REPORT

DESIGN REPORT FOR PROCESS AREA III GROUNDWATER INTERCEPTOR TRENCH

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MODEL CITY, NEW YORK

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DESIGN REPORT FOR PROCESS AREA III AND TANK ASSESSMENT FOR TANK T-8010

CWM Chemical Services, LLC
Model City, New York Facility

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Golder Associates Inc.
Patrick T. Martin, P.E.

5/9/12
Date

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has been contracted by CWM Chemical Services, LLC (CWM) to develop the detailed design for additional corrective measures in the Process Area located at the Model City TSD Facility in Model City, New York. Specifically, corrective measures are proposed for an area south of the existing Full Trailer Park staging pad, herein referred to as Process Area III (PA III). This area was initially referenced as the area in the vicinity of "Monitoring Wells R201S and R202S and Soil Boring Areas #43 and #61" when discovered as part of the RMU 2 subsurface investigation. Refer to Figures 1 and 2 for CWM Site and PA III project location maps, respectively.

Conditions for implementation of Corrective Action are stipulated under Module II (Corrective Action Requirements) Condition B of the current 6NYCRR Part 373 Site-Wide Permit No. 9-2934-00022/00097. PA III falls within the "Central Area" of the Facility as defined in Condition E of Module II. The New York State Department of Environmental Conservation (NYSDEC) considers the entire Central Area to be a single "Area of Contamination" and PA III was identified as a new Area of Concern (AOC) related to the more than twenty Category 6 Solid Waste Management Units (SWMUs) that are identified within the Central Area, including Tank Farm E and Group D SWMUs. Module II allows for corrective measures for new AOCs in the Central Area to be evaluated and implemented in the context of the remedies that are in place for the entire area and not on an individual SWMU basis.

In accordance with Module II, Condition B of the current 6NYCRR Part 373 Site-Wide Permit, CWM performed a Focused Corrective Measures Study (Focused CMS) in April 2010 (Golder, Ref. 1) which summarized the site specific conditions such as the history and background of the site and the area covered by the Focused CMS, groundwater, surface water, nature and extent of contamination and the potential risk to the environment. The Focused CMS provided a detailed discussion of the issues that affected the ultimate development, evaluation and selection of the recommended corrective measures alternative. The Focused CMS evaluated three potential remedial corrective measures alternatives: installation of a dedicated Non-Aqueous Phase Liquid (NAPL) collection system; use of the existing Groundwater Extraction System; or installation of a new Groundwater Interceptor Trench. Based on the analysis performed, Alternative 3, installation of a new Groundwater Interceptor Trench, was recommended in the Focused CMS and approved by the New York State Department of Environmental Conservation (NYSDEC).

The Groundwater Interceptor Trench alternative was selected because it meets the corrective action objectives of plume capture/containment and treatment and discharge of collected groundwater required in Module II of the Part 373 Permit. This alternative would also meet the Remedial Goal in the Part 373 Permit for: "Containment and control of the DNAPL contamination through the development of a groundwater/DNAPL extraction system or an alternative system as needed". Installation of the

groundwater interceptor trench immediately downgradient of the areas containing elevated volatile organic compounds (VOCs)and SVOC constituents would significantly reduce the potential exposure of construction workers to known contamination. The recommended focused corrective measure will meet the primary corrective measures objective, as stated in the Site-Wide Permit, of utilization of containment technologies to achieve the remedial goals.

To expedite the design and installation of a groundwater interceptor trench system to remove/collect impacted groundwater for treatment at the on-site Aqueous Wastewater Treatment (AWT) Facility, the detailed design presented in this document for the PA III Groundwater Interceptor Trench system is based closely on similar interceptor trench system designs that have been previously approved by the NYSDEC and successfully operated by CWM for many years in the vicinity of PA III (e.g. Process Area I and II trenches, Lagoons Area Groundwater Interceptor Trench). The proposed PA III design includes approximately 240 feet of a linear permeable groundwater interceptor trench spanning the low permeability Silt and Clay Tills (Upper Tills) soil unit and keyed into the Glaciolacustrine Clay unit, a submersible pump in a centrally located groundwater extraction sump, automatic pumping based on water levels, a storage tank with secondary containment, and treatment of collected groundwater at the Model City AWT facility.

1.1 Objective

The objective of this corrective measures design is to address the groundwater contamination in the PA III area located south of the Full Trailer Park containment area. The primary purpose of the corrective measures is to restrict migration of groundwater contaminants in groundwater in the area. This objective will be achieved through groundwater collection and treatment.

This document presents the detailed design for the proposed corrective measures in PA III. Information related to design analyses, operation and maintenance, health and safety requirements, construction quality assurance objectives, and schedule is presented. The detailed design drawings are attached in Appendix A. Specifications for the corrective measures are included on the design drawings. In addition, manufacturer's technical data on proposed equipment is provided in Appendix B.

2.0 SYSTEM DESIGN

2.1 General Design Overview

The proposed location of the PA III Groundwater Interceptor Trench is shown on Sheet 2 (Appendix A). A continuous trench, approximately 240 feet in length, will be installed along an east to west orientation just south of the Full Trailer Parking staging pad. The trench will be installed downgradient of the Boring 43 and 61 and the wells R201S and R202S investigation areas and will be installed beyond the known limit of dense non-aqueous phase liquids (DNAPLs). The trench is designed as a hydraulic barrier to intercept dissolved phase contaminants present in the Upper Tills as well as dissolved phase contaminants from the dissolution of DNAPLs present in the Upper Tills upgradient of the trench. The trench design is similar to the existing Groundwater Extraction System (GWES) interceptor trenches at the facility and will be approximately 2 feet in width and will key into the top of the Glaciolacustrine Clay unit. A groundwater extraction sump will be centrally located within the trench to remove accumulated groundwater. The hydraulic performance of this type of trench design has been verified by past performance and operation of the existing interceptor trenches at the facility.

The trench will operate in conjunction with the existing GWES (interceptor trenches and extraction wells) presently in place around the Process and Lagoons Areas. The installation of this trench is designed to provide a hydraulic barrier to groundwater migration downgradient of the PA III that encompasses the impacts identified during the investigations performed to the east of and in the vicinity of Monitoring Wells R201S and R202S within the Upper Tills unit (see Sheet 2).

The groundwater extracted from the trench will be transferred to a new groundwater extraction storage tank system (T-8010), and then transferred to the on-site Aqueous Wastewater Treatment Facility where it will be treated and discharged in accordance with the facility's permit. Data collected during the RCRA Facility Investigation (RFI), findings of the Site-Wide Corrective Measures Study (CMS), operational data from the Process Area and Lagoons Area Groundwater Interceptor Systems and other existing groundwater collection systems at the Site have been used to establish a design basis for corrective measures in PA III.

2.2 Trench Design/Construction

As indicated above, the trench alignment has been established based on the extent of known impacted soils and groundwater of PA III. In addition, the trench alignment has been established to minimize impacts to existing localized surface/stormwater drainage patterns and structures within PA III. The proposed 240 foot trench alignment is shown on Sheet 2.

The trench will be excavated to a nominal 2 foot width and installed to a depth roughly equivalent to the top of the Glaciolacustrine Clay with the trench base keyed into the clay approximately six inches. A

projected profile of the top of the Glaciolacustrine Clay and trench base is provided on Sheet 3. Elevations of the top of the clay have been projected along the alignment based upon review of a limited number of record logs of borings previously advanced in the vicinity of the proposed trench. The actual depth of the trench will be determined in the field by a qualified Construction Quality Assurance (CQA) monitor familiar with the characteristics of the Glaciolacustrine Clay. Detailed observations and measurements will be taken to insure that the integrity of the Glaciolacustrine Clay is maintained during the excavation activities. As indicated on the proposed trench profile, the trench base in the center of the proposed trench alignment (Sump Area) is anticipated to be maintained at or below elevation 309.0 feet mean sea level (MSL) to facilitate flow to the extraction sump. However, based upon actual field conditions, the location and elevation of the extraction sump may change, but will be based upon on the profile of the bottom of the excavated trench,

As excavation proceeds, completion of the trench will be as follows:

- A 10 oz/square yard (oz/sy) filter geotextile will be installed to line the trench sidewalls and base;
- Gravel backfill will be deposited within the trench to an elevation of approximately four feet below existing grade;
- The geotextile will be overlapped on top of the gravel backfill;
- Clean clay backfill from an onsite soil stockpile will then be placed and compacted to existing grade; and
- Gravel or topsoil will be placed over the trench alignment.

A typical detail showing the above components of the groundwater interceptor trench is shown on Sheet 4. Management of excavated soils and residual soils is described in Section 2.4 below.

2.3 Groundwater Conveyance/Removal System

The typical existing groundwater elevation within the Upper Tills along the proposed trench alignment is approximately 313 to 314 MSL. The trench has been designed to maintain a control elevation of 311 feet MSL which is approximately 2 to 3 feet below the existing groundwater elevation in the Upper Tills along the proposed alignment (see Sheet 2). Maintenance of the control elevation within the trench will provide a hydraulic barrier to lateral flow through the Upper Tills. Additionally, maintaining the proposed groundwater control elevation will create an upward gradient along the trench alignment between the underlying Glaciolacustrine Silt/Sand aquifer and the trench. A pressure transducer installed within the sump and integral to the pump control system will be calibrated to initiate pump start at approximately 315 MSL, the transducer will initiate pump shut-off at approximately 311 MSL.

Transmission of groundwater within the trench will be achieved by flow through a highly permeable gravel backfill. Removal of groundwater from the extraction trench will be through the use of an HDPE sump

installed at central point of the trench alignment. Discussion of the features and design of the groundwater conveyance and removal system follows.

An analysis was performed to evaluate the discharge capability of select gravel backfill for the purpose of comparison to potential trench inflows. Utilizing discharge data from the existing GWES interceptor trenches located in close proximity to the proposed trench, and assuming similar hydrologic conditions will prevail for the proposed trench as exist for the GWESs, a conservative inflow from the Upper Tills to the proposed trench has been estimated based on CWM's operational experience with existing groundwater interceptor trench systems at approximately 5 gallons per minute (GPM). The trench gravel backfill will be required to exhibit a minimum permeability of 10 cm/sec, therefore under design pumping conditions, it is anticipated that the gravel backfill can discharge groundwater to the collection sump at a rate of approximately 10 GPM. In summary, assuming similar hydrologic conditions will be encountered for the proposed trench as exist for the GWESs evaluated, the discharge capability of the specified groundwater conveyance media exceeds the potential influx of seepage to the trench. The gravel specified for installation within the trench will be clean (washed), stone meeting the following general gradation requirements:

Square Opening Size	Percent Passing by Weight
1½ inch	100
1 inch	90-100
½ inch	0-15

To remove groundwater transmitted by the gravel backfill, a 24-inch diameter HDPE sump will be installed within the trench at Station 1+20 (See Sheet 3). The sump and associated fittings will be constructed of SDR 11 HDPE. To achieve hydraulic connection with the gravel backfill, the sumps will be perforated over a 4-foot section at their base. A proposed schedule of elevations for the sump is provided on Sheet 3. A typical HDPE sump detail is provided on Sheet 4. A submersible effluent pump capable of discharging at 25 GPM at an anticipated total dynamic head of 45 feet will be installed within the sump. During operation, the trench pumping system will discharge at a maximum rate of approximately 25 GPM. Discharge from the sump will be conveyed to an aboveground 2-inch diameter gravity header pipe which will be routed into a new tank storage shed structure located to the south of the proposed sump (south of the existing drainage swale). The groundwater will be conveyed to a 1,000 gallon holding tank (T-8010) located in the shed enclosure. Typical details regarding the sump discharge piping and support systems are shown on Sheet 4. All flanges, fittings, and other connections will either be located inside the extraction sump or located within the tanks secondary containment. The groundwater transfer piping system will be installed approximately 4-6 feet above ground surface to facilitate visual inspections. Electrical controls for the HDPE sump will be installed inside the new storage tank shed building and

installed in accordance with all applicable local, state, and national codes (e.g. National Electric Code (NEC)).

2.4 Storage Tank (T- 8010) and Secondary Containment

The extracted groundwater will discharge into a high density polyethylene (HDPE) vertical storage tank located within a new wood frame shed building constructed to house the tank, pump control panel and associated electrical equipment. The storage tank will have a capacity of 1,000 gallons. The storage tank will be located in a high density linear polyethylene (HDPLE) molded secondary containment basin with a capacity of 1,300 gallons that will provide in excess of 100 percent of the storage tank's capacity. To insure the integrity of tank T-8010 prior to system start-up, the tank will be hydrostatically tested over a 24-hour period. The tank will be filled to capacity with clean potable water and the tank will be observed for leaks over a 24-hour period.

