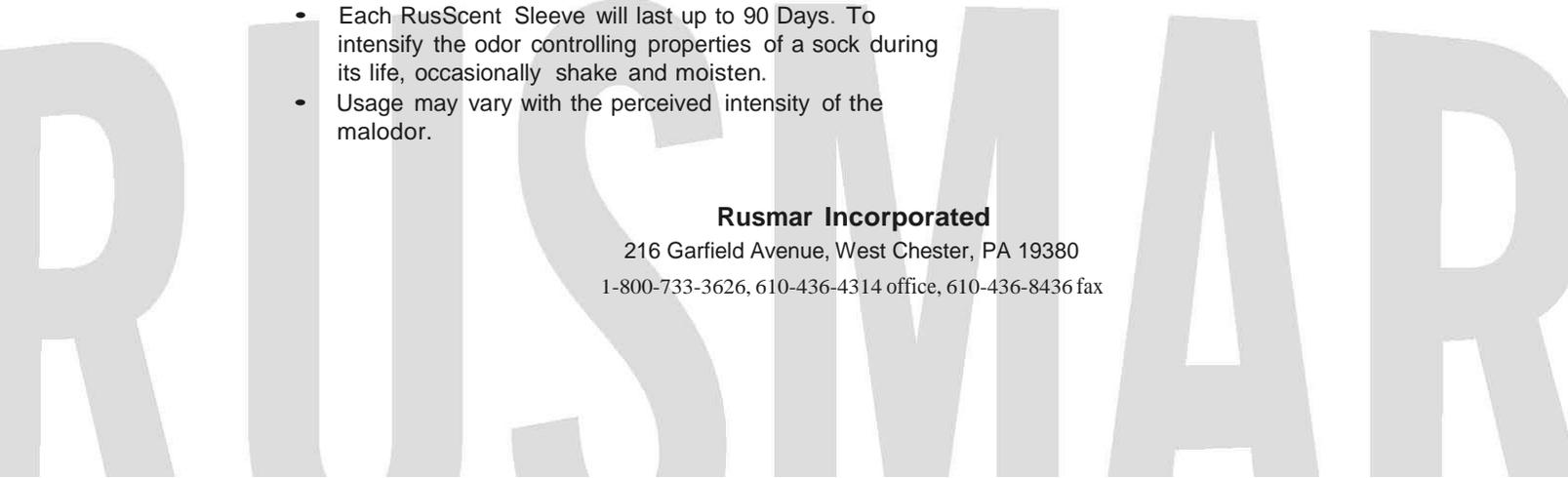


Usage Rates:

- When creating a barrier between a malodor and the public, hang one RusScent Sleeve every 10 feet
- When you use a RusScent Sleeve to control malodors in a room, use one for every 270 square feet. Hang in front of an air stream.
- Each RusScent Sleeve will last up to 90 Days. To intensify the odor controlling properties of a sock during its life, occasionally shake and moisten.
- Usage may vary with the perceived intensity of the malodor.

Rusmar Incorporated

216 Garfield Avenue, West Chester, PA 19380
1-800-733-3626, 610-436-4314 office, 610-436-8436 fax





LONG DURATION FOAM AC-645

GENERAL DESCRIPTION

AC-645 Long Duration Foam is a patented product which produces a thick, long-lasting, viscous foam barrier for immediate control of dust, odors and volatile organic compounds (VOCs). AC-645 is designed for use with Rusmar Pneumatic Foam Units.

AC-645 foam is recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for a period up to 17 hours. AC-645 has been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

FEATURES

- Biodegradable
- Will not add to treatment costs
- No ambient temperature limitations
- Easy to use
- More effective than tarps
- Non-reactive
- Non-hazardous
- Safe for workers and the environment
- Requires only water dilution
- No clean up necessary
- Non-combustible
- Covers any contamination source

APPLICATIONS

The primary application for AC-645 is control of odors, VOCs and dust during active excavation and for overnight coverage of contaminated soils at hazardous waste sites.

AC-645 can also be applied on top of liquid surfaces.

SPECIAL ODOR CONTROL PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. AC-645 has little or no odor itself, although a pleasant wintergreen or vanilla scent can be added. It forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide an immediate and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water. AC-645 will not add to soil volume or treatment costs.



LONG DURATION FOAM AC-645

AC-645 can also be applied on top of trucks for emission control during transport of materials such as contaminated soils or sewage sludge. Ammonia tests performed on trucks containing sewage sludge resulted in a drop of concentration levels from 170 ppm prior to foaming down to 6 ppm after coverage with AC-645.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Works on lagoon and pond closures
- Can be applied to near vertical or liquid surfaces

FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. AC-645 can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

EMERGENCY SPILL CLEAN UP

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. AC-645 Long Duration Foam can be applied to any shaped object, as well as steep slopes, water, mud, snow and ice. It is non-flammable and non-reactive - difficult spill problems can be accommodated.

METHOD OF APPLICATION

AC-645 Long Duration Foam is supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately dilute and transfer the chemical. AC-645 is designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.



SOIL EQUIVALENT FOAM AC-667SE

GENERAL DESCRIPTION

AC-667SE Soil Equivalent Foam is a patented product which produces a thick, long-lasting, viscous foam barrier for immediate control of foul odors, blowing litter, disease vectors and scavengers when applied to landfills as a daily cover material. AC-667-SE is also an excellent choice for emission control at remediation sites where dust, odors and volatile organic compounds (VOCs) are a concern. AC-667SE maintains its integrity for up to 72 hours and is designed for use with Rusmar Pneumatic Foam Units.

FEATURES

- Biodegradable
- Will not add to treatment costs
- No ambient temperature limitations
- Easy to use
- More effective than tarps
- Can withstand moderate rainfall
- Non-hazardous
- Safe for workers and the environment
- Requires only water dilution
- No clean up necessary
- Non-combustible
- Maintains integrity for up to 72 hrs

APPLICATIONS

The primary application for AC-667SE is to replace soil for the daily cover of landfills. However it also effectively controls odors, VOCs and dust during active excavation and provides multi-day coverage of contaminated soils at hazardous waste sites. AC-667SE will adhere to vertical surfaces such as balefill landfills and can also be applied on top of liquid surfaces.

SPECIAL ODOR CONTROL PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. AC-667SE forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide a continuous and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water. AC-667SE will not add to soil treatment costs.



LONG DURATION FOAM AC-667SE

AC-667SE can also be applied on top of trucks for emission control during transport of materials such as contaminated soils or sewage sludge.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Works on lagoon and pond closures
- Can be applied to liquid surfaces

FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. AC-667SE can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

EMERGENCY SPILL CLEAN UP

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. AC-667SE foam can be applied to any shaped object, as well as vertical slopes, water, mud, snow and ice. It is non-flammable and non-reactive - difficult spill problems can be accommodated.

METHOD OF APPLICATION

AC-667SE is supplied in either 450-pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and mixed chemical storage tank and a microprocessor controlled dispensing system to accurately dilute and transfer the chemical.

AC-667SE is designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.



LONG DURATION FOAM AC-900 SERIES

GENERAL DESCRIPTION

The AC-900 Series Long Duration Foam products produce an impermeable, flexible membrane that seals a surface to prevent emissions. AC-900 Series foam products utilize foam as a distribution method for latex. After the foam has been applied, the air bubbles begin to collapse and the latex coagulates to form a continuous flexible membrane that adheres to the substrate. AC-900 Series products are designed for use with Rusmar Pneumatic Foam Units.

AC-900 Series foams are recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for periods up to 6 months. AC-900 Series foams have been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

FEATURES

- Adheres to vertical and irregular surfaces
- Completely controls odors & VOCs
- Prevents erosion
- Easy to use, no mixing necessary
- Available in black, red, green or brown
- Non-hazardous
- Controls dusting
- Repels water
- No temperature limitations
- More effective than tarps

APPLICATIONS

AC-900 Series foams are the technology of choice when conditions demand superior coverage for periods up to 6 months. Some of the more common uses are:

ODOR AND VOC CONTROL

As a medium for controlling odors and VOCs, AC-900 Series has proven to be very effective with diverse applications.

- Can be left in place or disposed of with soil - will not interfere with thermal or bioremediation process
- Extended odor & VOC control of open excavations or exposed trash
- Extended odor & VOC control of stockpiled soils or debris
- Special odor control problems, such as sewage sludge
- Baled trash cover - the membrane seals the surface completely



LONG DURATION FOAM AC-900 SERIES

FUGITIVE DUST

Exposed soil can often become a dust problem in windy locations, presenting a potential health hazard. Hazardous waste sites, receiving periodic shipments of dusty materials, can prevent windborne dust by immediately applying AC-900 Series foam.

- No need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.
- Extended dust control of stockpiled soils or debris

EROSION CONTROL

Graded areas can be covered with AC-900 Series Membrane reducing erosion damage caused by rain, melting snow or ice and wind.

- On outside slopes of the landfill – prevents trash from being exposed
- On landfill caps - prevents erosion before growth of new vegetation
- Stockpiles

SEALING HIGH PERCOLATION SOILS

Sand and other high percolation soils do not effectively repel rain water or melting snow and ice. Covering areas with AC-900 Series foam dramatically reduces soil permeability.

- Improved run-off from inside surfaces of the landfill
- Reduced leachate generation

WASTE TRANSPORTATION

Trucks or railcars transporting trash, odorous or dusty materials can be quickly covered with AC-900 Series foam to form a complete barrier between emissions and the atmosphere.

- No wind blown losses
- Produces a better visual appearance



LONG DURATION FOAM AC-900 SERIES

METHOD OF APPLICATION

AC-900 Series Long Duration Foam products are supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately transfer the chemical.

AC-900 Series products are designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.



Piian Odor Control Systems

Flexi~Fog System

Applications:

- Landfills / Compost Facilities.
- Garbage Transfer & Recycling Facilities.
- Sewage and Waste Water Plants.
- Lagoons / Settling Ponds.
- Agriculture / Animal Housing.
- Petrochemical Refineries.

In the past, atomization technology has come in two "types": small, low cost off-the-shelf sprayers for localized odor problems and more expensive custom-built systems for major odor control problems. Now, Piian Systems introduces the Piian Flexi~Fog System, which combines the capabilities of large atomization systems at a very affordable price.

The Piian Flexi~Fog System pumps a mixture of ordinary water and all natural odor neutralizer concentrate at 1000PSI pressure through a manifold tube, where it is released through highly specialized low flow atomization nozzles to form a mist of 10 micron sized droplets. The droplets are so fine they remained suspended in the air until complete evaporation occurs. This not only eliminates wetting or dripping, but it provides an extremely efficient system for delivering odor neutralizer and destroying odors.

The Piian Flexi~Fog System is comes in a simple self-install kit. The kit includes a 1000PSI pump module, chemical injector pump, a coil of manifold tubing, between 10 and 500 nozzles and all necessary fittings. No tools are required for assembly; simply cut the manifold tube to the required length and "press-on" fittings are used to install the nozzles.

A metering pump injects all natural odor neutralizer concentrate into the water supply feeding the pump module creating a powerful odor fighting system. The metering pump includes both volume and frequency adjustments for accuracy and flexibility. Because the system produces molecular sized droplets of odor neutralizer, they remain suspended in the air, where there attach to and destroy odorous compounds present in the environments around:



Landfill Perimeters

A Piian Flexi Fog System can be used to surround an entire landfill site. Systems have been installed to cover a linear distance of up to 5 miles. By replicating the system at several locations, huge areas can be effectively managed.