A tank high level float alarm has been provided in the design. When the water level in the tank reaches a pre-determined height (approximately 80 percent capacity), a high level alarm (flashing light) mounted externally and near the control panel will notify CWM personnel that the storage tank is full. The flashing light will remain on until acknowledged by site personnel. In addition to the alarm light, the high level float will also trigger an electrical relay that will shut-off power from the submersible pump, thereby shutting down the collection system. The system will be restarted after the storage tank has been emptied.

The groundwater collected in the storage tank will be transferred by truck by CWM personnel to the on-site AWT Facility for treatment and ultimate discharge to the Niagara River under the existing State Pollution Discharge Elimination System (SPDES) permit.

2.5 Instrumentation and Controls

The electrically powered submersible pump selected for the corrective measures at PA III will be controlled by a pressure transducer mounted within the sump. A pump control panel to regulate pump on and off cycles and thermal overload protection for the pump motor will be supplied as an integrated part of the pump and level pressure transducer package.

A storage tank level-control panel will be provided for the 1,000 gallon storage tank. The storage tank panel will be powered by 115 VAC from the mini power zone and will interface with the high level float in the storage tank and a flashing alarm light. The sequence of operations is as follows:

- The high level float in the storage tank will transmit a signal to the control panel that the storage tank is full. When the signal is received, the high level amber dome light located on the outside of the storage tank shed building will begin flashing. The high level signal will also de-energize and shutoff of the pump;

- CWM personnel will acknowledge the high level alarm by depressing “PB2” on the control panel which will stop the light from flashing. The light will remain on as a reminder that the groundwater system is not operating; and

- After CWM personnel have removed the collected groundwater, “PB1” will be depressed to reset the high level alarm, turn off the non-flashing light, and re-energize the pump (this will resume normal operation).

2.6 Contingency DNAPL Sump Installation

Although the trench alignment has been established beyond the known extent of DNAPL within PA III, the potential exists that DNAPLs could be encountered during excavation of the trench. Consequently, a contingency plan for DNAPL removal and DNAPL sump installation within the trench will be in-place during construction as follows:

Limited and excessive DNAPLs encountered - the contractor will be directed to excavate and remove affected soils within the trench alignment as part of a source removal. A DNAPL sump will be set within the trench directly downgradient from the impacted area. A typical detail for a contingency DNAPL sump is provided on Sheet 5.. All affected soils will be disposed of at a location designated by CWM upon characterization. Affected soils will be separately containerized and managed as site generated waste following existing CWM procedures. Construction of the trench can then proceed as previously described.

No DNAPLs encountered - Should no DNAPLs be encountered during trench installation, no DNAPL sumps will be set within the trench. In the unlikely case that DNAPLs enter the trench in the future, they would be contained by the trench base and slowly be removed through dissolution to the aqueous phase being extracted from the trench.

2.7 Residuals Soil Management and Handling Plan

Excavated soils generated from trench construction will be staged adjacent to the trench such that any run-off contacting the soils would drain to the trench or will be stockpiled on the south side of the extraction trench (south of the existing drainage ditch) at the location shown on Sheet 2. Temporary polyethylene sheeting will be placed on the existing ground surface prior to stockpile construction and will be used to cover the surplus materials stockpile. Appropriate drainage and sedimentation control features will be constructed at the perimeter of the stockpile area (see sedimentation control details on Sheet 5). Radiological and VOC screening of the soil excavation will follow the Process Area Phase III Project Specific Soil Excavation Monitoring and Management Plan submitted under separate cover.

The installation of the extraction trench is anticipated to be beyond the extent of impacted groundwater and soil. However, air monitoring and chemical screening analyses will be performed on samples of excavated soils to assist in management decisions regarding the use of the material. Soil exhibiting visual or olfactory signs of contamination or exhibiting greater than 10 parts per million (PPM) of VOCs using a photoionization detector (PID) will be placed into containers (rolloffs). Soil exhibiting no visual or olfactory signs of contamination or exhibiting VOC screening results less than 10 PPM will be placed into a non-impacted soil stockpile as indicated above. Five discrete soil samples for VOC analyses and a five point composite soil sample for SVOC, PCB, and metals analyses will be obtained from the non-impacted soil stockpile. The samples will be analyzed by the CWM onsite laboratory and/or by another ELAP/NELAP certified laboratory.

If contamination is not present, the soil may be used for backfill, placed in a soils stockpile for future use on-site or placed in the landfill as a non-hazardous waste. If hazardous constituents are present in the non-impacted soil stockpile, the soil will be characterized for appropriate waste disposal.

Soil exhibiting visual or olfactory signs of contamination or exhibiting greater than 10 PPM of VOCs using a PID will be analyzed for VOCs, SVOCs, PCBs, and metals. The results of the analyses will be evaluated according to the Project Specific Soil Excavation Monitoring and Management Plan for appropriate disposal.

2.8 Monitoring and Performance Assessment

The GWESs Operation and Maintenance (O&M) Manual (April 2008) will be revised to include PA III. The PA III system will be operated consistent with the remedial systems installed in the Process Area and LAGWIT trench collection systems. The sump in the interceptor trench will operate from April 15 through November 1 and be shut-down from November 2 through April 14. In addition, the sump pump may be temporarily shut-down periodically for short durations (a few days) for maintenance or during heavy precipitation events, without impairing the effectiveness of the removal system.

The hydraulic performance of the interceptor trench will be evaluated by:

- monitoring the groundwater level in five proposed piezometers installed perpendicular to the interceptor trench; and
- monitoring the water level in the central sump of the trench.

A total of five piezometers will be installed at Station 0+80 of the interceptor trench alignment (See Sheets 2 and 3). One piezometer will be installed within the trench and the remaining piezometers will be installed at a distance of approximately 10 feet and 20 feet from the trench, on either side of the trench. The piezometers will consist of one and one quarter-inch diameter, schedule 40 PVC pipes, installed to

the top of the Glaciolacustrine Clay unit. Construction details for the piezometers are presented on Sheet 5. Groundwater elevation measurements in the piezometers and water level measurements in the sumps will be obtained each quarter of the operational period. In conjunction with the groundwater level measurements, the aqueous sump will also be checked for the presence of non-aqueous material (NAPL).

Semi-annual groundwater monitoring in the PA III area will provide sufficient data for assessment of the efficacy of the PA III corrective measures in intercepting and capturing concentrations of contaminants from PA III to downgradient areas north and northwest of the proposed interceptor trench. In particular, monitoring well R202S screened in the upper tills strata and located approximately 50 feet northwest of the western terminus of the interceptor trench will be added to the Corrective Measures groundwater monitoring program. Groundwater monitoring well R202S will be used as the primary indicator of the long term effectiveness of the PA III corrective measure.

Monitoring and performance assessment of the corrective measures at PA III will also include the following procedures:

- Tank T-8010 will be sampled within approximately one week of start up of the system. The initial samples collected from tank T-8010 will be analyzed for full Target Compound/Target Analyte list (TCL/TAL) of parameters. Thereafter, tank T-8010 will be sampled semiannually, i.e., approximately one week after annual start up of the system in the Spring and within one week of shut-down of the system in the Fall. Samples will be analyzed for the Site Specific Priority Pollutant VOC List of 27 compounds by Method 8260, unless the results of the initial samples indicate analyses for additional parameters would be appropriate; and
- The volume of collected groundwater in T-8010 will be measured and recorded at the storage tank prior to removal by CWM personnel. The observations, date and time will be recorded so that an approximate extraction rate could be calculated for the groundwater collection system.

The PA III corrective measures system operating data will be incorporated into the site's quarterly corrective action reports that are submitted to the NYSDEC. The reports will contain the monthly volume of groundwater removed from the storage tank, the cause and duration of any system down time, and any actions taken to resolve recurrent operational problems. The first report that includes data from the PA III corrective measures will be submitted to NYSDEC following the first full quarter of operation.

3.0 TANK DESIGN ASSESSMENT

The 1,000 gallon, HDPE tank has been designed to meet the requirements of 6 NYCRR §373-2.10. The purpose of this section is outline the design criteria set forth by this regulation.

3.1 Location

The tank will be located inside a wood frame shed building that will be constructed to house the tank, tank secondary containment basin and associated pump and tank electrical control panels. The new storage tank shed building will be located approximately 20 feet to the southwest of the central sump on the south side of the existing drainage swale as shown on Sheet 2 located in Appendix A.

3.2 Dimensions and Capacity

The vertically oriented tank is 64 inches in diameter and 77.5 inches high. The nominal storage capacity is 1,000 gallons. A schematic drawing of the tank is presented on the manufacturers design drawing located in Appendix B.

3.3 Structural Support and Foundation

The HDPE tank is designed to be self supporting with a molded flat bottom round tank base. The tank will be supported by a 6 foot by 8 foot by 16 inch high, painted steel frame constructed of 3 inch by 3 inch by ¼ inch thick welded steel angle. The tank will rest on a 1 inch thick, pultruded polyester grating which will provide for continuous support across the bottom of the tank. The grating will be fastened to the steel frame utilizing clips as recommended by the grating manufacturer**.** The tank support framing leg plates will have ½ inch thick rubber attached to the bottom in order to protect the secondary containment basin fromwear or abrasion.

The secondary containment system will be fabricated from molded high density linear polyethylene which will be placed directly on a the buildings ¾ inch thick wood floor which is supported by a minimum of 7 – 4 inch by 4 inch treated lumber (4 x 4s). Three of the 4 x 4 supports will be placed directly below the tanks steel framing leg supports. The building will rest upon a new 6-inch reinforced concrete slab planned for the storage building. Six inches of Type 2 subbase material in accordance with Section 733-04 of the NYSDOT “Standard Specifications.will be placed and compacted to minimum of 90% of the maximum dry density (MDD) as determined by the modified Proctor test. Compaction tests of the stone will be conducted by the construction quality assurance (CQA) consultant using the nuclear moisture-density method. The CQA consultant shall approve stone compaction placement prior to rebar and concrete placement. The six-inch thick reinforced concrete floor will be designed to support static loads in excess 2,000 pounds per square foot (psf). The calculated static loading that the storage tank system (at full capacity) will exert is calculated to exert less than 430 psf , i.e., 9,500 lbs (tank + contents) divided by 22.34 square feet (tank bottom surface area).

Due to the materials of construction and configuration of the tank and secondary containment, traditional anchor points on each unit are not provided. Steel eye bolts will be fastened to the shed flooring and a J-hook tie down ratchet strap will placed over the tank in the top grooves, as provided by the tank manufacturer, and tightened down so as not to damage the tank, but to keep it stationary during operation. Product information for the tie down straps is located in Appendix B.

3.4 Materials of Construction

The tank will be constructed of HDPE which is chemically compatible and highly resistant to the anticipated low-level concentrations of VOCs anticipated in the extracted groundwater.

Tank walls will be ¼ - inch thick and are designed to meet or exceed the strength requirements of ASTM D1998-06 for molded polyethylene tanks.

3.5 Tank Attachments

The tank will have a number of attachments that include a manway and various fittings. There will be one 16-inch manway located on the top of the tank. The following is a list of fittings to be used:

- 1 - 2" bulkhead coupling for high level float control
- 1 - 2" bulkhead coupling for vacuum truck access for tank emptying
- 1 – 2" bulkhead coupling air vent
- 1 – 2" bulkhead coupling for groundwater discharge

3.6 Overfill Protection

Overfilling will be prevented by a high level float alarm. When the level in the tank reaches a pre-determined height, a flashing light located on the outside of the storage tank shed building will notify CWM personnel that the tank is full. The light will remain on until deactivated by CWM personnel. In addition to the alarm light, the high level float will also trigger a switch that that will shut off power to the submersible pump, thereby shutting down the collection system. The system will be restarted after the storage tank has been emptied.

3.7 Air Emissions

The installation of the Process Area Phase III Groundwater Extraction System is part of the RCRA Corrective Measures for the facility. As indicated in 6 NYCRR §373-2.29(a)(2)(v) and 40 CFR 264.1080(b)(5), air emission standards for tanks do not apply to; "*A waste management unit that is used solely for on-site treatment or storage of hazardous waste that is placed in a unit as a result of implementing remedial activities required under the corrective action authorities of RCRA ……..*" Therefore, CWM is not required to comply with 6 NYCRR 373-2.29. However, CWM has elected to revise

the tank system design to include a carbon unit to treat air emissions from the tank as a Best Management Practice (BMP).