System Features:

- Effective odor control for any size environment.
- 1000PSI Operation - 10 Micron Sized Droplets.
- No Wetting or Dripping.
- Supplied as a simple self install kit.
- Uses "Push-On" Style Nozzles & Fittings
- Fast Simple Installation.
- An exact pre - design is not necessary; kit includes enough nozzles and fittings to install the system several ways, fittings and nozzles may be added or removed as you like.
- Kit Sizes - 10, 25, 50, 75, 100, 130, 200, 300 and 500 nozzles.



Sewage Treatment

A Piian Flexi Fog System dispensing Piian Odor Neutralizing Agent is attached to the perimeter of a large primary clarifier. Odor compounds rising from the tank must pass through the fog barrier to escape. Odorous compounds contacting the fog are instantly and permanently destroyed. The system provides a highly cost effective alternative to tank covers and expensive scrubbing equipment.



Large Scale Composting & Waste Disposal/Recycling

A Piian Flexi Fog System dispensing Piian Odor Neutralizing Agent surrounds a compost pile effectively forming an odor neutralizing barrier.

The Piian Odor Neutralizing system is a highly valuable part of a waste disposal operators' odor management program.

The system uniformly delivers odor neutralizer over medium to large-scale areas without any wetting or dripping problems.

Automated operation with low installation and operating costs.

A Piian Flexi Fog System is suspended on cables above a working area. The system is installed to allow machinery to move and operate safely underneath with out interfering with site operations.



Garbage Transfer

A Piian Flexi Fog System dispensing Piian Odor Neutralizing Agent is attached to the transfer building structure at roof level. Odor compounds present inside the building are destroyed by the fog. The system does not interfere with the operation of the facility.

Timers automatically operate the system at preset intervals over a 24 hour period.



Piian Odor Control Systems

Flexi~Fog System

Three reasons why the Piian Flexi~Fog System is an excellent solution to your odor control requirements:

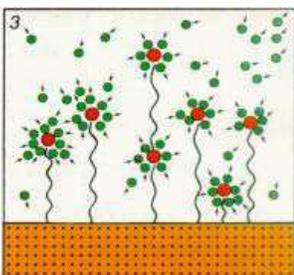
1. **Performance** – Operating at 1000PSI, the system produces 10 micron sized droplets that evaporate completely in the air without any wetting or dripping.
2. **Quality** – The system includes proven industrial quality components that will provide years of trouble free operation.
3. **Cost** – As the system is packaged as a kit for you to install, we have no design costs, which provides tremendous savings to you.

Harnessing Nature to Solve Odor Problems.

Piian Odor Control Systems use Piian Odor Neutralizer, a completely natural proprietary blend of plant extracts, essential oils and emulsifiers. When sprayed, atomized or vaporized, molecules of this natural solution surround odorous gases causing immediate odor neutralization, followed by complete destruction of the gas through a biodegrading action. This is an entirely natural process, completely safe and environmentally benign.

Independent laboratory tests, field tests and a long track record have proven Piian Odor Neutralizers ability to destroy common odorous gases and compounds such as Hydrogen Sulfide, Ammonia, Sulfur Dioxide, Mercaptans, Carbon Disulfide, Acetic Acid / Anhydride, Phenols and Styrene.

Additional laboratory tests have verified that Piian Odor Neutralizer is completely safe for dispersion in a workspace environment, manufactured completely from food grade and pharmaceutical grade ingredients; it is non-toxic, non-sensitizing, non-flammable, non-reactive, non-volatile, biodegradable and ecologically safe.



System Features:

- No Special tools required for assembly.
- Uses simple "press-on" fittings.
- Kit includes everything required for installation.
- Industrial quality components.
- Kits sizes - 10, 25, 50, 75, 100, 130, 200, 300 & 500 nozzles.
- Full 1 year warranty.



Nozzle Line Features:

- 1000PSI operating pressure produces 10 micron droplets.
- Simple "press-on" fitting connections, requires no tools.
- Any nozzle spacing is possible with several layout options.
- 360° adjustable nozzle orientation.
- UV Resistant construction ~ no shrinkage, elongation or brittleness.
- Anti-drip valves.
- Automatic drainage after each use.



Pump Module Features:

- CAT Pump, industry leader in reliability and durability.
- Leeson Electric Motor.
- Heavy Duty Skid Frame.
- Stainless Steel Chassis and Cover.
- Outlet pressure gauge.
- Automatically drains after each use.



High Capacity Filters:

- Built In Water Conditioner.
- 50, 10 and 5 Micron High Capacity Filters.
- Pressure Switch Protection.
- Pressure Gauge.
- Chemical Injection.
- Compressed Air Purge.
- Float Switch to Monitor Odor Neutralizer Tank Level



Starter Panel:

- Nema 4 Enclosure.
- Lock Out and Electrical Disconnect Switch.
- IEC Starter.
- Motor Overload Protection.
- Control Circuit Transformer.
- Terminal Strip Connection.
- Hour Meter.
- Status Pilot Lights.



Digital Control Panel:

- Wind Speed and Direction Activation
- 24 Hour and Repeat Cycle Timing.
- Low Temperature Shutdown.
- Humidity Measurement.
- Smart Pressure Switch Monitoring.
- Oil Life Monitoring.
- Air Purge Control.
- Status LEDs / Audible Alarm / Fault.
- Odor Neutralizer Tank Level Monitor.





Piian Odor Control Systems

Flexi~Fog System ~ Standard Duty Kits



Kit Contents



Standard Duty Pump Module



Standard Duty – Filter Assembly



Standard Duty – Starter Panel

Flexi~Fog Systems Kits - 115 vAC - 60 Hz Power Supply			
10 Nozzle Kit	Includes – 10 Nozzle Assemblies, PL25S 1000PSI Pump Module, Metering Pump, 50ft Manifold Tube, 50 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0010	\$3,815
25 Nozzle Kit	Includes – 25 Nozzle Assemblies, PL25S 1000PSI Pump Module, Metering Pump, 100ft Manifold Tube, 50 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0025	\$4,195
50 Nozzle Kit	Includes – 50 Nozzle Assemblies, PL50S 1000PSI Pump Module, Metering Pump, 150ft Manifold Tube, 100 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0050	\$5,075
75 Nozzle Kit	Includes – 75 Nozzle Assemblies, PL75S 1000PSI Pump Module, Metering Pump, 200ft Manifold Tube, 100 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0075	\$5,645
100 Nozzle Kit	Includes – 100 Nozzle Assemblies, PL100S 1000PSI Pump Module, Metering Pump, 250ft Manifold Tube, 150 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0100	\$6,325
130 Nozzle Kit	Includes – 130 Nozzle Assemblies, PL130S 1000PSI Pump Module, Metering Pump, 300ft Manifold Tube, 150 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKS0130	\$7,175

Flexi~Fog Systems Kits - 230 vAC - 50 Hz Power Supply			
10 Nozzle Kit	Includes – 10 Nozzle Assemblies, PL20F 1000PSI Pump Module, Metering Pump, 50ft Manifold Tube, 50 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0010	\$3,815
20 Nozzle Kit	Includes – 20 Nozzle Assemblies, PL20F 1000PSI Pump Module, Metering Pump, 100ft Manifold Tube, 50 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0020	\$4,095
40 Nozzle Kit	Includes – 40 Nozzle Assemblies, PL40F 1000PSI Pump Module, Metering Pump, 150ft Manifold Tube, 50 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0040	\$4,895
55 Nozzle Kit	Includes – 55 Nozzle Assemblies, PL55F 1000PSI Pump Module, Metering Pump, 175ft Manifold Tube, 100 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0055	\$5,395
80 Nozzle Kit	Includes – 80 Nozzle Assemblies, PL80F 1000PSI Pump Module, Metering Pump, 200ft Manifold Tube, 100 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0080	\$6,175
110 Nozzle Kit	Includes – 100 Nozzle Assemblies, PL100F 1000PSI Pump Module, Metering Pump, 250ft Manifold Tube, 150 Loop Clamps, 1 Tee, 2 Elbows, 2 Unions, 2 End Caps, 2 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PLKF0110	\$6,945



Piian Odor Control Systems

Flexi~Fog System ~ Industrial Duty Kits



Kit Contents



Industrial Duty Pump Module



Industrial Duty – Filter Assembly



Industrial Duty – Starter Panel

Flexi~Fog Systems Kits - 60 Hz Power Supply

50 Nozzle Kit	Includes – 50 Nozzle Assemblies, PN50S 1000PSI Pump Module, Metering Pump, 150ft Manifold Tube, 50 Loop Clamps, 2 Tees, 4 Elbows, 4 Unions, 4 End Caps, 6 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter.	PFKS0050	\$12,295
100 Nozzle Kit	Includes – 100 Nozzle Assemblies, PN100S 1000PSI Pump Module, Metering Pump, 250ft Manifold Tube, 150 Loop Clamps, 2 Tees, 4 Elbows, 4 Unions, 4 End Caps, 6 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKS0100	\$13,475
130 Nozzle Kit	Includes – 130 Nozzle Assemblies, PN130S 1000PSI Pump Module, Metering Pump, 300ft Manifold Tube, 150 Loop Clamps, 2 Tees, 4 Elbows, 4 Unions, 4 End Caps, 6 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKS0130	\$14,145
200 Nozzle Kit	Includes – 200 Nozzle Assemblies, PN220S 1000PSI Pump Module, Metering Pump, 500ft Manifold Tube, 200 Loop Clamps, 4 Tees, 6 Elbows, 6 Unions, 6 End Caps, 10 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKS0200	\$15,975
300 Nozzle Kit	Includes – 300 Nozzle Assemblies, PN300S 1000PSI Pump Module, Metering Pump, 750ft Manifold Tube, 300 Loop Clamps, 6 Tees, 8 Elbows, 8 Unions, 8 End Caps, 12 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKS0300	\$18,075
500 Nozzle Kit	Includes – 500 Nozzle Assemblies, PN500S 1000PSI Pump Module, Metering Pump, 1200ft Manifold Tube, 500 Loop Clamps, 8 Tees, 10 Elbows, 10 Unions, 10 End Caps, 16 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKS0500	\$22,295

Flexi~Fog Systems Kits - 50 Hz Power Supply

55 Nozzle Kit	Includes – 55 Nozzle Assemblies, PN55F 1000PSI Pump Module, Metering Pump, 200ft Manifold Tube, 50 Loop Clamps, 2 Tees, 4 Elbows, 4 Unions, 4 End Caps, 6 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKF0055	\$12,825
110 Nozzle Kit	Includes – 110 Nozzle Assemblies, PN110F 1000PSI Pump Module, Metering Pump, 300ft Manifold Tube, 150 Loop Clamps, 2 Tees, 4 Elbows, 4 Unions, 4 End Caps, 6 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKF0110	\$13,150
185 Nozzle Kit	Includes – 185 Nozzle Assemblies, PN185F 1000PSI Pump Module, Metering Pump, 500ft Manifold Tube, 200 Loop Clamps, 4 Tees, 6 Elbows, 6 Unions, 6 End Caps, 10 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKF0185	\$15,695
300 Nozzle Kit	Includes – 300 Nozzle Assemblies, PN300F 1000PSI Pump Module, Metering Pump, 750ft Manifold Tube, 300 Loop Clamps, 6 Tees, 8 Elbows, 8 Unions, 8 End Caps, 12 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKF0300	\$18,075
500 Nozzle Kit	Includes – 500 Nozzle Assemblies, PN500F 1000PSI Pump Module, Metering Pump, 1200ft Manifold Tube, 500 Loop Clamps, 8 Tees, 10 Elbows, 10 Unions, 10 End Caps, 16 Spare Nozzles plus a Nozzle Cleaning Brush and Tubing Cutter	PFKF0500	\$22,295





Piian Odor Control Systems

Flexi~Fog System ~ Individual Parts



Nozzle Assembly

Add extra nozzles onto a system
Part # PLNA0008
Price **\$18.75 ea**



X-Scale Water Conditioner

Minimizes Nozzle Maintenance in Hard Water Conditions
Part # CPWC0004
Price **\$375.00 ea**



Nozzle Cluster Assembly

For spot treatment
Part # PLNC0008
Price **\$85.00 ea**



Atomization Nozzles

Replace nozzles on a system
Part # LPNA0004
Price **\$5.25 ea**



Atomization Nozzles Plugs

Block of nozzles on a system
Part # LPPG0001
Price **\$1.45 ea**



Tubing Connector - Elbow

Install tubing around tight corners
Part # PLEB0006
Price **\$17.25 ea**



End Cap

Terminate the end of an extra Nozzle
Part # PLEC0006
Price **\$10.75 ea**



Stainless Hanger Cable

Stretch between two points to hang manifold tube and nozzles
Part # LSAC0001
Price **\$0.60 / ft**



Nozzle Cleaning Brush

Maintains clean nozzle spray pattern
Part # LTKT0002
Price **\$13.25 ea**



Manifold Tubing

Extend the distance between nozzles or from nozzles to pump module location.
Part # PLMT0006
Price **\$1.70 / ft**



Tubing Quick Disconnect

Allows fast connection/disconnection of tubing
Part # PLQD0006
Price **\$59.75 ea**



Tubing Connector - Union

Connect two pieces of manifold tube
Part # PLTU0006
Price **\$13.25 ea**



Tubing Connector - Tee

Split manifold tubing into two runs
Part # PLTT0006
Price **\$16.95 ea**



Manifold Ball Valve

Shut off flow of water to sections of nozzles
Part # PFBV0004
Price **\$23.75 ea**



Tubing Clamp

Extra Clamps to support nozzles or tubing
Part # LSHC0002
Price **\$0.50 ea**



Pump Module Filter

Cleans water supply to system
Part # PFCX1010 (10 Micron)
Price **\$9.95 ea**
Part # PFCX1005 (5 Micron)
Price **\$9.95 ea**



Cable Turnbuckle & Crimp Sleeves

Applies tension to Stainless Hanger Cable
Part # LSCT0001
Price **\$12.50 ea**



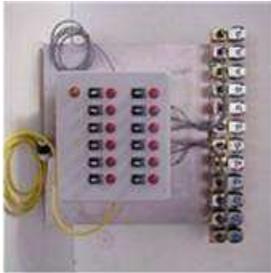
Tubing Cutter

Cuts manifold tube right.
Part # LTKT0003
Price **\$17.75 ea**



Piian Odor Control Systems

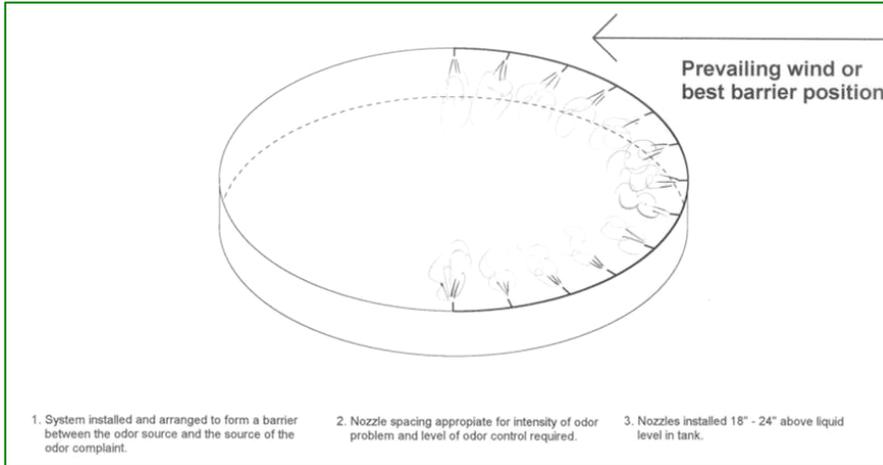
Flexi~Fog System ~ Optional Control Items

Item	Part #	Price
Remote Start Switch – Starts and Stops Pump Module From Remote Location	ESWB0001	\$145.00
Outdoor Skid Frame – Mounts the pump, filters and starter on to a forklift skid frame for outdoor use	CPSF0001	\$1075.00
Chemical Injection Pump – injects odor neutralizer into inlet water to pump module for odor control applications 	115 vAC 5.0 GPD 150 PSI Pump 230 vAC 5.0 GPD 150 PSI Pump 115 vAC 10.0 GPD 110 PSI Pump 230 vAC 10.0 GPD 110 PSI Pump	CECJ0115 \$775.00 CECJ0230 \$775.00 CECJ1115 \$845.00 CECJ1230 \$845.00
High Pressure Zone Valve – splits system in to multiple control zones 	2 Zone Controller, 3/8" NPT 1200 PSI 3 Zone Controller, 3/8" NPT 1200 PSI 4 Zone Controller, 3/8" NPT 1200 PSI 5 Zone Controller, 3/8" NPT 1200 PSI 2 Zone Controller, 3/8" NPT 1200 PSI with De-Pressurization Valve 3 Zone Controller, 3/8" NPT 1200 PSI with De-Pressurization Valve 4 Zone Controller, 3/8" NPT 1200 PSI with De-Pressurization Valve 5 Zone Controller, 3/8" NPT 1200 PSI with De-Pressurization Valve * Multiple additional zones and other standard voltages available	LPSN2115 \$750.00 LPSN3115 \$1275.00 LPSN4115 \$1795.00 LPSN5115 \$2350.00 LPSC2115 \$1050.00 LPSC3115 \$1675.00 LPSC4115 \$2295.00 LPSC5115 \$2925.00
In-line Water Conditioner – modifies the TDS content of inlet water to reduce nozzle maintenance. Unit is installed onto inlet plumbing to system, requires no servicing or maintenance. 	1/2" NPT Unit Treats Water Flow Rate from 0.5 GPM to 2.9 GPM 3/4" NPT Unit, Treats Water Flow Rate from 2.2 GPM to 5.0 GPM 1" NPT Unit, Treats Water Flow Rate from 3.5 GPM to 11.0 GPM 1 1/2" NPT Unit, Treats Water Flow Rate from 7.0 GPM to 20.0 GPM 2" NPT Unit, Treats Water Flow Rate from 15.0 GPM to 35 GPM 3" NPT Unit, Treats Water Flow Rate from 30 GPM to 50 GPM 4" NPT Unit, Treats Water Flow Rate from 40 GPM to 100 GPM	CPWC0004 \$365.00 CPWC0006 \$795.00 CPWC0008 \$1195.00 CPWC0012 \$1650.00 CPWC0024 \$2425.00 CPWC0036 \$3050.00 CPWC0048 \$3795.00
D-ionization System - treats unsuitable water for use in up to 5 GPM system	CEDI0004	POR
Reverse Osmosis System - treats unsuitable water for use in greater than 5 GPM system	CERS0004	POR



Piian Odor Control Systems

Flexi~Fog System ~ Layout Illustrations and Design Factors

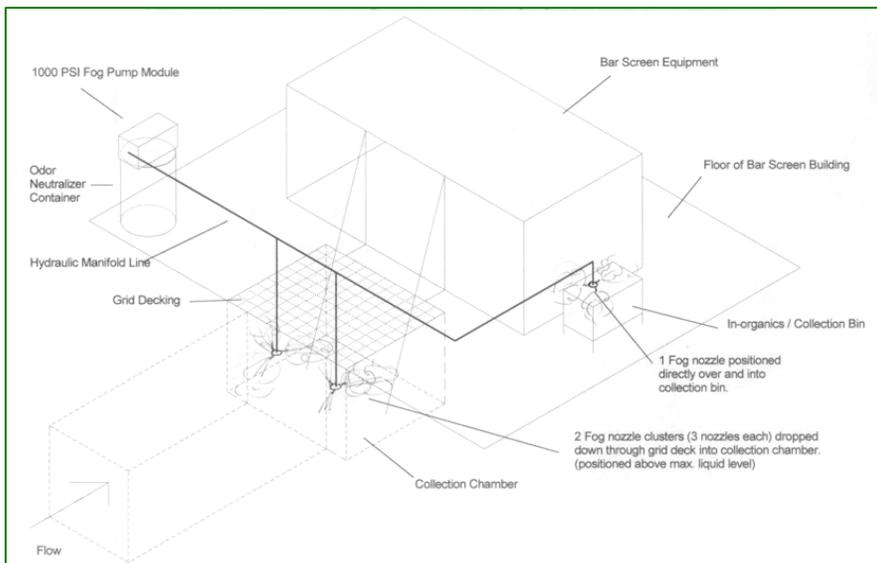
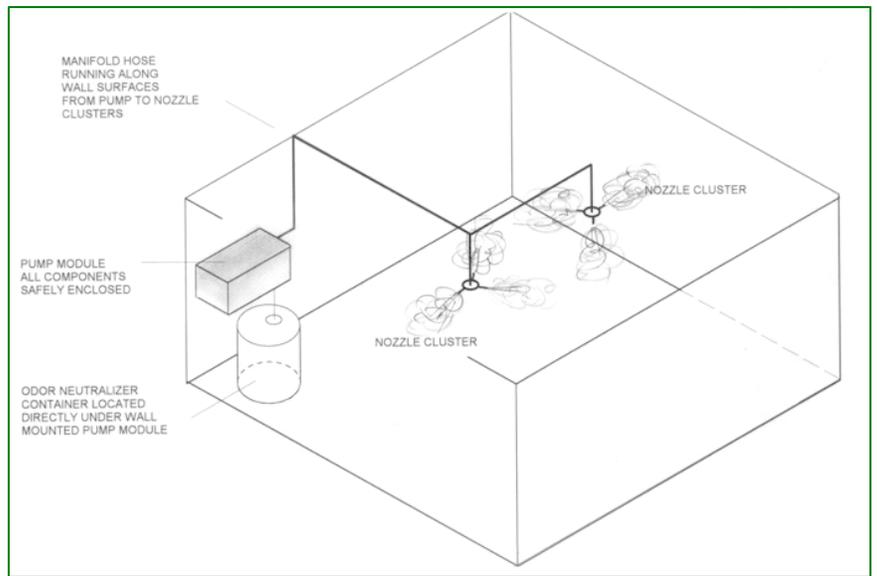


Process and Holding Tanks

The fog system may be attached to the guardrail or upper lip around tanks commonly found in process operations. It is possible to install the atomization lines inside the tank provided the nozzles are accessible for service and that the nozzles remain 24" above the maximum liquid level in the tank.

Spot Treatment with Nozzle Clusters

In process's where there are several points of intense odor emission, nozzle clusters may be suspended / positioned to eliminate odors at their source.