At this time, CWM believes that the liquids that will be removed by the extraction system and stored in tank T-8010 will have organic concentrations of less than 10-percent by weight based on the analysis of groundwater removed by the groundwater extraction system at Process Area Phase II. Therefore, the requirements of 6 NYCRR §373-2.28 will not be applicable. As indicated in Section 2.8, initial samples of collected liquids from Tank T-8010 will be analyzed for full TCL/TAL parameters. If results of the analysis indicate the presence of organics greater than 10-percent by weight, CWM will comply with 6 NYCRR 373-2.28 requirements.

3.8 Secondary Containment and Leak Detection

The storage tank will be located in a HDLP secondary containment basin with a capacity of 1,300 gallons that will be well in excess of the minimum of 100 % of the storage tanks capacity.

Leak detection of the storage tank, all above ground piping, and the secondary containment area will be by visual means on a daily basis during operation of the system.

3.9 Process Description

The groundwater collected in the storage tank will be stored until operating capacity is achieved (approximately 80 percent of total capacity) and then it will be transferred via site vacuum truck by CWM personnel to the on-site AWT Facility for treatment. A Process and Instrumentation Diagram (P&ID) has been prepared for the PA III groundwater extraction system and is included in Appendix C.

4.0 OPERATION AND MAINTENANCE

The following operation and maintenance procedures represent those that CMW has employed and gained during approximately 20 years of similar operational experience of the Process Area and LAGWIT groundwater interceptor and collection systems which are the basis for this proposed Corrective Measures design.

4.1 Operation

Consistent with the Part 373 Site-Wide Permit, CWM proposes to operate the PA III groundwater collection and pumping system between April 15 and November 1 to avoid operational and maintenance problems caused by freezing. This is the seasonal operating period for all other existing corrective measures systems at the CWM site.

4.2 Inspection/Maintenance

If the corrective measure system is inoperable for a period of more than three consecutive days or five days in a thirty day period, CWM will notify the NYSDEC. The notification will include a plan for restoring system operation as soon as possible. The following is a description of the long-term monitoring and maintenance that will be conducted for the corrective measures at PA III:

- The submersible pump will be inspected annually to ensure that it is functioning properly;
- A daily inspection (during the seasonal operational period) of all above ground piping , the storage tank, and secondary containment shall be performed and include documentation of any required maintenance; and
- The storage tank will be emptied within eight (8) hours of a high level alarm. Water levels within the tank shall be confirmed and reported with estimated system shut down and start-up time and date.

The PA III corrective measures system operating data will be incorporated into the site's quarterly corrective action reports that are submitted to the NYSDEC. The reports will contain the monthly volume of groundwater removed from the storage tank, the cause and duration of any system down time, and any actions taken to resolve recurrent operational problems.

5.0 HEALTH AND SAFETY REQUIREMENTS

This project involves a state mandated corrective action and also may involve contact with hazardous substances, it will be necessary for the Contractor to comply with OSHA 1910.120 (HAZWOPER) regulations. A Health, Safety and Emergency Response Plan is required to be developed by the Contractor.

Safety is of utmost importance to CWM with any project undertaken. In addition to the OSHA 1910.120 requirements, any other pertinent federal, state or county requirements must be followed as well as CWM's own Contractor Safety Procedures.

6.0 PROJECT SCHEDULE

The construction activities are anticipated to require eight weeks to perform. This estimate includes contractor mobilization/demobilization, but does not include the time required to select a contractor using a competitive bidding process, or fabrication of the collection tank and secondary containment. CWM proposes the following schedule for implementing the design and installation of the corrective measures at PA III:

Activity	Submittal Period
Begin Construction of the PA III Corrective Measure	Within 60 days of written receipt of final Department approval of the Detailed design of PA III Corrective Measures (Weather permitting)
Complete Construction of the PA III Corrective Measures	Approximately 60 days after construction begins.
Submittal of the Certification report	Within 30 days of completing construction.
Begin operation of the PA III Corrective Measures	Within 15 days of written receipt of Department approval of the Certification Report.

The time estimate presumes that the work to be performed is that identified in the detailed design documents without significant changes or modification. Major design changes may significantly impact the schedule. Any changes or modifications which are deemed appropriate based on material availability and/or interim construction activities will be reviewed with the NYSDEC at the earliest opportunity.

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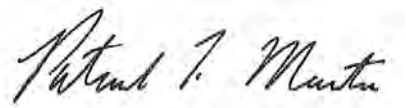

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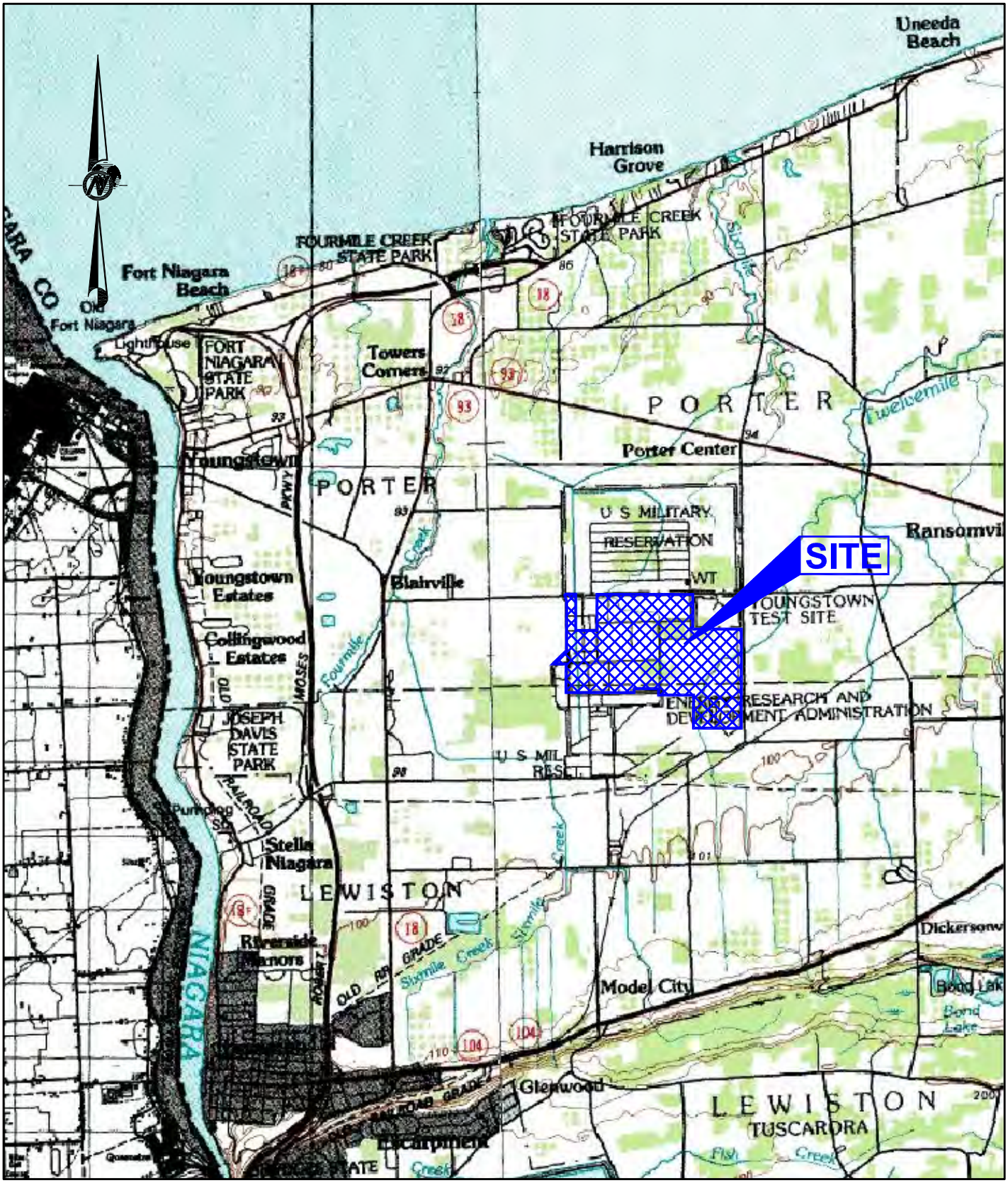
David C Wehn, CPG
Associate

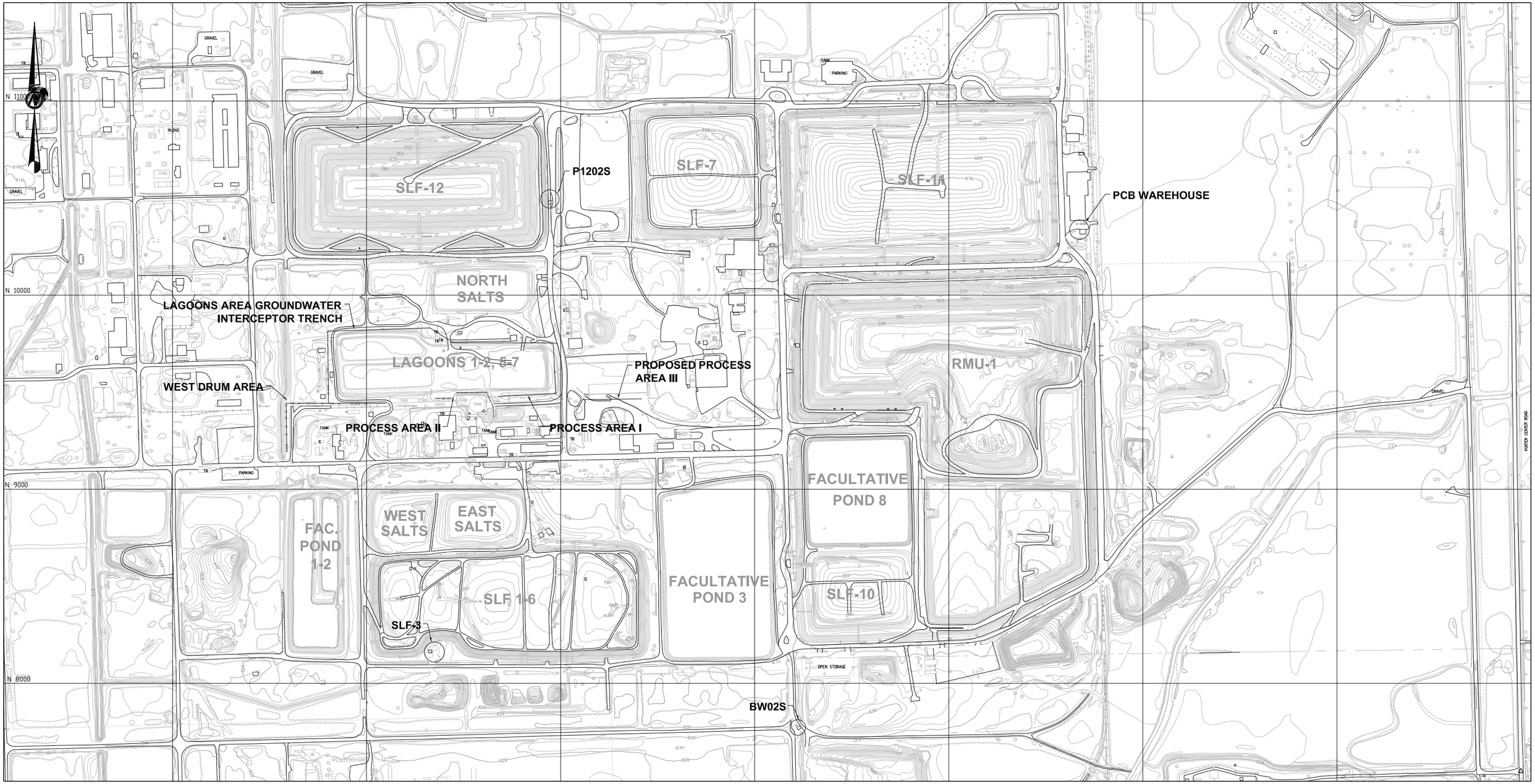
FIGURES



REFERENCE

1.) DRAWING WAS ADAPTED FROM THE USGS TOPOGRAPHIC QUADRANGLE OF RANSOMVILLE, NEW YORK, OBTAINED FROM www.topozone.com.