Complex Process Equipment

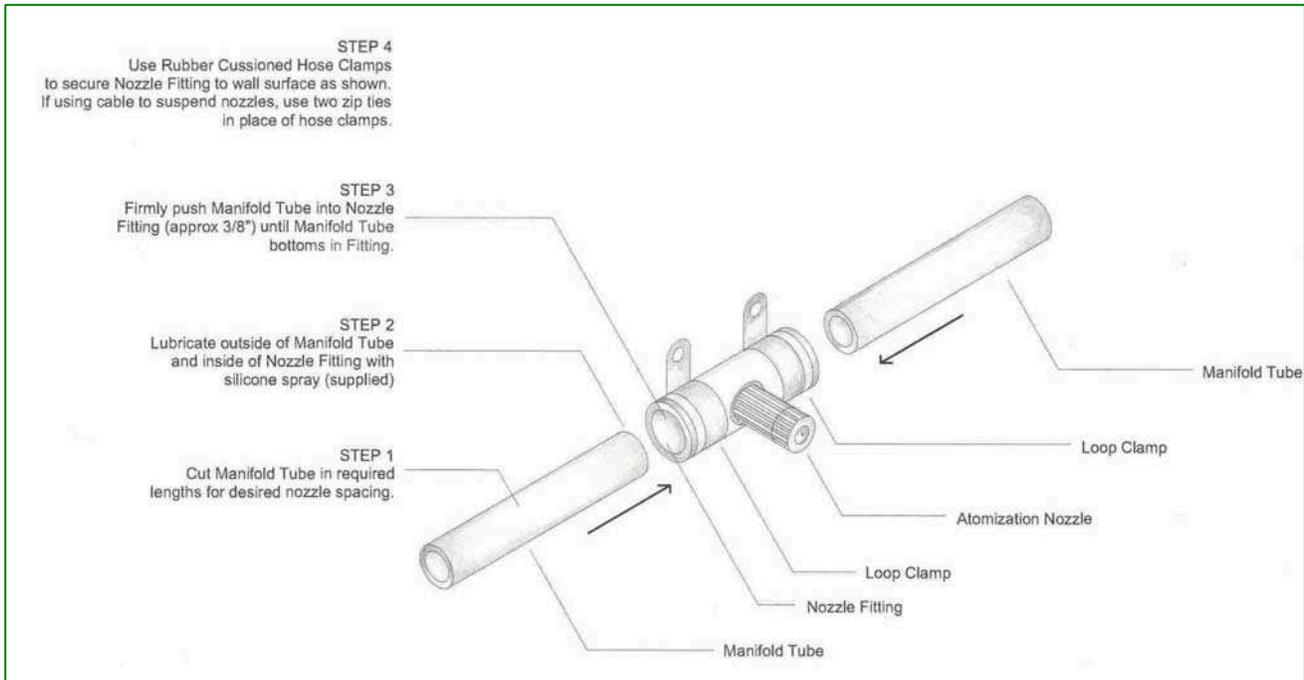
Nozzle clusters may be positioned under lids, down shafts and inside hoppers etc to treat odors caused by complex processes.



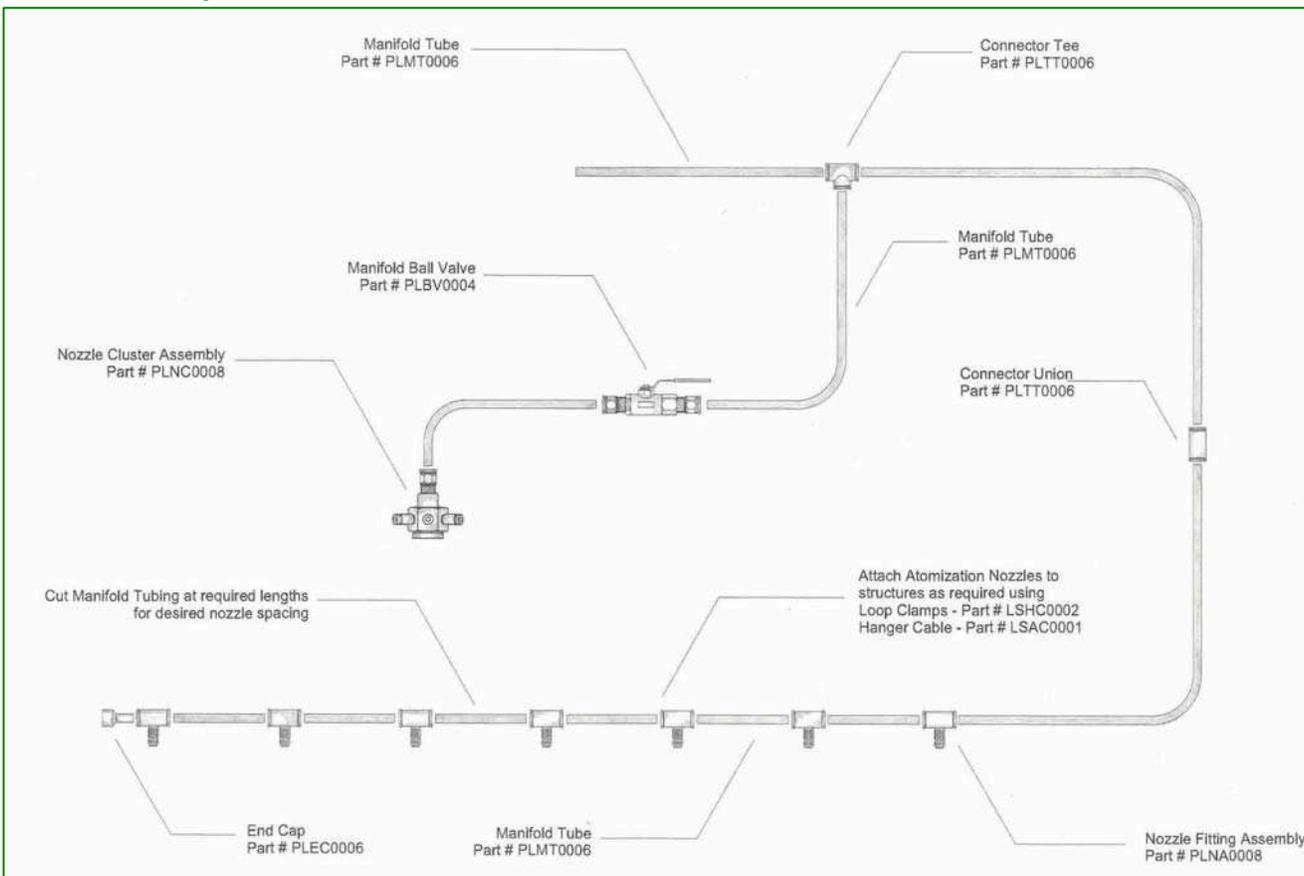
Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Nozzles and Tubing

Nozzle Assembly



Nozzle and Manifold Layout

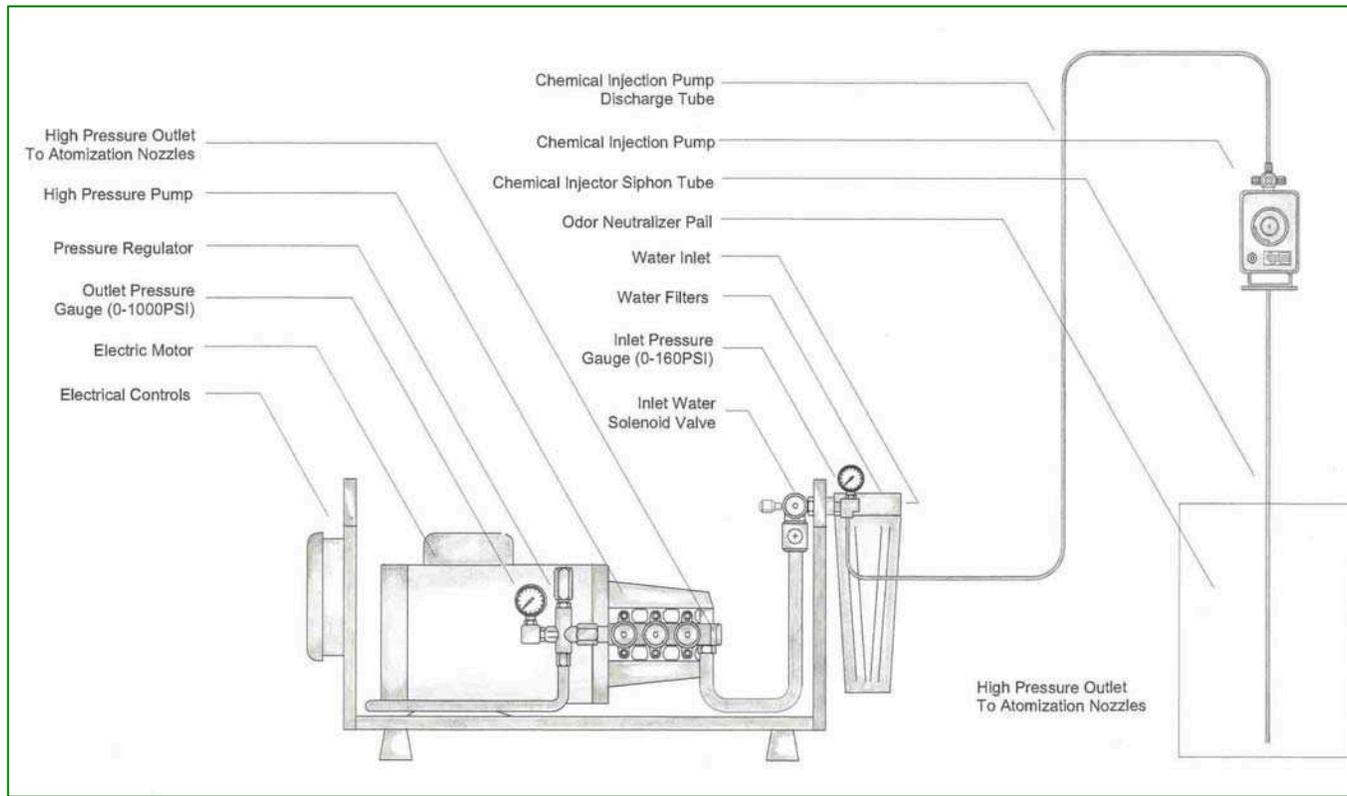




Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Standard Duty Pump Modules

Small Standard Duty Pump Packages (Self Contained Pump Module, Chemical Injector, Electrical Controls and Filters)