Golder Associates Buffalo, New York	SCALE 1:28,000	TITLE	
	DATE 01/26/12	SITE LOCATION MAP	
	DESIGN AJN		
	CADD AML		
FILE No. 11389352A010	CHECK PTM		
PROJECT No. 113-89352 REV. 0	REVIEW MLB	CWM CHEMICAL SERVICES, L.L.C./MODEL CITY TSD FACILITY	FIGURE 1



NOTES

1.) FIGURE ILLUSTRATES THE LOCATION OF PROPOSED PROCESS AREA III GROUNDWATER EXTRACTION SYSTEM AND THE EXISTING GROUNDWATER EXTRACTION SYSTEMS OPERATING AT THE FACILITY

REFERENCES

1.) BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED MAY 31, 2001 BY AIR SURVEY CORP., DULLES, VIRGINIA.

200 0 200 400
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
△						

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

TITLE

PROCESS AREA III PROJECT LOCATION MAP

Golder Associates
Buffalo, New York

PROJECT No.		113-89352	FILE No.		11389352A013
DESIGN	AML	03/01/12	SCALE	AS SHOWN	REV. 0
CADD	AML	03/01/12			
CHECK	PTM	03/01/12			
REVIEW					

FIGURE 2

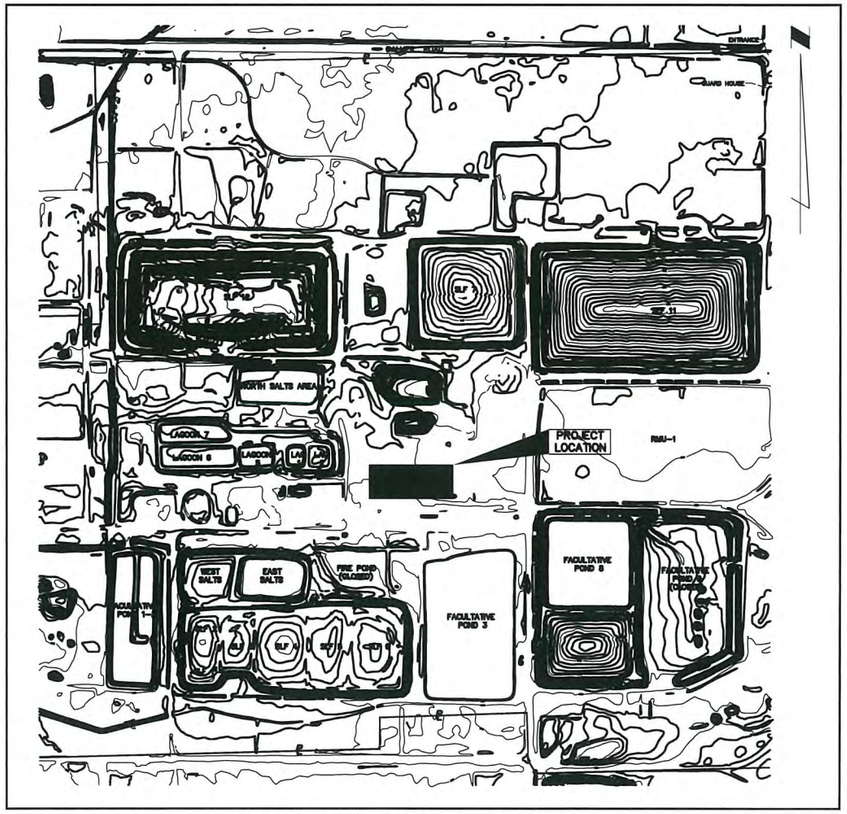
APPENDIX A

DETAILED DESIGN DRAWINGS

Sheet 1 - Cover Sheet
Sheet 2 - Proposed Interceptor Trench Alignment
Sheet 3 - Interceptor Trench Profile and Details
Sheet 4 - Building Layout and Piping Details
Sheet 5 - Ancillary Details 1
Sheet 6 - Ancillary Details 2

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NIAGARA COUNTY, NEW YORK

PROCESS AREA III
INTERCEPTOR TRENCH DESIGN
MAY 2012



PROJECT LOCATION MAP
NOT TO SCALE

DRAWING SCHEDULE

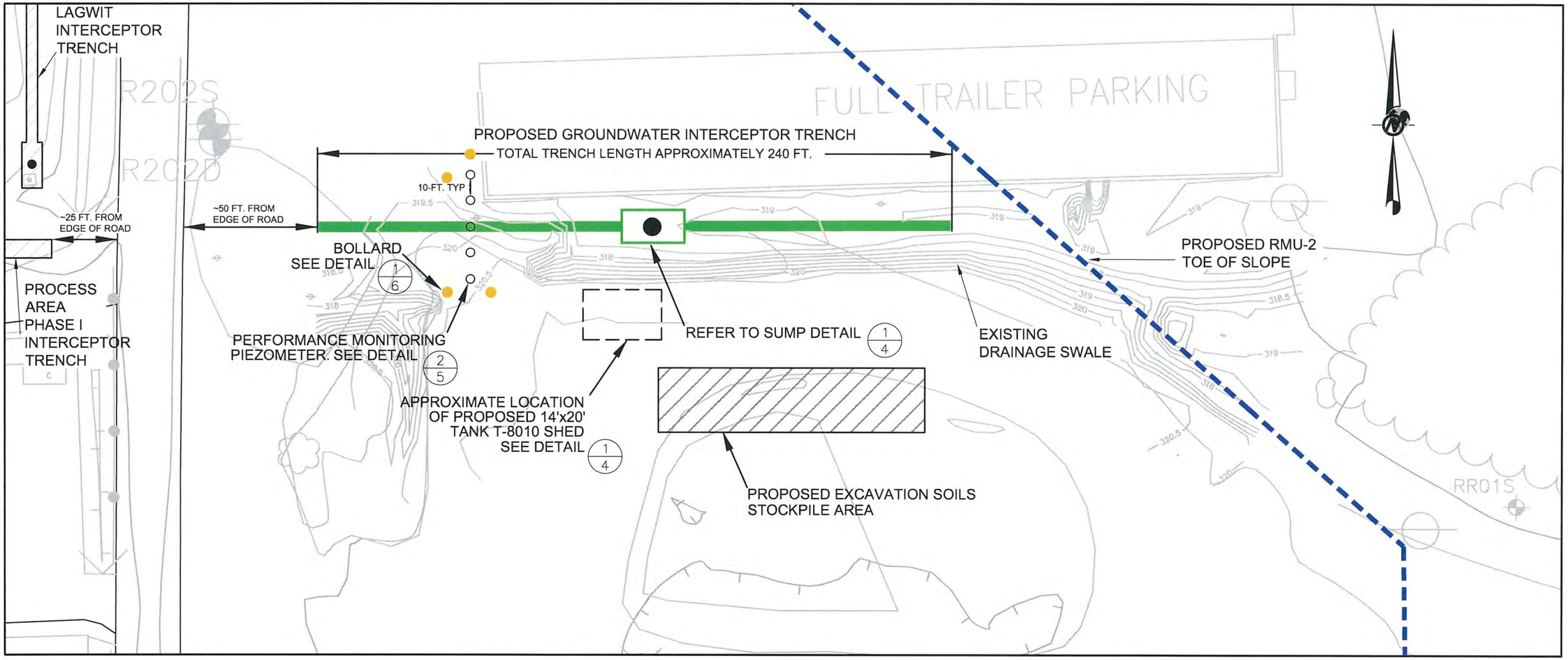
SHEET No.	DESCRIPTION
1	COVER SHEET
2	PROPOSED INTERCEPTOR TRENCH ALIGNMENT
3	INTERCEPTOR TRENCH PROFILE AND DETAILS
4	BUILDING LAYOUT AND PIPING DETAILS
5	ANCILLARY DETAILS 1
6	ANCILLARY DETAILS 2

WASTE MANAGEMENT

Prepared by:

Golder Associates
Buffalo, New York

STATE OF NEW YORK
PATRICK T. MARTIN
No. 71014-1
LICENSED PROFESSIONAL ENGINEER



LEGEND

- PROPOSED PERFORMANCE MONITORING PIEZOMETER
- GROUND WATER EXTRACTION AQUEOUS SUMP, DNAPL SUMP OR EXTRACTION WELL
- UPPER TILLS AND GLACIOLACUSTRINE SILT/SAND UNIT MONITORING WELL
- Proposed Bollard
- PROPOSED RMU-2 TOE OF SLOPE
- EXISTING GROUNDWATER INTERCEPTOR TRENCHES
- PROPOSED GROUNDWATER INTERCEPTOR TRENCH
- 320 — EXISTING CONDITIONS INDEX CONTOUR (SEE REFERENCE 4)
- EXISTING CONDITIONS INTERMEDIATE CONTOUR (SEE REFERENCE 4)

NOTES

1.) LOCATIONS OF PROCESS AREA LAGWIT INTERCEPTOR TRENCH AND PROCESS AREA I INTERCEPTOR TRENCH APPROXIMATED ON FIGURE.

2.) UPON TRENCH INSTALLATION, AREA SHALL BE RESTORED TO PRE-CONSTRUCTION GRADES OR TOPOGRAPHY.

REFERENCES

1.) BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED MAY 31, 2001 BY AIR SURVEY CORP., DULLES, VIRGINIA.

2.) RMU-2 TOE OF SLOPE OBTAINED FROM DRAWING PREPARED BY GOLDER ASSOCIATES, INC., BUFFALO, NEW YORK, ENTITLED "HISTORIC & RECENT SITE INVESTIGATION AREAS & SAMPLE LOCATION MAP" (FILE NO. 08389111A321.DWG.), DATE: AUGUST 2009.

3.) R201S/D AND R202S/D GROUNDWATER MONITORING WELLS SURVEYED BY WENDEL-DUCHSCHERER ON SEPTEMBER 26, 2008.

4.) EXISTING CONDITIONS INDEX AND INTERMEDIATE CONTOURS TAKEN FROM DIGITAL CAD FILE F_01-Int Trench-Ex Cond.DWG, ENTITLED "EXISTING CONDITIONS SURVEY," PREPARED BY ENSOL, INC. DATED NOVEMBER 2011.

40 0 40
SCALE FEET

STATE OF NEW YORK
PATRICK T. MARTIN
No. 71014-1
LICENSED PROFESSIONAL ENGINEER

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	05/09/12	PTM	CHANGED DETAIL NUMBERS AND ADDED SHED SIZE	MJS	PTM	DCW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

TITLE

PROPOSED INTERCEPTOR TRENCH ALIGNMENT

Golder Associates
Buffalo, New York

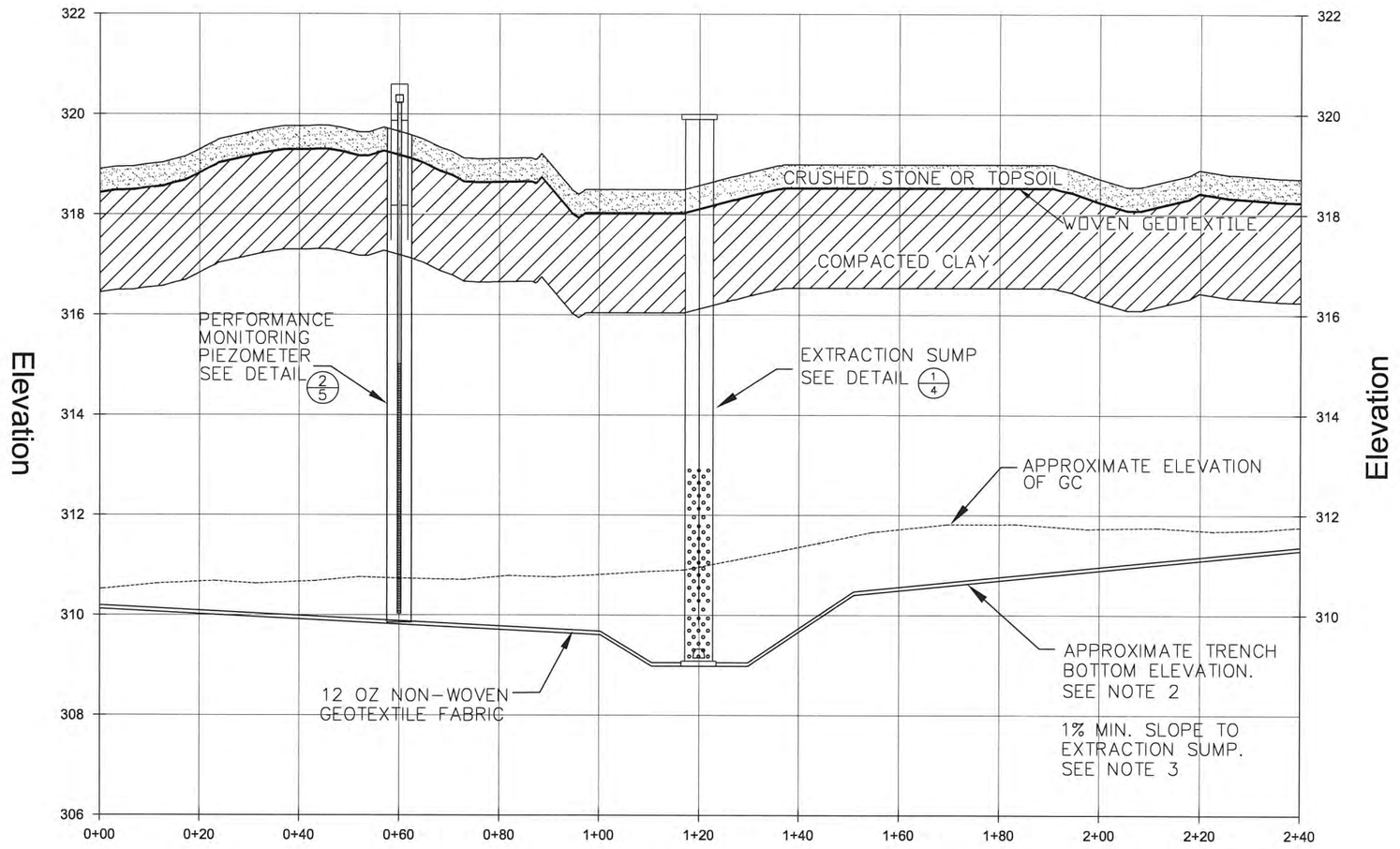
PROJECT No.		113-89352	FILE No.		11389352A001
DESIGN	AML	11/21/11	SCALE	AS SHOWN	REV. 1
CADD	AML	02/13/12	SHEET 2		
CHECK	PTM	03/01/12			
REVIEW	DCW	03/01/12			

GENERAL NOTES

1. Top of glaciolacustrine clay inferred from record logs of borings previously drilled for other projects in the vicinity of the trench alignment. The actual top of the glaciolacustrine clay may vary from that shown on the trench profiles. The upper glaciolacustrine clay has historically varied in thickness and is discontinuous in some locations in this part of the site.
2. Depth of trench to be determined in the field during construction. Assumed profile of the trench is shown on this figure. Maximum trench base elevation shall be 309.0 Ft. MSL.
3. Bottom of proposed groundwater interceptor trench slopes minimum of 1% from east: west ends towards collection sump at center point of trench. The integrity of the glaciolacustrine clay unit will be maintained and elevations will vary based upon field conditions.
4. Elevations in Schedule A are based on assumed subsurface conditions as shown on this figure. Modifications may be required during construction and shall be subject to the approval of the ENGINEER.
5. CONTRACTOR shall install sump using procedures that satisfy all applicable safety regulations.
6. Based on soil types encountered all excavations shall be sloped or benched in accordance with applicable OSHA regulations. CONTRACTOR shall be responsible for compliance with these regulations during construction. A trench box or shoring and bracing may also be used subject to the same regulations.
7. Excavated trench soil shall be placed at the proposed stockpile location shown on Sheet 2.
8. Coarse aggregate for the ground water extraction trench backfill and structure bedding shall be clean (washed), subrounded or rounded stone, free from slag, cinders or other deleterious material. Coarse aggregate shall meet the following gradation requirements:

Opening or Sieve Size	% Passing by Weight
1-1/2 Inch	100
1 Inch	90-100
1/2 Inch	0-15

CONTRACTOR shall submit certification of compliance with the gradation and permeability specifications.

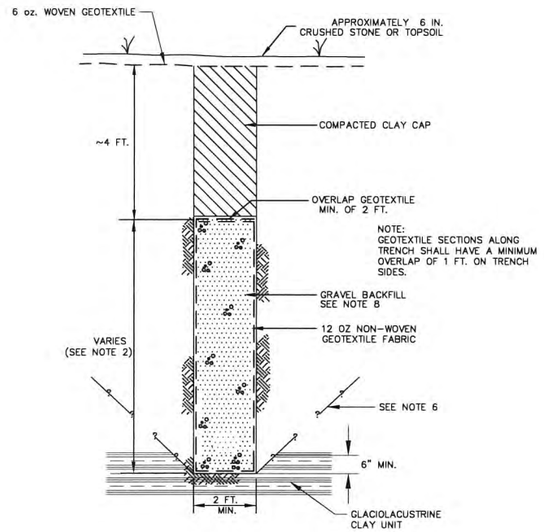


GROUNDWATER INTERCEPTOR TRENCH PROFILE 0+00 TO 2+40

1/3

VERTICAL EXAGGERATION 10X

NOT TO SCALE



TYPICAL GROUND WATER INTERCEPTOR TRENCH DETAIL

2/3

NOT TO SCALE

SCHEDULE A HDPE SUMP ELEVATION**	
LOCATION*	ELEVATIONS (FT-MSL)
SUMP BASE	309.0
BOTTOM OF PERFORATIONS	309.5
TOP OF PERFORATIONS	313.5
PUMP OFF	311.0
PUMP ON	315.0
HIGH LEVEL ALARM	316.0
FINAL CONC. GRADE	319.0
DISCHARGE PIPE INVERT	319.5
BASE OF SUMP TOP FLANGE ADAPTOR	320.5

*SEE 1/4

**SEE NOTE 4

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	05/09/12	PTM	DELETED OR MOVED DETAILS TO NEW SHEET 4; COMBINED CLAY LAYERS	MJS	PTM	DCW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

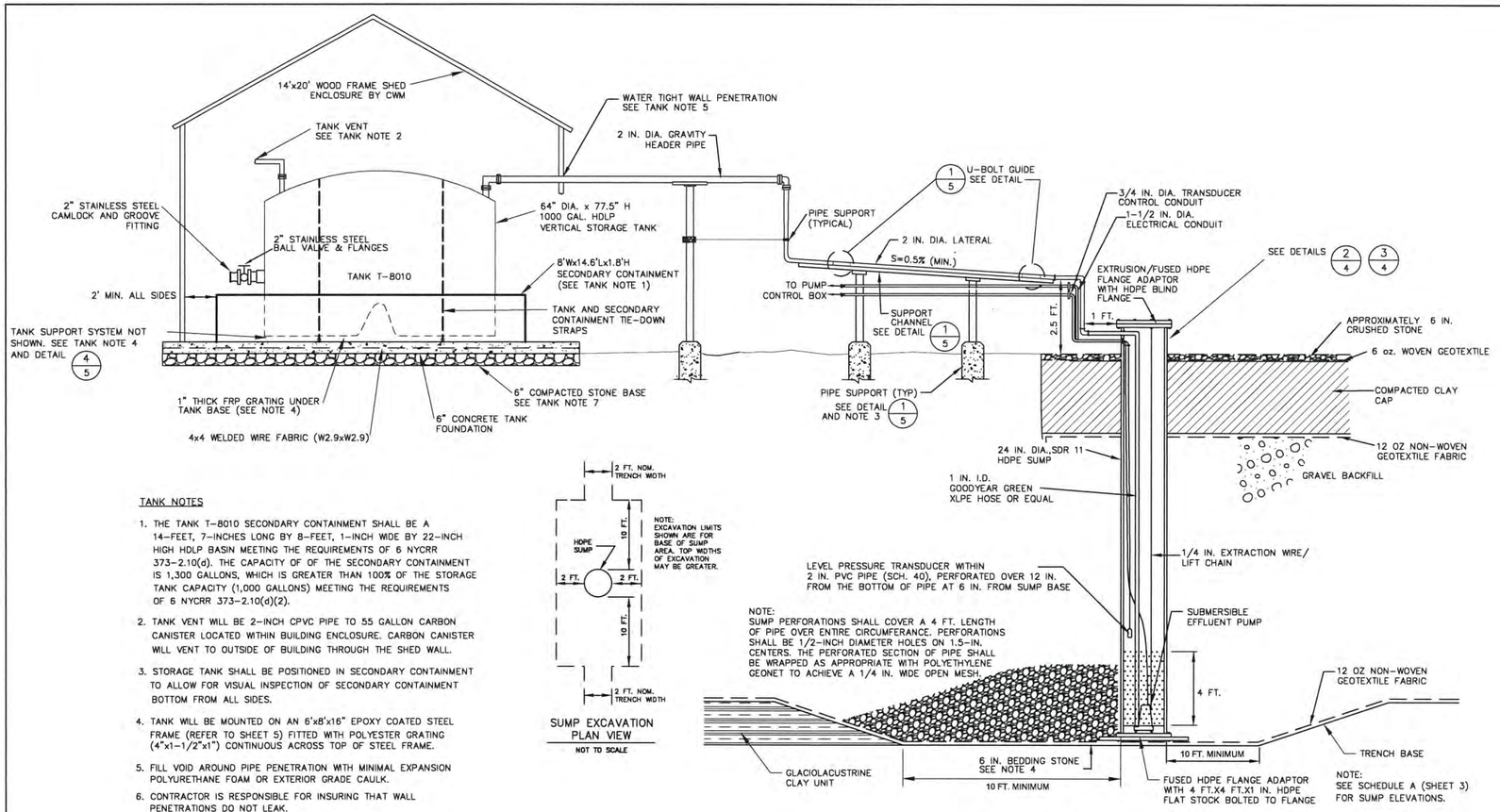
TITLE

INTERCEPTOR TRENCH PROFILE AND DETAILS

Golder Associates
Buffalo, New York

PROJECT No.	113-89352		FILE No.	11389352A008	
DESIGN	AML	12/07/11	SCALE	AS SHOWN	REV. 1
CADD	RJM	02/16/12			
CHECK	PTM	03/01/12			
REVIEW	DCW	03/01/12			

SHEET 3



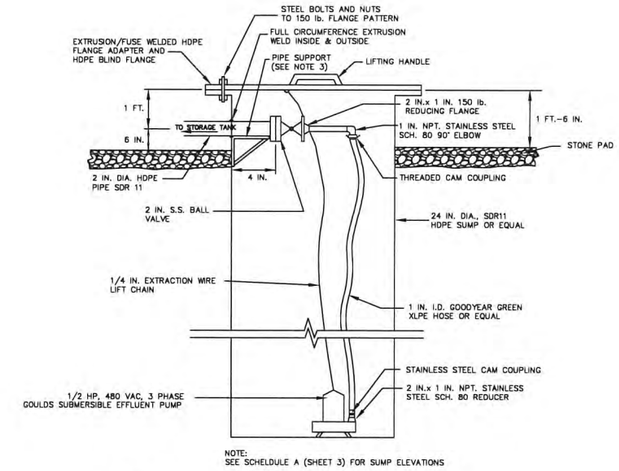
EXTRACTION SYSTEM DETAIL (TYPICAL)

1/4

NOT TO SCALE

TANK NOTES

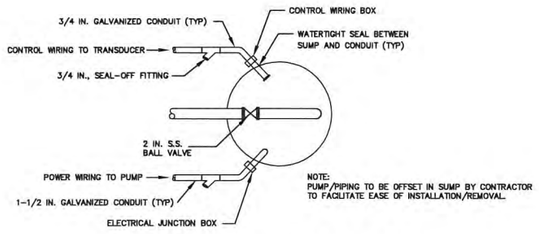
1. THE TANK T-8010 SECONDARY CONTAINMENT SHALL BE A 14-FEET, 7-INCHES LONG BY 8-FEET, 1-INCH WIDE BY 22-INCH HIGH HDLP BASIN MEETING THE REQUIREMENTS OF 6 NYCRR 373-2.10(d). THE CAPACITY OF OF THE SECONDARY CONTAINMENT IS 1,300 GALLONS, WHICH IS GREATER THAN 100% OF THE STORAGE TANK CAPACITY (1,000 GALLONS) MEETING THE REQUIREMENTS OF 6 NYCRR 373-2.10(d)(2).
2. TANK VENT WILL BE 2-INCH CPVC PIPE TO 55 GALLON CARBON CANISTER LOCATED WITHIN BUILDING ENCLOSURE. CARBON CANISTER WILL VENT TO OUTSIDE OF BUILDING THROUGH THE SHED WALL.
3. STORAGE TANK SHALL BE POSITIONED IN SECONDARY CONTAINMENT TO ALLOW FOR VISUAL INSPECTION OF SECONDARY CONTAINMENT BOTTOM FROM ALL SIDES.
4. TANK WILL BE MOUNTED ON AN 8'x8'x16" EPOXY COATED STEEL FRAME (REFER TO SHEET 5) FITTED WITH POLYESTER GRATING (4"x1-1/2"x1") CONTINUOUS ACROSS TOP OF STEEL FRAME.
5. FILL VOID AROUND PIPE PENETRATION WITH MINIMAL EXPANSION POLYURETHANE FOAM OR EXTERIOR GRADE CAULK.
6. CONTRACTOR IS RESPONSIBLE FOR INSURING THAT WALL PENETRATIONS DO NOT LEAK.
7. 6-INCHES OF TYPE 2 SUBBASE MATERIAL IN ACCORDANCE WITH SECTION 733-04 OF THE NYSDOT "STANDARD SPECIFICATIONS" WILL BE PLACED AND COMPACTED TO MINIMUM OF 90% OF THE MAXIMUM DRY DENSITY (MDD) AS DETERMINED BY THE MODIFIED PROCTOR TEST. COMPACTION TESTS OF THE STONE WILL BE CONDUCTED BY THE CONSTRUCTION QUALITY ASSURANCE (CQA) CONSULTANT USING THE NUCLEAR MOISTURE-DENSITY METHOD. THE CQA CONSULTANT SHALL APPROVE STONE COMPACTION PLACEMENT PRIOR TO REBAR AND CONCRETE PLACEMENT.
8. NEW TANK T-8010 WILL BE HYDROSTATICALLY TESTED OVER A 24-HOUR PERIOD. THE TANK WILL BE FILLED TO CAPACITY WITH CLEAN POTABLE WATER AND THE TANK WILL BE OBSERVED FOR LEAKS OVER A 24-HOUR PERIOD.