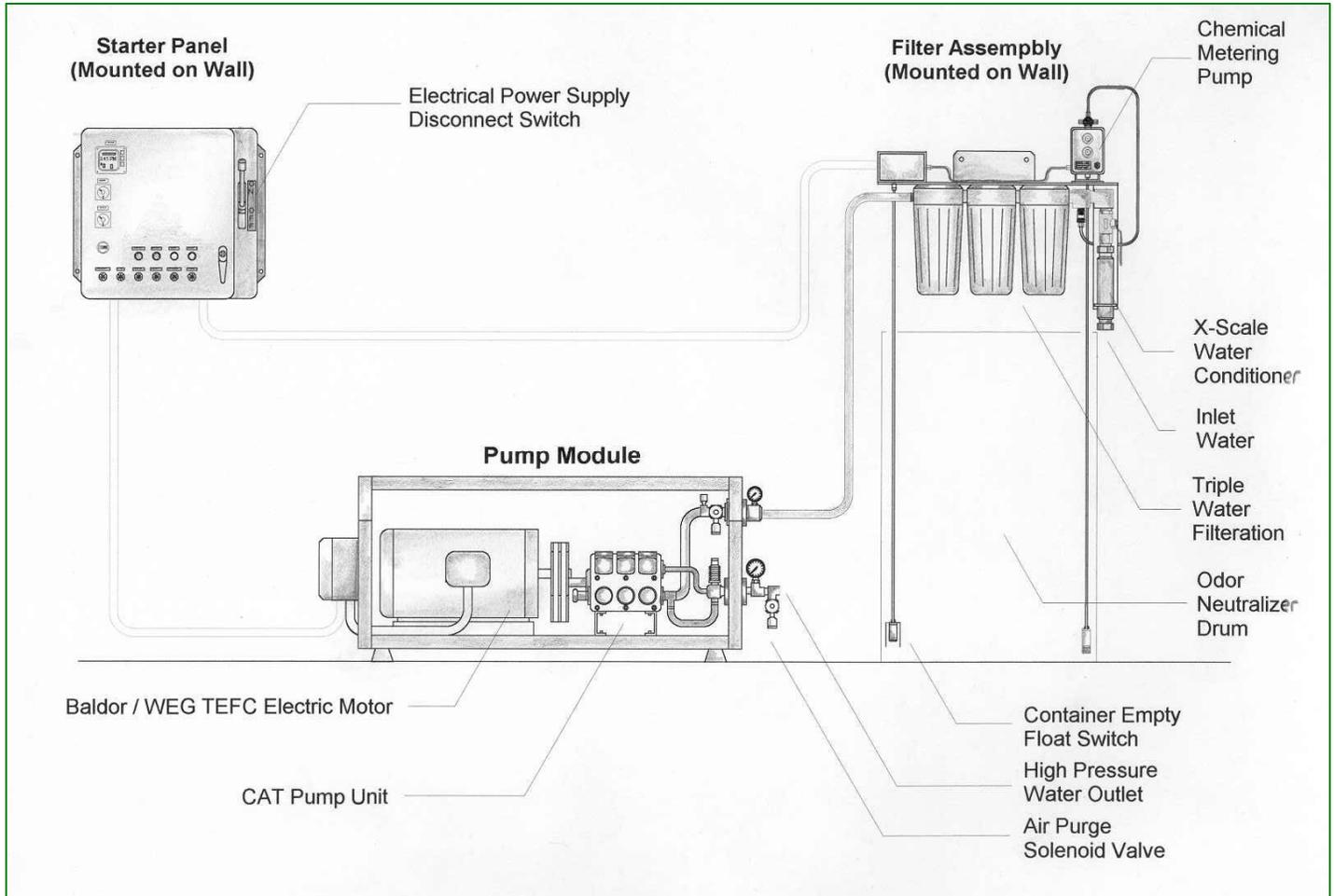


- Over 10 years of experience goes into the design of each pump module.
- Only the highest quality industrial duty components are used in the construction of a Piian Pump Module.
- The pump module package is designed to operate in the toughest dusty and dirty environments.
- Optional water treatment device is used to adjust hard water characteristics and minimize nozzle maintenance.
- Modules include CAT pumps and Baldor or WEG electric motors which lead their industry in reliability, durability and serviceability.
- Includes LMI Chemical Metering Pump with stroke and frequency adjustment
- The pump module includes a stainless steel frame and cover.
- Double Water Filtration – 10 & 5 micron inlet water filters remove sediment and particulate matter from inlet water supply.
- Nema 4 IEC 60529 & IP66 rated poly carbonate electrical enclosure with lockable enclosure
- 22mm Pilot lights / Fault Lights for power supply, system operation, motor overload and low inlet water pressure
- Reset buttons for motor overload and low inlet water pressure
- ON/OFF/AUTO Operator switch for system operation
- Flush mounted hour meter
- Liquid tight conduit and cord connections



Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Industrial Duty Pump Package



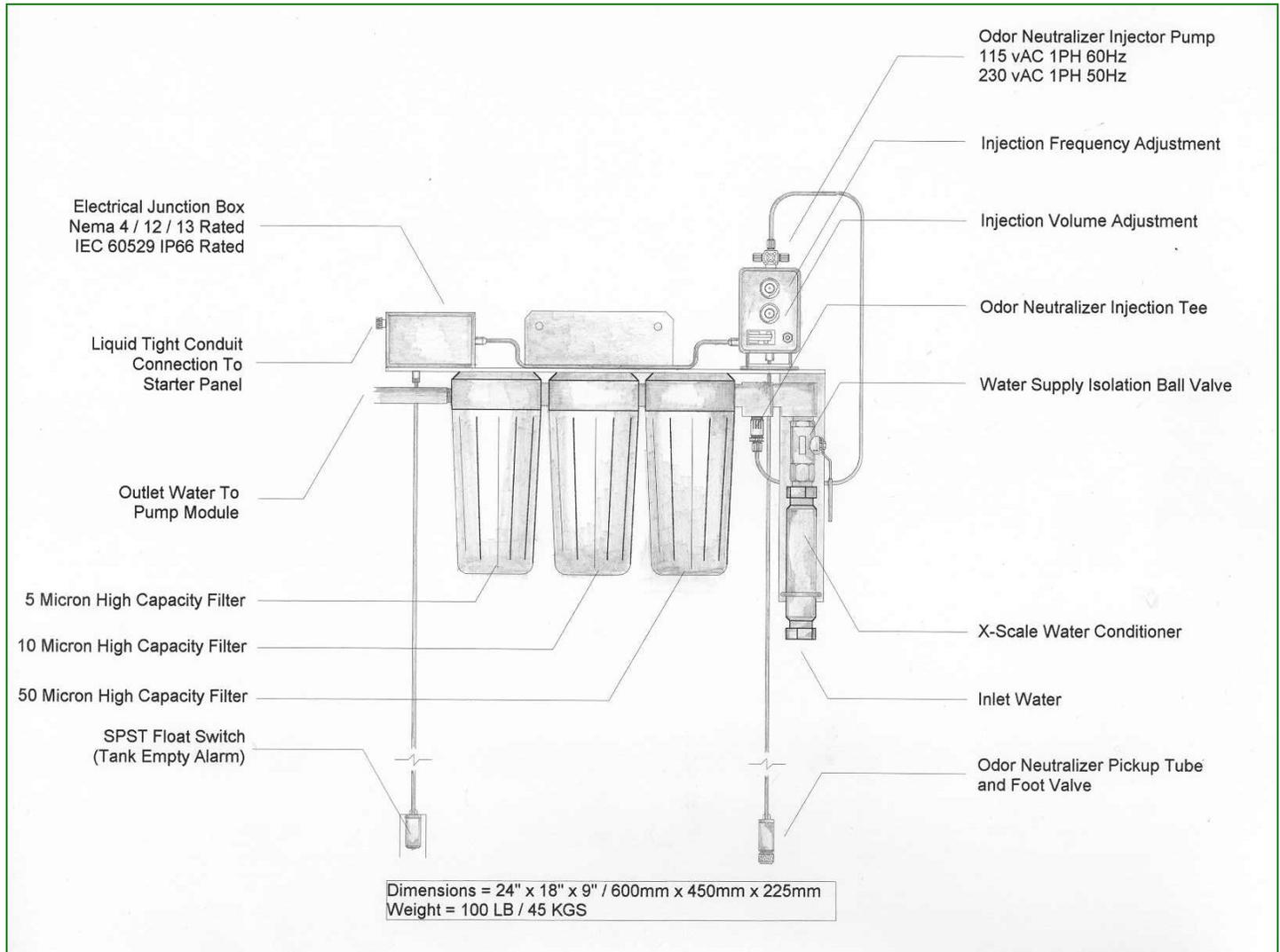
- 1000PSI operating pressure produces 10 micron droplets.
- Designed to operate in the toughest dusty and dirty environments
- System uses only proven industrial quality components.
- Pump Modules include CAT pumps and Baldor or WEG electric motors which lead their industry in reliability, durability and serviceability
- A water treatment device is used to adjust hard water characteristics and minimize nozzle maintenance.
- Includes triple high capacity filters to minimize servicing requirements.
- Includes as standard an air purge mechanism to removes all moisture from the manifold lines and atomization nozzles on each shut down to minimize nozzle maintenance and for freeze protection.
- Includes a fully featured wall mounted NEC / IEC electrical approved starter panel.
- The pump module includes a stainless steel frame and cover.
- Full 1 year warranty.



Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Industrial Duty Filter Assembly

Filter Assembly / Water Treatment Package



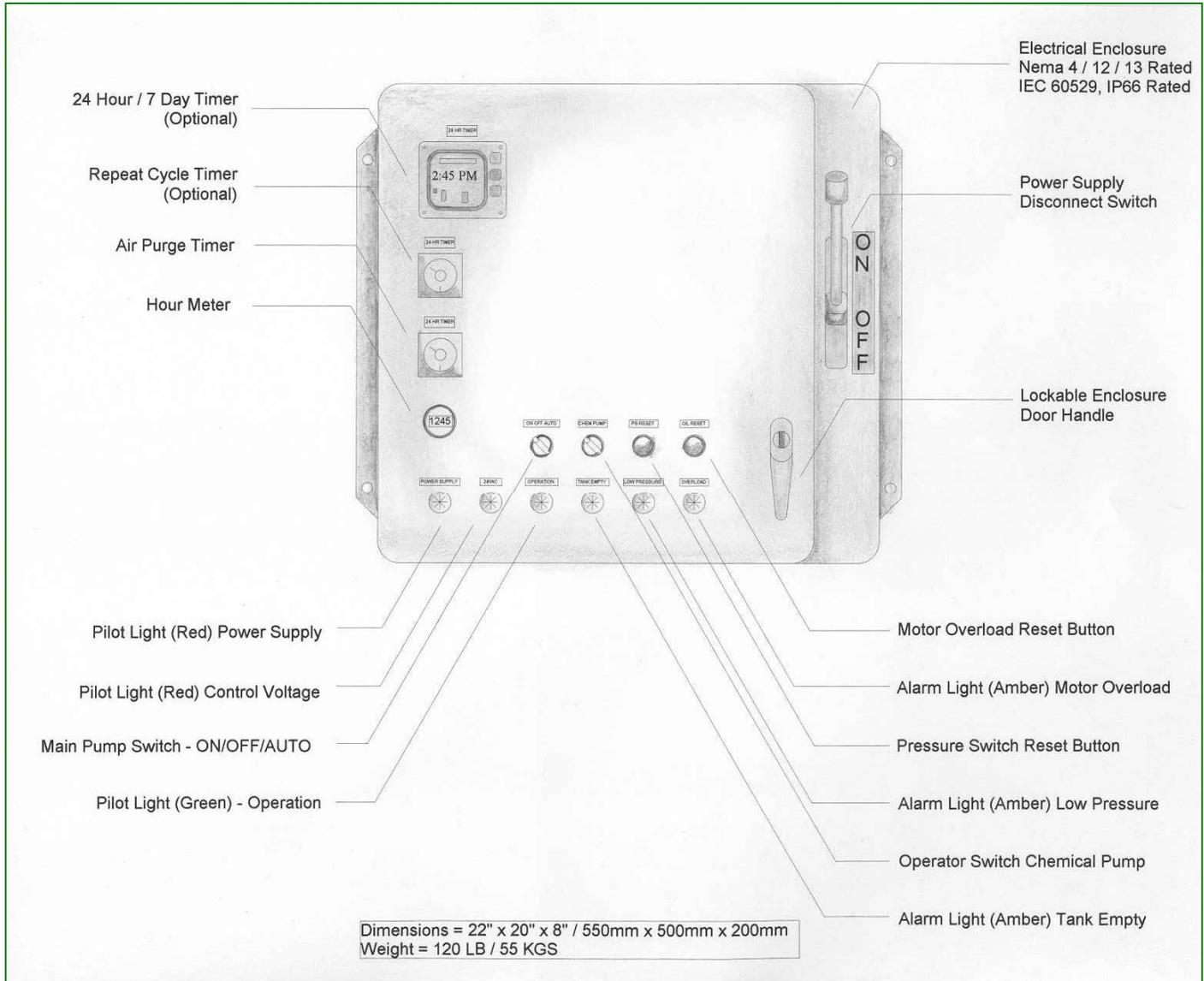
Filter Assembly Specification:

- Triple Water Filtration – 50, 10 & 5 micron inlet water filters remove sediment and particulate matter from inlet water supply.
- Large High Capacity Filters – maximizes filter life and minimizes servicing requirements
- Specialized X-scale Inlet Water Conditioner – adjusts the TDS content of inlet water to minimize nozzle maintenance, requires no servicing or maintenance.
- Optional LMI Chemical Metering Pump with injection frequency and volume adjustments for flexible and accurate odor neutralizer dosing with a float Switch mechanism and Alarm to alert the user when odor neutralizer container is empty.
- Electrical Enclosure – Nema 4x and IP66 approved electrical junction box with terminal strips with liquid tight conduit & cord connections.
- Filter Assembly includes a heavy duty 1/4" thick bracket that will not flex or bend



Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Industrial Duty Starter Panel



Starter Panel Specification:

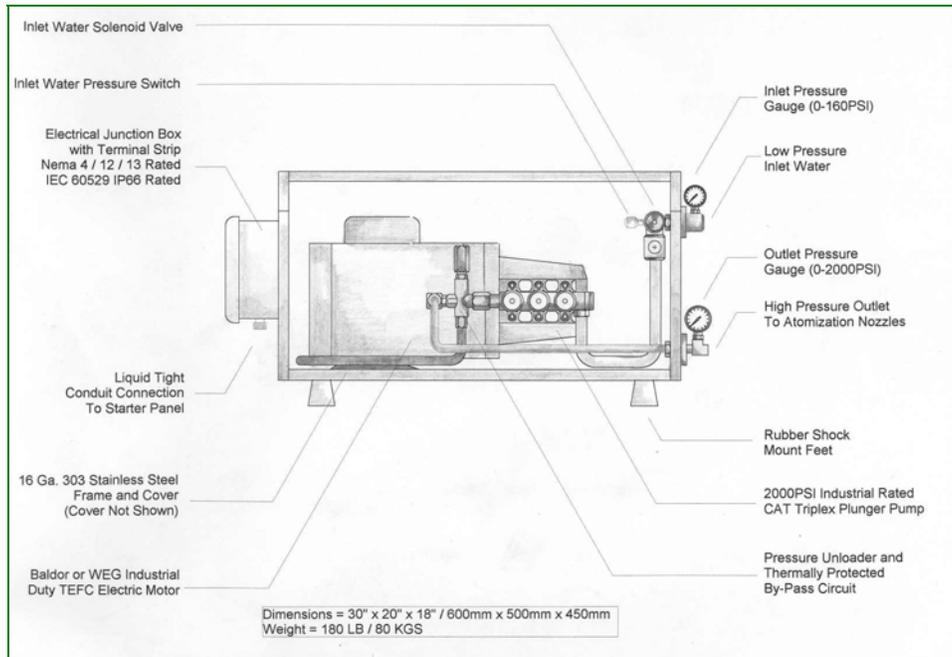
- Nema 4/12/13, IEC 60529 & IP66 rated metal electrical enclosure with lockable enclosure door handle
- 3 Pole, 30AMP electrical power supply disconnect safety switch
- 22mm Pilot lights for power supply, control circuit and system operation
- 22mm Fault lights for motor overload and low inlet water pressure
- Reset buttons for motor overload and low inlet water pressure
- ON/OFF/AUTO Operator switch for system operation
- 22mm Alarm light for odor neutralizer tank empty
- Optional - Separate ON/OFF operator switch for chemical metering pump
- Flush mounted adjustable countdown timer for air purge mechanism
- Flush mounted hour meter
- Numbered terminal strip
- Liquid tight conduit and cord connections



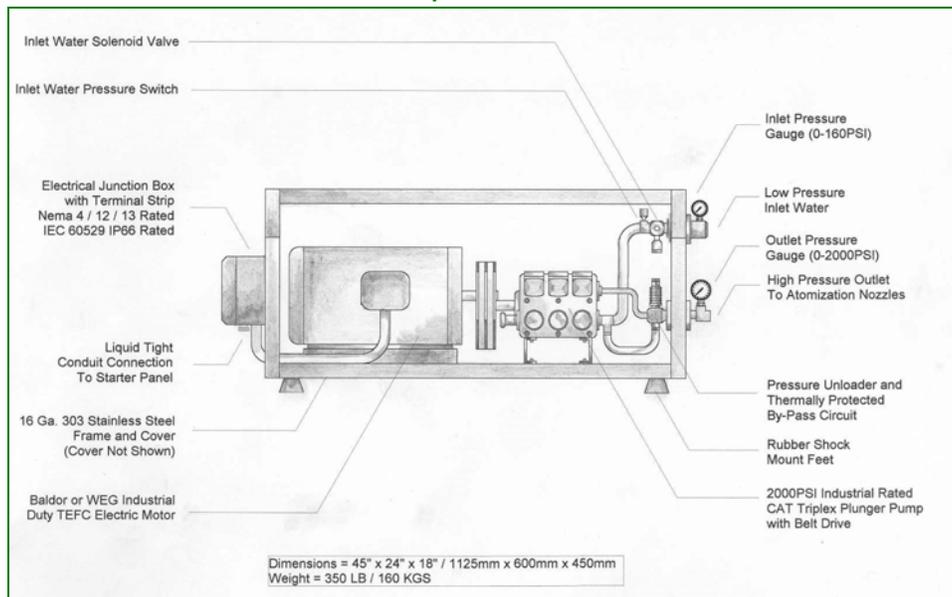
Piian Odor Control Systems

Flexi~Fog System ~ Equipment Drawings ~ Industrial Duty Pump Modules

Direct Drive Pump Modules Up To 5 GPM



Belt Drive Pump Modules Above 5 GPM



Pump Module Specification:

- 1000PSI operating pressure to create 10 micron sized fluid droplets.
- Inlet water solenoid valve to shut off water supply to pump when not in operation.
- CAT triplex plunger pump head 2000 PSI pressure rated with large oil capacity.
- Inlet and outlet water pressure gauge to record water pressure at pump module at all times.
- Pressure regulator, adjusts pressure from 0 to 1200 PSI
- External thermally protected by pass loop. cools & circulates unused pressurized water, drains overheated water if required
- Baldor or WEG TEFC motor, continuous duty rated.
- Nema 4/12/13, IEC 60529 & IP66 rated electrical enclosure with numbered terminal strip with Liquid tight conduit and cord fittings
- Low pressure switch for low inlet water pressure protection – manual reset.
- Vibration damped 303 stainless steel frames with stainless steel weather cover.



Piian Odor Control Systems

Terms, Conditions & Warranties

The following terms & conditions of sale become a part of all proposals & any subsequent sale of equipment manufactured by Piian Systems, its Divisions or Subsidiaries, hereafter referred to as "we", "us", "our", etc. whether the equipment be purchased directly from us or our Agent, Representative or Dealer or from a Leasing Company. "Buyer" as used herein includes not only the purchaser but also the original user & original owner of the equipment.

PRICES

1. Prices are firm for a period of 60 days from date of our published price schedule or proposal, provided shipment will be accepted within six months of price schedule or proposal.
2. Prices are F.O.B. point of manufacture. Shipments are normally made freight collect.
3. Prices are in U.S. currency & do not include any excise, sales, use or property taxes, export or import duties or other taxes of any taxing authority. Prices are subject to increase equal in amount to any tax we may be required to collect or pay on the sale or use of the equipment. Such amount will be payable when invoiced.

TERMS OF PAYMENT

1. Unless otherwise specified by us, the following payment schedule applies to all accepted domestic orders, based on the total value of the order:
To \$20,000 - Net 30 calendar days from date of shipment, subject to credit approval. All orders to be prepaid without credit approval. Visa / Master Card Accepted up to \$1000.
\$20,001 up - 50% payable at time of placement of order, 40% payable five (5) calendar days prior to shipment, 10% 30 calendar days from date of shipment
Accounts not paid within 30 days of invoice date will bear a service charge of one & a half percent (1 1/2%) per month on the balance due.
2. Unless otherwise specified by us, the following payment schedule applies to all accepted international orders, based on the total value of the order:
To \$100,000 - Prepaid by wire transfer with purchase order. Visa / MasterCard Accepted up to \$1000
\$100,001 up - Prepaid by wire transfer or Irrevocable letter of credit plus \$900 processing charge, terms of letter of credit subject to our approval prior to acceptance.

ACCEPTANCE

1. All orders are subject to acceptance in Palm Springs, California in writing by our sales manager or one of our corporate officers. Typographical & clerical errors in quotations & acknowledgements are subject to correction.
2. For credit verification, we may require a financial statement or other financial information from the Buyer. At our option prior to shipment of the equipment, we may require the utilization of a financing statement & security agreement or Irrevocable Letter of Credit. Title to equipment shall pass to Buyer only upon payment in full.
3. Any contract for the sale of equipment by us shall be treated as made & as performed in the State of California.

CHANGES IN DESIGN

1. Specifications are subject to change without notice. We are not obligated to apply any change or improvement on equipment previously manufactured.
2. Changes in design or construction of equipment made at the request of the Buyer after its order has been accepted, or in the case of custom equipment orders after the approval of drawings will be made at the expense of the Buyer under terms to be mutually agreed.

CANCELLATION

Accepted orders cannot be cancelled or assigned without prior written agreement by our sales manager or one of our corporate officers & payment of a charge of not less than 15%, of the purchase price to cover lost time & handling expenses in the case of a cancellation.

SHIPMENT

1. We reserve the right to select a transportation carrier that has equipment to meet the shipping requirements of our equipment & the requirements of our shipping facility.
2. We are not responsible for shipping delays beyond our reasonable control. It is understood that we are free of any & all liability & penalty for delayed shipments caused by transportation delays, inability to obtain necessary labor, components & or materials for fabrication & assembly, labor disturbances, wars, riots, fires, accidents, explosions, floods, epidemics, quarantine, adverse weather, governmental acts or regulations, or acts of God

RISK OF LOSS & DAMAGES

We assume no responsibility for loss or damage to equipment incurred after we load the equipment on the transportation carrier. Risk of loss or damage shall thereafter be borne by the Buyer regardless of whether title has passed to Buyer upon shipment. Claims for such loss or damage must be filed by the Buyer with the transportation carrier or other responsible party.

SERVICE

1. Before the equipment is placed in operation, start-up & training service by one of our field service engineers is available & recommended.
During this start-up, final equipment adjustments are made & the Buyer & his operating & maintenance personnel are instructed. This service is charged at prevailing rates
2. Two Owners Manuals covering Installation, Operating & Maintenance Instructions & Spare & Replacement Parts Lists are furnished with the equipment purchased. Additional manuals may be purchased at the prevailing nominal charge.

GENERAL

1. Electrical components used on the equipment meet ANSI & National Electrical Code requirements & are UL approved. Hydraulic system components used on the equipment comply with National Fluid Power Association & JIC Standards.
UL field inspection & approval costs of completed system shall be borne by Buyer as & if required.
The equipment is constructed in compliance with the intent of the Occupational Safety & Health Act of 1970 (OSHA). & in particular with Title 29, Chapter XVII, Part 1910, of the Occupational Safety & Health Standards adopted Oct. 18, 1972.
2. Additional costs as the result of special components or other special arrangements required by local standards or codes will be the responsibility of the Buyer.
3. The equipment is skidded as is normal to the transportation carrier. Special loading, skidding, crating, export boxing, packing or painting can be provided at an extra charge.
4. We agree to defend litigation brought against the Buyer for alleged U.S. patent infringements. We do not agree to defend infringement suits involving accessories not of our manufacture used in combination with other equipment or to defend suits involving process patents.
5. These terms & conditions supersede & take precedence over all provisions of the Buyer's purchase order or any similar document of the Buyer.
6. These terms & conditions of sale, our written warranty, published current literature & specifications & our acceptance of the Buyers order define our entire obligation with respect to any sale of our equipment.
7. All information in the proposal is confidential, prepared solely for the Buyers consideration to purchase our equipment. Transmissions of all of any part of the proposal information to others or use by the Buyer for other purposes is unauthorized without our written consent

STANDARD EQUIPMENT WARRANTY

1. The seller warrants that the goods to be delivered will be of the kind & quality described in the order or contract & will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within one (1) year after the initial date of delivery or a period of 2500 hours of operation; which ever occurs first, the seller shall, upon prompt notification thereof & substantiation that the goods have been stored, installed, maintained & operated in accordance with the seller's recommendations & standard industry practice, correct such defect by suitable repair or replacement at its own expense. It is the seller's sole decision on whether replacement or repair of goods is necessary. Buyer is responsible for freight & labor costs associated with any installation of replacement goods honored under this warranty. This warranty excludes work that is considered by us to be follow-up installation or incidental maintenance of newly installed equipment. This warranty is limited to repairing or replacing products, which our investigation shows, were defective at the time of shipment by the manufacturer. All goods subject to this warranty shall be returned for examination, repair or replacement, freight pre-paid to our factory.
2. This warranty has no application to normal replacement of service parts such as operating oil, paint & drive belts & other parts which may have service life inherently shorter in duration than the warranty period. Customer specified components will carry the component manufacturers warranty only. Electric motor warranty claims should be directed to the local motor manufacturer service center
3. This warranty has no application to wear or damage resulting from accidents, alteration, misuse, abuse, neglect, non-action, improper removal or reinstallation or handling of new or defective parts, lack of preventive maintenance, sabotage, tampering, fire, explosion or any other causes not directly attributable defective workmanship or material of the equipment or any part of the equipment.
4. In addition to all of the above, Piian Systems accepts no liability if the system is used to dispense corrosive, flammable, toxic or other non approved agents.

This warranty is exclusive & is in lieu of any warranty or merchant ability, fitness for a particular purpose or other warranty of quality, whether express or implied, except of title & against patent infringement. Correction of non-conformities, in the manner & for the period of time provided above, shall constitute fulfillment of all liabilities of the seller to the purchaser with respect to, or arising out of the goods, whether based on contract negligence, strict tort or otherwise.

LIMITATION OF LIABILITY - Repair or replacement of defective products as provided above is the sole & exclusive remedy provided hereunder & the seller shall not under any circumstances be liable for special or consequential damages such as, but not limited to, damage or loss of other property or equipment, loss of profits, or revenue, cost of capital, cost of purchased or replacement goods, or claims of customers of purchaser for service interruptions. The remedies of the purchaser set forth are exclusive & the liability of seller with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, installation or use of any goods covered by or furnished under this contract whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liabilities based. This is the only warranty on any Piian Systems product, no other writing or description in literature shall be construed as a warranty. Products manufactured by other than Piian Systems bear the following limited warranty:

Seller warrants that the goods manufactured by others will conform to the description herein stated. No other warranty express or implied is made, & warranty of the manufacturer is hereby assigned & transferred to the buyer. Furthermore, except for the manufacturer's warranty, if any, the products sold hereunder are sold as is. Piian Systems is not liable for any incidental or consequential damages in connection with these products.

MAECTITE® Chemical Treatment Overview

Overview

Sevenson Environmental Services, Inc. has conducted all phases of heavy metal chemical fixation, from initial viability study through detailed work plans to full-scale implementation. Sevenson has successfully treated heavy metal contamination on small, relatively uncomplicated sites, as well as large complex sites. This success in treating RCRA metal-contaminated wastes is attributable to Sevenson's patented MAECTITE® chemical treatment process. Metals and compounds that are successfully rendered non-hazardous by RCRA definition with the MAECTITE® technology include, lead, mercury, cadmium, arsenic, chromium, selenium, and barium. Additional target species are copper, nickel, zinc, cyanide, and sulfide. Low-level radioactive nuclides have also been rendered non-leachable as determined by Gamma Spectra Analysis in TCLP extract. To date 3 million tons of arsenic, lead, cadmium, and chromium contaminated soil and waste have been chemically fixed by the MAECTITE® process at nearly 200 sites in 43 states and all 10 USEPA Regions. The process may be used to treat metal-contaminated soils, solids, sludges or aqueous wastes from the manufacture and use of batteries, paints, pigments, leaded glass, tetraethyl lead, photographic materials, wastes from primary and secondary lead smelting operations, shooting range soil, lead and cadmium contaminated wastes from foundries, chromium ore process residue (COPR), ceramic frit sludge, nickel cadmium battery plant sludge and heavy metal contaminated soil and marshland. Contamination has been remediated in a variety of matrix types, including gravelly sandy soil, clay, red soils, ash, foundry sand, and sediments or sludges. All heavy metal contaminated waste materials and debris that fail TCLP criteria have proven responsive to the MAECTITE® treatment process. The product of MAECTITE® treatment closely resembles untreated material with no volume increase and minimal increase in mass (i.e. <10%). The product may be landfilled as a special waste or interred onsite. Since decontamination wastewaters are used to dilute the proprietary reagent(s), no waste streams are generated. MAECTITE® does not use cements, silicates, or pozzolans and does not form monoliths. Therefore, the technology can be applied using exsitu or insitu methods. The MAECTITE® process was accepted into the USEPA Superfund Innovative Technology Evaluation (SITE) program in 1992. In 1991 it was also nominated for the President's Environment and Conservation Challenge Award. That same year the MAECTITE® process was selected by USEPA as one of six technologies for inclusion in the US/German Bilateral Agreement as part of the environmental technology demonstration and information exchange program.

As a technology approved under USEPA's Pre-Qualified Offers Procurement System (PQOPS), the MAECTITE® treatment process is available to project coordinators and emergency response teams without the need for technical evaluation on EPA funded projects. The process was patented in March 1993 for lead impacted soil and solid waste, and for chromium contaminated material in 1995. Other related patents have been granted or are pending. Benefits of Sevenson's MAECTITE® Heavy Metals Treatment Process:

- Cost-Effective
- Field Proven
- Irreversible Mineral Products
- Long-term Product Stability
- Reacts Immediately
- Remains Soil-like After Treatment
- NO Volume Increase
- Practical Field Application
- Minimal Mass Increase
- Applicable to All RCRA Metals
- Applicable to All Matrix Types
- National and State Regulatory Acceptance
- Conforms with OSHA Requirements and USEPA ARAR's

Process Description

The one, two, or three-step MAECTITE® process converts leachable metals into mineral crystal species within the waste matrix, greatly lowering the solubility of the metal in this complexed form. The number of treatment reagent additions is a function of the matrix geochemistry, metal type and valence form. In the first step a proprietary powdered chemical may be blended with the lead-contaminated material. In the second step a proprietary liquid reagent (MAEPRIC®) is blended into this mixture. An additional oxidation reducing step may be required for multi-valent metals. Under standard conditions of temperature and pressure, curing takes 3 to 5 hours. Treated materials consistently pass the Paint Filter test, and do not exceed the TCLP criteria for characteristic and listed hazardous wastes as well as criteria associated with other test procedures. These include USEPA SW 846 methods for TCLP, EP Tox, and Multiple Extraction Procedure (MEP Method 1320), and other procedures, such as the California Wet Test (Citric Acid Leach), Synthetic Precipitate Leaching Procedure (SPLP) and recently developed simulated bioavailability extractions. The principle behind the MAECTITE® process is chemical bonding, which creates substituted mixed mineral forms, stable and resistant to leaching. Traditional and generally accepted stabilization testing procedures focusing on geophysical or geotechnical methods are not applicable to material treated by MAECTITE®, although compliance with engineered properties can be easily attained. Material treated by MAECTITE® contains the metal species as a mineral within the waste matrix. These minerals cannot be degraded by physical forces or other environmental stressors such as chemical conditions present within landfills or associated with acid rain. MAECTITE®'s stability has been supported by exposing MAECTITE®-treated material (containing metallic-complexed mixed mineral forms) to: (1) intense and prolonged ultrasonic energy as a physical degradation force; (2) TCLP and EP Tox methods; (3) MEP that simulates 1000 year acid rain conditions; and (4) simulated gastric fluids in bioavailability testing. Treated material has also been subjected to electron microscopy mineralogic assay testing. Material treated by the MAECTITE® process resembles untreated material. It is not monolithic, complies with the Paint Filter test free liquid limits, and is easily handled by standard earthmoving equipment. On the

rare occasion when the first MAECTITE® application does not achieve treatment criteria, re-treatment is readily accomplished without grinding or shredding to resize previously treated materials as would be the case for competing physical bonding approaches.

Process Geochemistry and Physical Properties

The MAECTITE® chemical process reagents form non-leachable mixed mineral species through induced nucleation from isomorphic reaction-series dynamics using problematic metal ions that are present in soil or waste. As a true chemical process MAECTITE® provides a classical approach to control problem metal and inorganic ions through the manipulation of non-problem inorganic ions. Traditional stabilization approaches employing silicates, pozzolans, or cement binders create mixtures susceptible to degradation from outside physical forces or pH conditions that overcome buffering capacity. MAECTITE® generated crystal forms cannot be degraded physically or by the most adverse chemical conditions found in environmental settings.