HDPE SUMP DETAIL (TYPICAL)

2/4

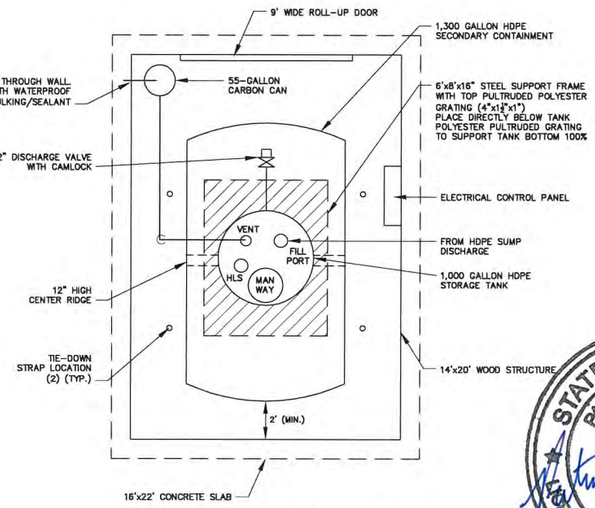
NOT TO SCALE



PLAN VIEW HDPE SUMP DETAIL (TYPICAL)

3/4

NOT TO SCALE



TANK T-8010 PROCESS AREA III BUILDING LAYOUT

4/4

NOT TO SCALE

GENERAL NOTES

1. All HDPE pipe and fittings shall be manufactured from virgin polyethylene resin, PE 3408 or approved equal and shall conform to ASTM D-3350.
2. HDPE sump pipe sections and fittings shall be joined using standard butt fusion or extrusion welding techniques.
3. CONTRACTOR shall field route and support top piping as necessary. Contract drawing does not show all required piping supports.
4. Coarse aggregate for the ground water extraction trench backfill and structure bedding shall be clean (washed), subrounded or rounded stone, free from slag, cinders or other deleterious material. Coarse aggregate shall meet the following gradation requirements:

Opening or Sieve Size	% Passing by Weight
1-1/2 Inch	100
1 Inch	90-100
1/2 Inch	0-15

CONTRACTOR shall submit certification of compliance with the gradation and permeability specifications.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	05/04/12	AML	Moved Ancillary Details to new Sheets 5 and 6	AML	PTM	DCW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

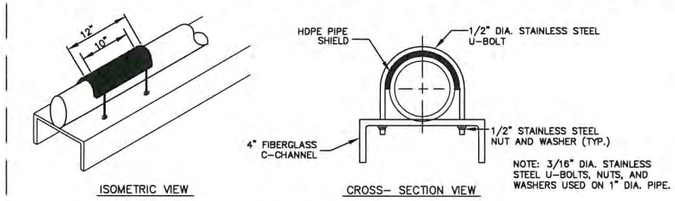
TITLE

BUILDING LAYOUT AND PIPING DETAILS

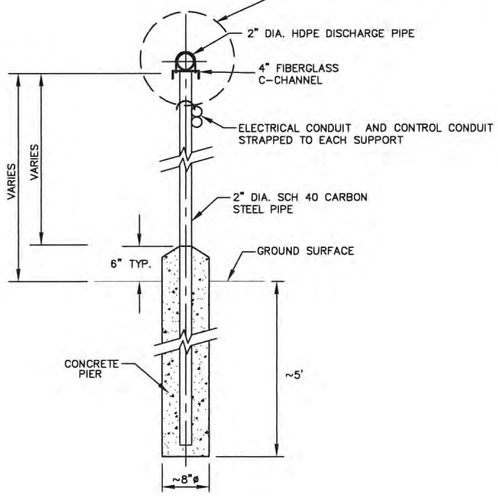
Golder Associates
Buffalo, New York

PROJECT No.		113-89352	FILE No.		11389352A015
DESIGN	PTM	05/03/12	SCALE	AS SHOWN	REV. 0
CADD	AML	05/03/12			
CHECK	PTM	05/04/12			
REVIEW	DCW	05/04/12			

SHEET 4

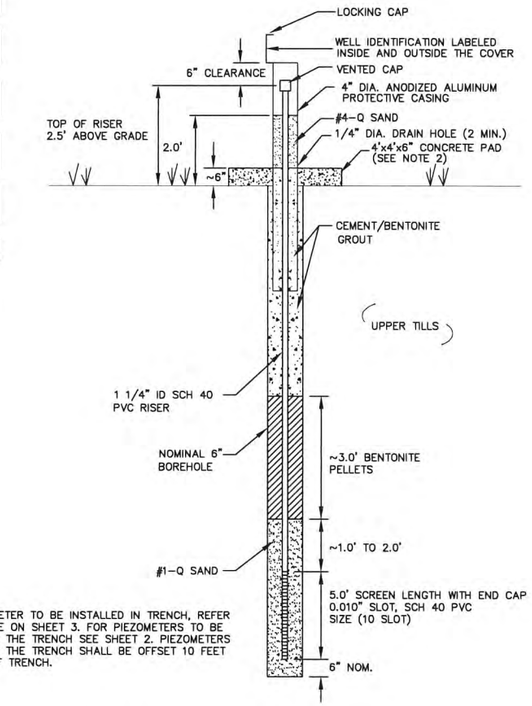


FIXED ANCHOR DETAIL (TYPICAL)
NOT TO SCALE



1/5 PIPE SUPPORT DETAIL (TYPICAL)

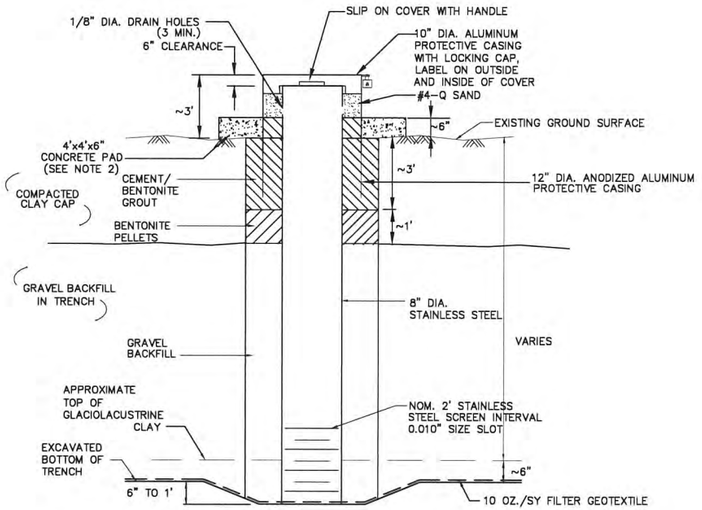
SCALE 1 0 1 FEET



NOTE: FOR PIEZOMETER TO BE INSTALLED IN TRENCH, REFER TO TRENCH PROFILE ON SHEET 3. FOR PIEZOMETERS TO BE INSTALLED OUTSIDE THE TRENCH SEE SHEET 2. PIEZOMETERS INSTALLED OUTSIDE THE TRENCH SHALL BE OFFSET 10 FEET FROM THE EDGE OF TRENCH.

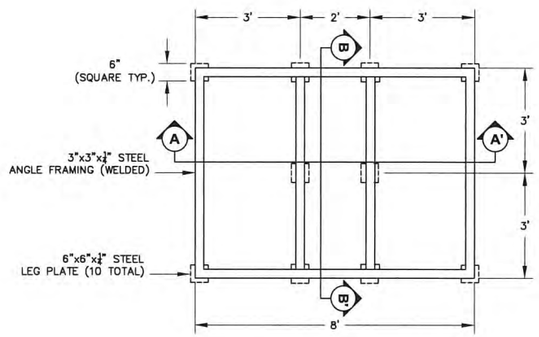
2/5 PIEZOMETER DETAIL (OUTSIDE OF TRENCH)

NOT TO SCALE

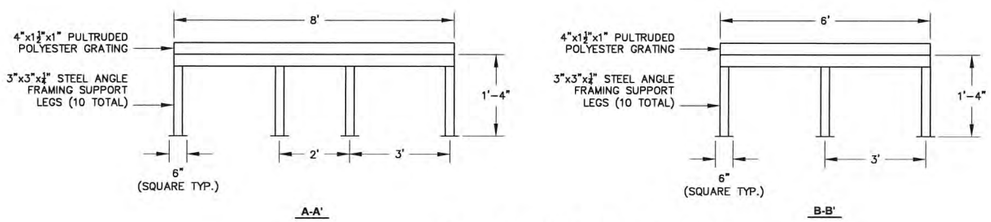


3/5 DNAPL SUMP DETAIL (TYPICAL)

NOT TO SCALE
(SEE NOTE 1)



PLAN



4/5 TANK T-8010 PROCESS AREA III TANK SUPPORT FRAME

SCALE 2 0 2 FEET

NOTES:
1.) ALL STEEL TO BE PRIMED AND EPOXY PAINTED.

2.) ¼" THICK RUBBER PADS TO BE ATTACHED TO BOTTOM OF 6-INCH SQUARE STEEL LEG PLATES.

NOTES

1.) DURING EXCAVATION FOR THE INTERCEPTOR TRENCH, DENSE NON-AQUEOUS PHASE LIQUIDS (DNAPL) MAY BE ENCOUNTERED IN THE TRENCH SIDEWALLS. BASED ON THE QUANTITY OF DNAPL ENCOUNTERED, THE CONTRACTOR MAY BE REQUIRED TO INSTALL A CONTINGENCY DNAPL SUMP WITHIN AN EXCAVATED DEPRESSION IN THE TRENCH BASE AND AS SHOWN IN DETAIL 3 IN SHEET 5. THE NUMBER OF DNAPL SUMPS PLACED WITHIN THE TRENCH WILL BE BASED ON FIELD CONDITIONS; I.E. THE NUMBER AND EXTENT OF LOW POINTS ENCOUNTERED IN THE TOP OF THE GLACIOLACUSTRINE CLAY ALONG THE TRENCH.