In nature, stability and longevity are largely due to structure and geometric symmetry. The MAECTITE® chemical process is based on this precept. Through the manipulation of soil and solid waste containing problematic metals with mineral dissolution-precipitation reactions, MAECTITE® creates substituted mineral-suite forms in the Barite and Apatite mineral groups. The Barite Group of analogous orthorhombic-crystallographic compounds, primarily sulfates, are often present in the matrix to be processed and can be intertwined. From a mineralogist perspective, orthorhombic twinning results in pseudo-hexagonal geometries during crystal nucleation and the MAECTITE® dissolution-precipitation reaction-series. The Apatite Group represents a suite of hexagonal-crystallographic compounds, primarily as hydroxyapatite, pyromorphite, and other similar forms. Once sulfate ions, either present or supplemented, are consumed from the mother solution or waste matrix, the reaction-series shifts to the post-precipitation stage reverting to supplemental mixed Apatites and/or Apatite/Barite complexes and scavenge the remaining problematic cations. The driving force of the combined MAECTITE® reaction is coincident crystal nucleation, heat loss, and dehydration primarily as a result of stoichiometric geochemical thermodynamics. Because of the flexibility of the MAECTITE® process, Severson can select reagents from a family of reactants ranging from liquids to solids that most efficiently stimulate and induce the desired chemical fixation response. The response is determined once the geochemical properties of a specific material or waste are understood. MAECTITE® process flexibility also allows for the treatment of non-reactive multivalent metal ions such as hexavalent chromium and arsenic. During a cursory treatment step, oxidation-reduction potentials of the material are altered along with the problematic multivalent ions. MAECTITE® then forms minerals with the intermediaries. The MAECTITE® technology can also be controlled to improve upon geotechnical properties of processed materials. Although longevity and stability (i.e. the ability to resist the leaching of contaminants over prolonged periods of time) of MAECTITE® treated material is not compromised by physical forces as are mixtures and agglomerations, MAECTITE® reactions have significantly enhanced engineering properties of soil and waste.

Unconfined compressive strength has been measured in excess of 1500 psi with permeability less than 1×10^{-8} cm/sec. While these criteria are achievable, the unnecessary use of treatment reagent resources and extended reaction periods must be carefully examined to establish sound, practical, and desired performance objectives.

Applications

The MAECTITE® process may be used alone or incorporated into a train of processes that treat organics or other metals. Organics contaminants do not interfere with MAECTITE® ability to form complexed mineral compounds with heavy metal contaminants. Among the types of material successfully treated by this technology are:

- Paint chips and abrasives
- Peat
- Sediments
- Battery casings
- Sludges
- Aqueous waste streams
- Filter and centrifuge cake
- Glass (coated and impregnated)
- Smelter slag
- Wire chop and installation fluff
- Matte/Dross
- Shooting/Skeet Range Soils
- Soils-clay, sand, gravel, silt and various
- Construction debris and other mixtures thereof oversized material

The most common application of the MAECTITE® process is ex-situ. Ex-situ treatment can allow for greater control under some conditions. Ex-situ treatment has been successfully applied to wastes amounting to only a few drums up to a project requiring 170,000 tons of treatment at a production rate of 2,000 tons per day. The system may be modified to comply with RCRA regulations on closed/contained and tank treatment systems.

Several in-situ processing techniques are available depending on topography and near surface soil conditions. Projects range from little as 300 yd³ treated to a depth of one foot to over 11,000 yd³ to a depth of 13 feet. Current capabilities now allow treatment to take place at much greater depths and under water tables. In-situ treatment at voluntary remediation and RCRA sites have not required a Part B RCRA treatment permit and have allowed clients to significantly expedite regulator approval for onsite treatment when the alternative was excavation and offsite disposal as hazardous waste. Cost of MAECTITE® treatment is low to moderate. Cost-effectiveness will depend on a number of site-specific factors. These include:

- Treatability studies and determination of reagent dosage requirements

- Physical handling characteristics of contaminated material
- Treatment system sizing and material variability
- Ease of site access
- Transportation and disposal costs for treated material
- Site support requirements
- Waste quantities (economy of scale)
- Ancillary site tasks additional to treatment

This product safety information sheet is principally directed to managerial, safety, hygiene, and medical personnel. The description of physical, chemical, and toxicological properties and handling advice is based upon experimental results and past experience. It is intended as a starting point for the development of health and safety procedures.

I. PRODUCT AND COMPANY IDENTIFICATION

Trade Name: MAECTITE® Reagent
Use: Industrial
Company: Severson Environmental Services, Inc.
8270 Whitcomb Street
Merrillville, IN 46410
(800) 779-7703
Emergencies: (800) 424-9300 (CHEMTREC)

II. HAZARD IDENTIFICATION

Potential Acute Health Effects

Eyes and Skin: Contact causes eye irritation, may cause burns or blindness if left untreated. Handle as a corrosive. May cause chemical burns or ulceration to the skin if left untreated.

Inhalation: Inhalation of mist or liquid reagent can cause irritation or corrosive burns to the upper respiratory system, including nose, mouth or throat. Lung irritation, pulmonary edema and chemical pneumonitis can also occur.

Ingestion: Ingestion causes irritation and can cause corrosive burns to mouth, throat and stomach resulting in hemorrhaging and permanent damage if left untreated. Can be fatal if swallowed.

Potential Chronic Health Effects

Long term exposure may cause upper respiratory disease and irritation to the skin.

III. COMPOSITION / INFORMATION ON INGREDIENTS

Composition: Trade Secret held by Severson; exemption referenced to 29 CFR 1910.1200.

OSHA PEL: 1 mg/m³

TLV-TWA: 1 mg/m³

STEL: 3 mg/m³

Concentration: Trade Secret held by Severson; exemption referenced to 29 CFR 1910.1200.

IV. FIRST AID MEASURES

Ingestion: Do NOT induce vomiting. Immediately give large quantities of water (or milk if available). If vomiting does occur, give fluids again. Do not induce vomiting or give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact: Immediately flush all affected areas with large amounts of water for AT LEAST 15 MINUTES. Remove all contaminated clothing and shoes while under a safety shower wiping away excess material from the skin. Do not attempt to neutralize with chemical agents. Get medical advice immediately if irritation develops or persists.

Eye Contact: Immediately flush the eyes with large quantities of running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. Do not attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used. Continue the flushing for an additional 15 minutes if the physician is not immediately available.

Inhalation: Remove to fresh uncontaminated atmosphere. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration, which may be supplemented by the use of a bag-mask respirator or a manually triggered oxygen supply capable of delivering one liter/second or more.

If the victim is breathing, oxygen may be delivered from a demand-type or continuous-flow inhalator, preferably with a physician's advice

V. FIRE FIGHTING MEASURES

MAECTITE Reagent is not flammable. In a fire, prevent human exposure to fire, smoke, fumes, or products of combustion. Evacuate nonessential personnel from the fire area.

When there is a potential for exposure to fire, smoke, fumes, products of combustion, etc., firefighters should wear full-face, self-contained breathing apparatus and impervious clothing such as gloves, hoods, suits, and rubber boots.

Use standard firefighting techniques to extinguish fires involving materials surrounding this product - use the most appropriate agent to extinguish the surrounding material. Water and/or water-based foam can be used; the amount should be large enough to avoid heat buildup. Use water to keep fire-exposed containers cool and to prevent rupture.

VI. ACCIDENTAL RELEASE MEASURES

This material is stable at atmospheric pressures and normal use conditions. It will freeze at low temperatures (see Section IX).

Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices (refer to Section IV).

Small spills can be handled routinely. If mists or vapors are generated, use adequate ventilation and wear a respirator to prevent inhalation. Wear suitable protective clothing and eye protection to prevent skin and eye contact. Use the following procedures:

Neutralize the spill area with soda ash and then flush the area with copious amounts of water. Exercise caution during neutralization as considerable heat may be generated.

Large spills should be handled according to a predetermined plan. Prevent large quantities from contacting waterways or vegetation. For assistance in developing a plan, contact Severson Environmental Services, Inc., 8270 Whitcomb St, Merrillville, Indiana 46410 (219) 756-4686.

VII. HANDLING AND STORAGE

Use appropriate personal protective equipment as provided in section VIII. Avoid contact with skin and eyes. Avoid inhalation and ingestion.

Containers should be stored in a cool, dry, well-ventilated area. Exercise due caution to prevent damage to or leakage from the container.

VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employee Exposure Limits: The permissible exposure limit (PEL) for this product is 1 mg/m³. The threshold limit value (TLV) time-weighted average for this product is 1 mg/m³; the short term exposure limit (STEL) is 3 mg/m³.

PEL's and TLV's refer to airborne concentrations measured in the breathing zone by appropriate sampling techniques.

Engineering Controls: Good ventilation is usually sufficient to control airborne levels.

All food should be kept in a separate area away from the storage/use location. Eating, drinking, and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, hands and face should be thoroughly washed.

Skin Protection: Skin contact with liquid or its aerosol must be prevented through the use of impervious clothing, gloves, and footwear, where contact is likely.

Eye Protection: Eye contact with liquid or its aerosol must be prevented through the use of chemical goggles or a face shield when eye and face contact is possible due to splashing or spraying of material.

Respiratory Protection: If use conditions generate airborne liquid or aerosol, the material should be handled in an open (e.g., outdoor) or well-ventilated area. Where adequate ventilation is not available, NIOSH-approved respirators should be employed to reduce exposure. Respirator selection must address the potential for exposure under the use conditions.

IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: (75°F/23.9°C at 14.7 psia): Amber viscous liquid mixture

Specific Gravity (at 75°F/23.9°C) (water = 1.0): 1.68

Density (at 68°F/20°C): 13.8 lbs/gal

Boiling Point (STP): 275°F/135°C

Melting Point: -38°F

Vapor Pressure (at 77°F): 2-6 mm Hg

Water Miscibility: Miscible in all proportions

Odor: Acrid odor

pH: 2.1 (1% aqueous solution)

Viscosity 90-125 cps @ 75°F

Flash Point: None

X. STABILITY AND REACTIVITY

This product is stable under normal conditions.

Hazardous polymerization will not occur.

Stainless steel (316 ELC) Teflon or polypropylene are the preferred materials of construction for process equipment, storage, and shipping containers. This product is corrosive to common metals such as mild steel, copper, brass, and bronze and may generate flammable hydrogen gas as a result of this reaction. Type 304 stainless steel is not recommended.

XI. TOXICOLOGY

DANGER: Corrosive - causes burns. Do not get in eyes, or skin, or on clothing. Avoid breathing mists.

Ingestion: Severe internal irritation and damage can result if ingested. (LD50 RAT = 1,530 mg/kg).

Skin Contact: (Rabbit) Not irritating to skin at 17% solution but severe irritation at higher concentrations.

Eye Contact: Corrosive to rabbit eyes. Contact of the liquid with the eyes may result in irritation or severe burns depending upon the extent of exposure.

Inhalation: Inhalation of the fumes may result in irritation of the nose, throat, and respiratory tract.

Carcinogenicity: no data available

XII. NOT MANDATORY

XIII. DISPOSAL CONSIDERATIONS

If uncontaminated, recover and reuse product. For assistance in disposing of unused material contact Severson Environmental Services, Inc., 8270 Whitcomb St., Merrillville, Indiana 46410, (219)756-4686. Thoroughly rinse and offer empty container for recycling, reconditioning, or disposal in an approved landfill or dispose of in such a manner that will not adversely affect the environment

XIV. NOT MANDATORY

XV. NOT MANDATORY

XVI. OTHER INFORMATION

NFPA Hazard Ratings Health: 3 Fire: 0 Reactivity: 0
0=insignificant 1=slight 2=moderate 3=high 4=extreme

Prepared July 1, 2015

Although the information contained herein is offered in good faith, SUCH INFORMATION IS EXPRESSLY GIVEN WITHOUT ANY WARRANTY (EXPRESSED OR IMPLIED) OR ANY GUARANTEE OF ITS ACCURACY OR SUFFICIENCY and is taken at the user's sole risk. The user is solely responsible for determining the suitability of use in each particular situation. SEVENSON specifically DISCLAIMS ANY LIABILITY WHATSOEVER FOR THE USE OF SUCH INFORMATION, including without limitation any recommendations which user may construe and attempt to apply which may infringe or violate valid patents, licenses, and/or copyrights.