2.) CONCRETE PAD SHALL BE CONSTRUCTED OF 3000 PSI (MIN.) CONCRETE WITH WELDED WIRE REINFORCEMENT.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

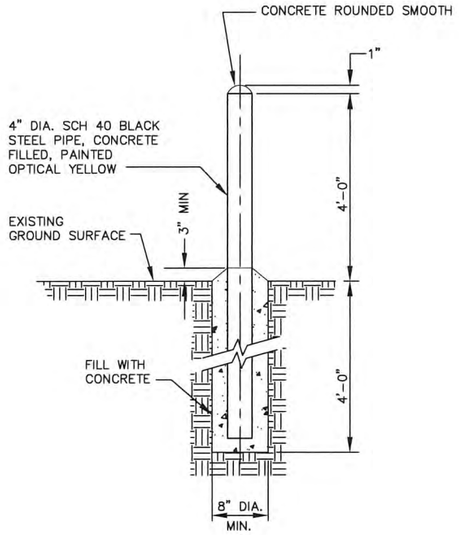
TITLE

ANCILLARY DETAILS 1

NJ Authorization #24GA28029100

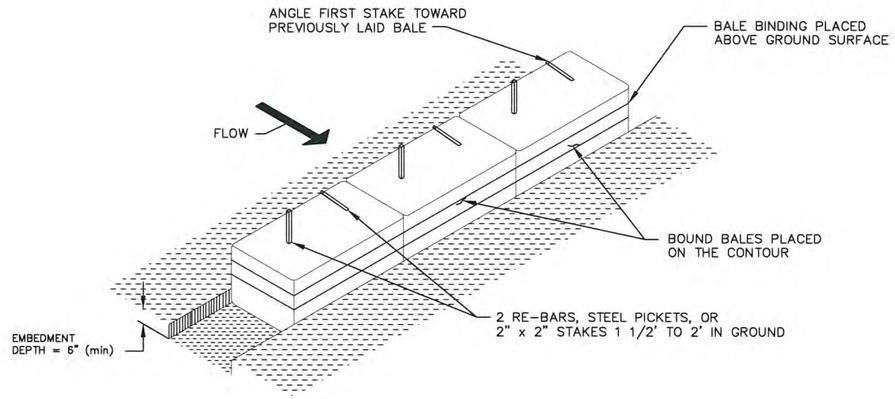
Golder Associates
Buffalo, New York

PROJECT No.	113-89352		FILE No.	11389352A012	
DESIGN	DCW	11/29/11	SCALE	AS SHOWN	REV. 0
CADD	AML	05/04/12	SHEET 5		
CHECK	PTM	05/07/12			
REVIEW	DCW	05/07/12			



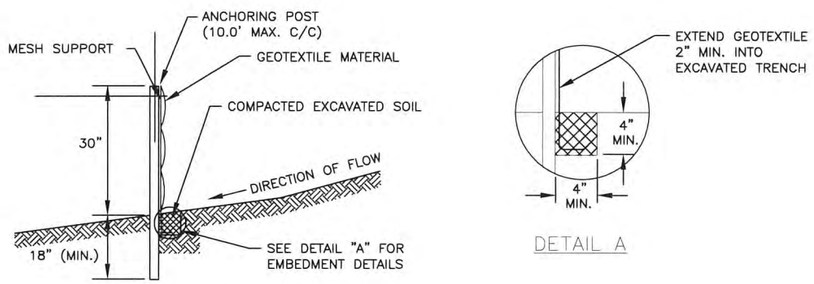
1/6 TYPICAL BOLLARD DETAIL

NOT TO SCALE



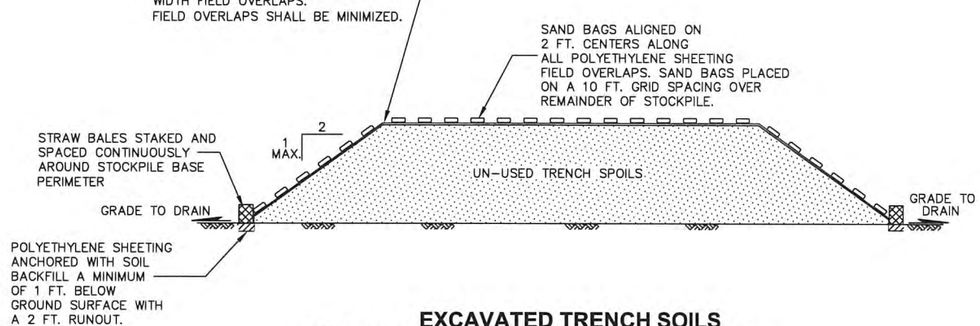
2/6 TYPICAL STRAW BALE DETAIL

NOT TO SCALE



3/6 TYPICAL SILT FENCE DETAIL

NOT TO SCALE



4/6 EXCAVATED TRENCH SOILS STOCKPILE PROTECTION MEASURES

NOT TO SCALE

NOTES

1.) TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED WHERE NECESSARY DURING CONSTRUCTION ACTIVITIES AND IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED SEDIMENTATION CONTROL PLAN.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

TITLE

ANCILLARY DETAILS 2

NJ Authorization #24GA28029100

Golder Associates
Buffalo, New York

PROJECT No.	113-89352		FILE No.	11389352A016	
DESIGN	DCW	11/29/11	SCALE	AS SHOWN	REV. 0
CADD	AML	05/04/12			
CHECK	PTM	05/07/12			
REVIEW	DCW	05/07/12			

SHEET 6

APPENDIX B

STORAGE TANK DESIGN MANUFACTURER'S DATA

Alltankscom LLC

PO Box 680747
Houston, TX 77268
281 825 4000
281 825 4099 Fx

Quotation

Date	Quotation
2/9/2012	12-507

Name / Address	Ship To
Waste Management Model City 1550 Balmer Road Model City, NY 14107 Steve Rydzyk 716-286-0325	Waste Management Model City 1550 Balmer Road Model City, NY 14107 Steve Rydzyk 716-286-0325

P.O. No.	Terms	Rep	FOB	Project
	Prepay	DT	MN	

Item	Description	Qty	Rate	Total
1000 C...	1000 gallon cylindrical, vertical, flat bottom High density polyethylene storage tank UV stabilized , and FDA approved standard 2" drain fitting and siphon tube and 16" Manway 64" diameter 80" height 1.5 Specific Gravity Tank in inventory in TX	1	[redacted]	[redacted]
Misc.	1300 Gallon, containment tank, 97"W x 175" L x 22" H, black in color, UV stabilized, FDA approved high density linear polyethylene tank, no fittings on tank Tank in inventory in MN Plant	1	[redacted]	[redacted]
Misc.	2" Bulk Head Fittings shipped loose and vent	4	[redacted]	[redacted]
Freight	Shipping and handling is Estimated.		[redacted]	[redacted]

Subtotal	[redacted]
Sales Tax	$0.00
Total	[redacted]

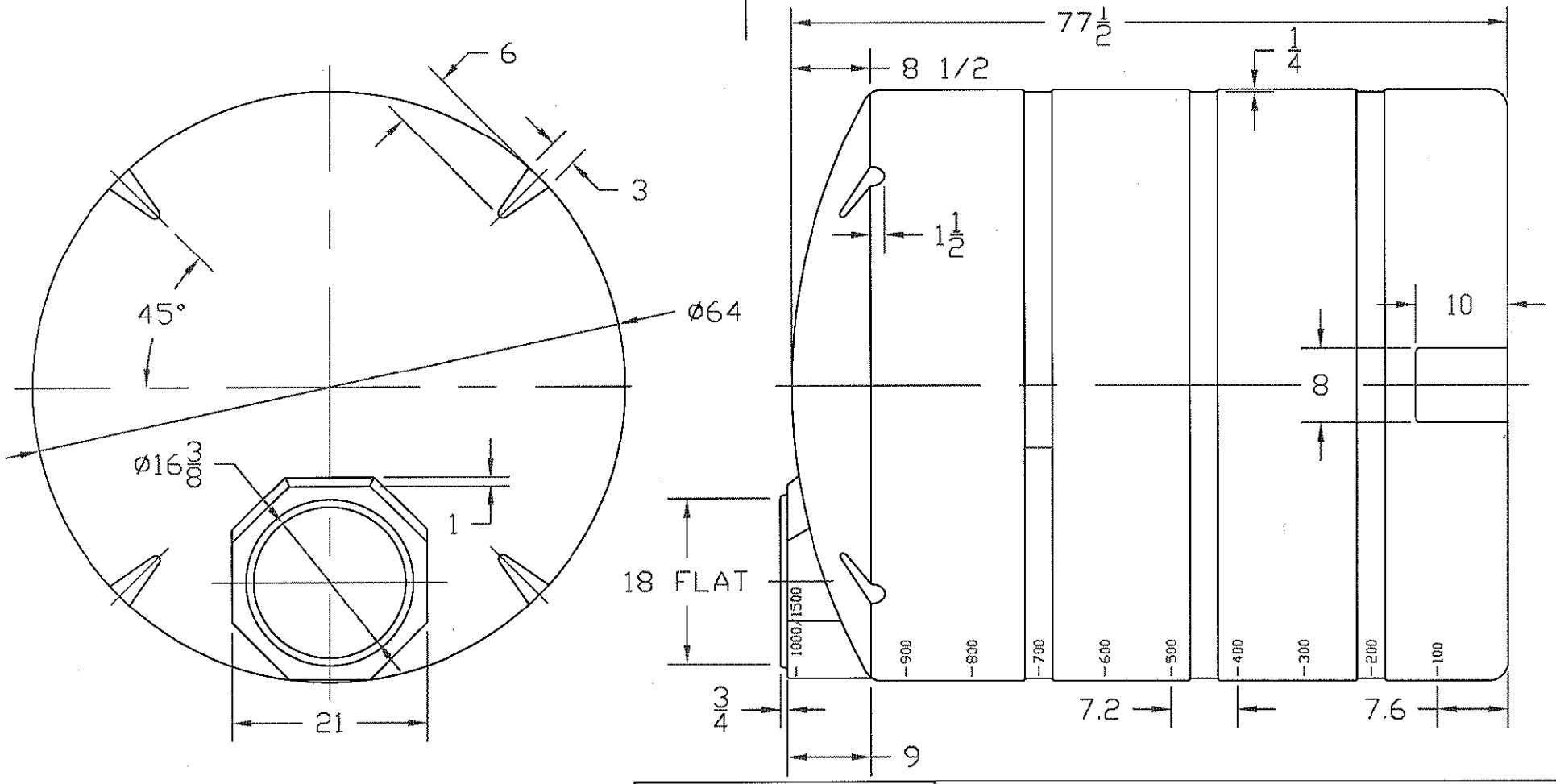
Confirm acceptance of pricing and terms. Add sales tax exemption form if applicable.

Date_____

Signed_____

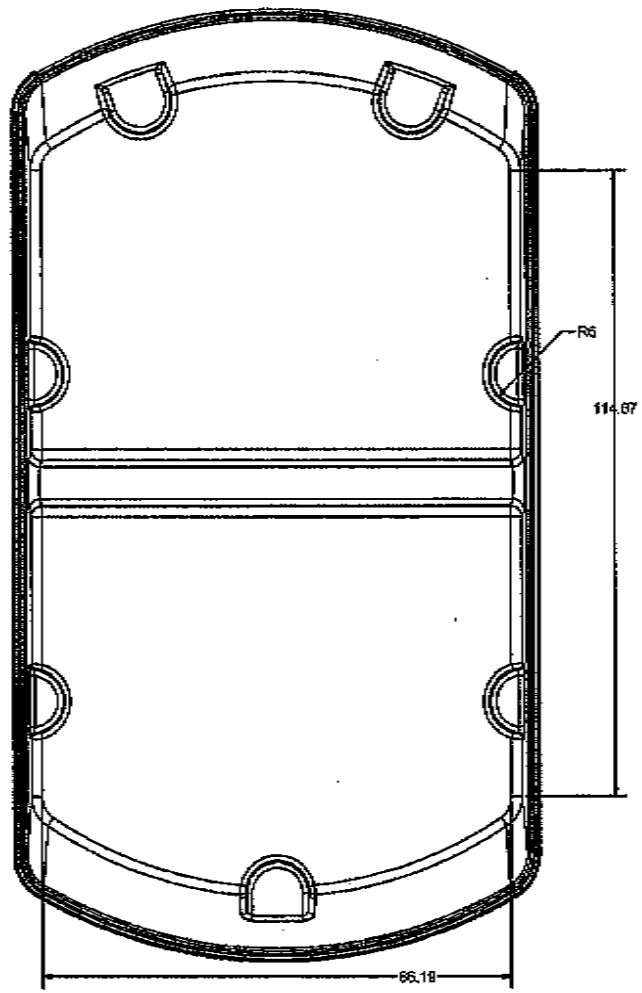
Phone #	Fax #	E-mail
281 825 4000	281 825 4099	gene@alltanks.com

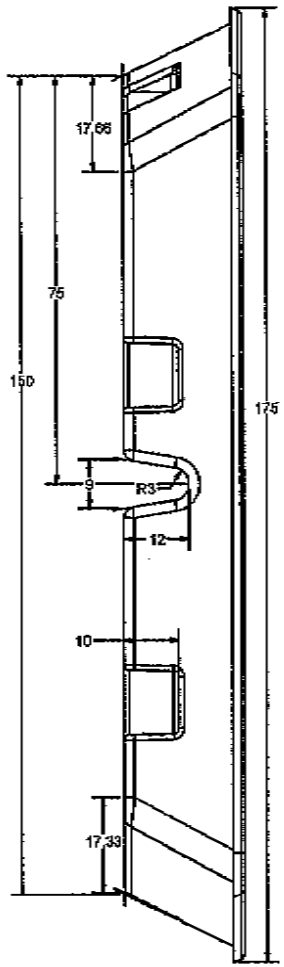
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	REDRAWN	09JAN97	

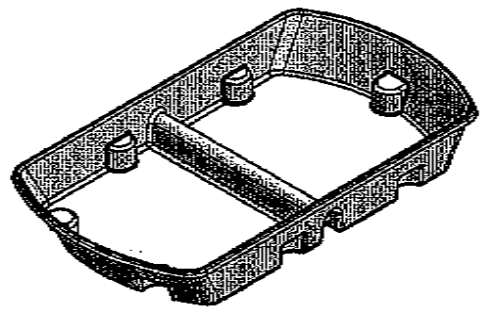


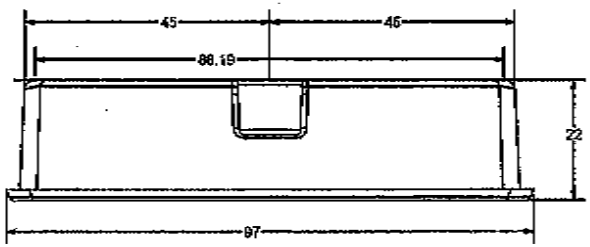
JTP 09JAN97

American Process Technology
1000 gallon vertical flat bottom
Part # 40152 / 40154
Phone # 281-825-4000
Fax # 281-825-4099









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CHECKED		
QA		
MFG		
APPROVED		

APT

www.TankSystems.com

TITLE: 1300 GALLON CONTAINMENT BASIN

SIZE	DWG NO	REV
C		

SCALE: 1/16 SHEET 1 OF 1

2" x 30' Keeper Ratchet Tie Down Strap w/ Double J Hook Ends (10,000 lbs) (1 Strap) Yellow 04630

More Images

$32.95 List: $44.44 **Save: $11.49**

Shipping: Ships between Apr 25th - Apr 26th
Free Shipping

Financing: See Terms

Part #: 04630

UPC: 051643046306

Application:

Overview | Details

Features

- Ratchet Design
- Maximum Tensioning with Minimum Force
- Hi-Test Strap Webbing
- Standard and Heavy
- Huge Selection
- Meets DOT and California Highway Patrol Standards
- Variety of Lengths, Widths and Capacities.

Description

Keeper ratchet tie down straps are great for securing your cargo. Keeper offers standard and heavy duty tie down straps. A Keeper tie down strap is built tough and are available in tie down strap packs or singles. Browse a wide range of tie downs for atv's, motorcycles, general cargo and hd straps. When choosing a tie-down strap it is as easy as 1-2-3 with Keeper cargo straps: 1. Estimate the Weight and Size of the item to be tied down. 2. Choose the Tie-Down with a Load Limit equal to or greater than the weight and the required length. 3.Choose the Buckle and Hook Style. The heart of a tie-down and tow strap is its webbing and the webbing design must be specific to the job. The webbing used to lash kayak to an automobile roof rack requires a different rated capacity, abrasion resistance, and weave pattern than a heavy duty motorcycle/ATV tie-down. Likewise, a 10,000lbs industrial ratchet tie-down has different requirements as well. Keeper's commitment to providing only high quality, long lasting, value driven products requires that we design specific webbing to meet the demands for specific applications. Keeper developed its Hi-Test webbing many years ago using 3 layers of high tenacity yarn to protect and provide strength. The face, back and edge layers provide the webbing with abrasion and weather protection and the center, or warp yarns, provide the strength. All Hi-Test webbing is tested for abrasion resistance using Federal Test Methods, required of all mil-spec webbing. The webbing is cycled over a steel hexagonal bar to simulate real life application. A tensile test is then conducted. All Keeper webbing passes an abrasion capacity requirement so you and your customers are assured of along lasting product. Made by Keeper Corp.

View all Keeper

Accessory Items

2" x 30' Keeper Ratchet Tie Down Strap w/ Double J Hook Ends (10,000 lbs) (1 Strap) Yellow 04630

More Images

$32.95 List: ~~$44.44~~ **Save: $11.49**

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Financing: See Terms

Part #: 04630

UPC: 051643046306

Application:

Overview | Details

Frequently Asked Questions

HOW TO CHOOSE A TIE-DOWN
Keeper recommends using a minimum of two (2) Tie-Downs to secure cargo and prevent load shift. Each Tie-Down should have a Working Load Limit equal to or greater than the weight of your cargo.

WORKING LOAD LIMIT
The maximum cargo weight a Tie-Down can safely handle and still accommodate unexpected forces caused by speed, road conditions or emergencies. The Industry Standard for Working Load Limit is 1/3 the Break-Strength of the Tie-Down assembly.

OPERATING INSTRUCTIONS
FOR RATCHET TIE-DOWNS

1. Place webbing over load and attach hooks to solid anchor points.
2. Insert webbing through ratchet reel and pull until **ALL** slack is out of webbing. (See How It Works Tab)
3. Pump ratchet handle to make webbing tight. Ratchet reel must have at least two layers of webbing wound around it.
4. CAUTION, too many layers of webbing will jam ratchet. If too much web is piling on ratchet reel, start procedure over, first removing **ALL** slack from webbing over load.
5. After load is secured, move handle down flat for transit. (See How It Works Tab)
6. To release, compress release bar and open handle 180 degrees. (See How It Works Tab)

Keeper Hi-Test Webbing: The heart of a tie-down and tow strap is its webbing. The webbing design must be specific to the job. For example, the webbing used to lash a kayak

to an automobile roof rack requires a different break strength, abrasion resistance, and weave pattern than a heavy duty ATV or motorcycle tie-down. Keeper is committed to providing high quality, long lasting, value driven products. Therefore, we design products with webbing that exceeds the demands of each specific application. Keeper introduced Hi-Test™ webbing to the tie-down market many years ago, using three layers of high tenacity yarn. The face, back and edge layers protect the webbing from abrasion and weather. The center, or warp yarns, provide the strength. All Keeper webbing meets appropriate abrasion capacity requirements so you and your customers are assured of longer lasting products.

Componet Capacity	**The strength of each component of an assembly. e.g. Keeper P/N 04622, the ratchet begins to fail at 13,000 lbs., the hooks began to fail at 10,000 lbs., and the webbing breaks in excess of 12,000 lbs.**
Rated Capacity	**Also known as "assembly capacity" or "break strength" is the minimum load a complete assembly can withstand before failure in a laboratory pull test when the product is NEW. e.g. Keeper P/N 04622 the failure occurs in excess 0f 10,000 lbs.**
Working Load Limited	**The maximum weight of a load a tie-down should be subjected to during normal use. To assist the consumer in making the proper tie-down choice for the job, Keeper, the Web Sling Association and the Federal D.O.T. require the Working Load Limit to be 1/3 of the Rated Capacity. e.g. In Keeper P/N 04622 the working load limit is 3,333 lbs.**
	DON'T BE FOOLED!
The Webbing Makes a Difference	**Sewing Efficiency - As webbing is sewn it is weakened where it is pierced by the needle, reducing its strength by 10-20%.**
	D.O.T. and Web Sling Association require each tie-down manufacturer to certify the Rated Capacity (Break Strength) and Working Load Limit of each product by attaching a tag or stencil to the product.
	To obtain the full 10,000 lbs. capacity for a 2" x 27' tie-down, "2 Stripe" (12,000 lbs. break strength) webbing *must* be used. "1 Stripe" webbing would only yield a capacity of 8,000 - 9,000 lbs. because of the sewing efficiency.

Specifications

COMPONENT CAPACITY: The strength of each component of an assembly. e.g. Keeper P/N 04622, the ratchet begins to fail at 13,000 lbs., the hooks began to fail at 10,000 lbs., and the webbing breaks in excess of 12,000 lbs.

RATED CAPACITY: Also known as "assembly capacity" or "break strength" is the minimum load a complete assembly can withstand before failure in a laboratory pull test when the product is NEW. e.g. Keeper P/N 04622 the failure occurs in excess 0f 10,000 lbs.

WORKING LOAD LIMIT: The maximum weight of a load a tie-down should be subjected to during normal use. To assist the consumer in making the proper tie-down choice for the job, Keeper, the Web Sling Association and the Federal D.O.T. require the Working Load Limit to be 1/3 of the Rated Capacity. e.g. In Keeper P/N 04622 the working load limit is 3,333 lbs.

WEBBING MAKES A DIFFERENCE: DON'T BE FOOLED! Sewing Efficiency - As webbing is sewn it is weakened where it is pierced by the needle, reducing its strength by 10-20%. D.O.T. and Web Sling Association require each tie-down manufacturer to certify the Rated Capacity (Break Strength) and Working Load Limit of each product by attaching a tag or stencil to the product. To obtain the full 10,000 lbs. capacity for a 2" x 27' tie-down, "2 Stripe" (12,000 lbs. break strength) webbing must be used. "1 Stripe" webbing would only yield a capacity of 8,000 - 9,000 lbs. because of the sewing efficiency.

Keeper Ratchet Tie Down Straps - How It Works

Ratchet Operation

1. Place webbing over load and attach hooks to solid anchor points. 2. Insert webbing through ratchet reel and pull until ALL slack is out of webbing., 3. Pump ratchet handle to make webbing tight. Ratchet reel must have at least two layers of webbing wound around it. 4. CAUTION, too many layers of webbing will jam ratchet. If too much web is piling on ratchet reel, start procedure over, first removing ALL slack from webbing over load. 5. After load is secured, move handle down flat for transit. 6. To release, compress release bar and open handle 180 degrees.

View all Keeper

Accessory Items

Keeper Chrome Fold Away Cargo Cleats w/ Ha...

$25.95

Keeper Anchor Point Tie Downs

$19.99

More Rock'n Tie Down Straps

Keeper Axle Straps

Highland Ratchet Tie Down Straps

Keeper Over the Wheel Tie Down Straps

Keeper Cambuckle Tie Down Straps

Core Camlock Tie Down Straps

Fiberglass Pultruded

Products Brochure

Fibergrate
Composite Structures

High Performance Composite Solutions

Pultruded Products

Introduction

Combining corrosion resistance, long life and a low maintenance design, Safe-T-Span® pultruded grating is superior to conventional metallic gratings. This advanced grating is manufactured with a recessed tie bar configuration and is lightweight and easy to fabricate. Savings on labor and equipment often make the total installed cost of Safe-T-Span grating comparable to that of steel. This advanced pultruded grating is designed for use in a wide range of industrial applications that require strength and corrosion resistance. Manufactured with a high percentage of glass within the laminate, pultruded grating provides durability, extremely high unidirectional strength and stiffness. Due to its exceptional stiffness, it can be used with confidence where wide support spans are required. For most applications where it is used to replace steel grating, Safe-T-Span industrial grating rarely requires additional support. Combining its low cost of installation with low maintenance and long life, Safe-T-Span offers a life cycle cost that is significantly lower than that of its metal counterpart.

The Safe-T-Span line includes High Load Capacity (HI) grating for up to H20 vehicular loads, industrial grating for standard industrial loads and pedestrian grating for foot traffic. Specially designed gratings for barefoot traffic in the recreation industry are available in the Aqua Grate® line and several pultruded series meet ADA guidelines. Another pultruded product, Dynadeck® interlocking flooring is available to provide a solid-top flooring.

For additional niche products, check out the Fibergrate website under *Pultruded Products* for custom pultruded market gratings.

Safe-T-Span® Grating Resin Systems

ISOFR: Isophthalic polyester resin formulation with a low flame spread rating of 25 or less designed for applications where there is moderate exposure to corrosive elements. (DNV Type Approval Certificate No. F-16856)

VEFR: Vinyl ester resin system with a flame spread of 25 or less for dependable resistance to both acidic and alkaline environments.

PHENOLIC: A Coast Guard approved flame-resistant phenolic resin with an extremely low flame spread of 5 or less and a smoke index of 45 or less - designed primarily for the offshore industry. (Coast Guard approved for Level 2 performance criteria - Approval Number: 164.040/2/0; DNV Type Approval Certificate No. F-16856; ABS Product Type Approval Certificate No. 01-H534733-X)

Fibergrate Markets

- Architectural
- Bridge & Highway
- Chemical
- Commercial
- Food & Beverage
- Manufacturing
- Metals & Mining
- Microelectronics
- Oil & Gas
- Pharmaceutical
- Power
- Pulp & Paper
- Recreation
- Telecommunications
- Transportation
- Water & Wastewater

Fibergrate® Benefits

Corrosion Resistant: Fibergrate® pultruded fiberglass products are known for their ability to provide corrosion resistance in the harshest environments and chemical exposures.

Slip Resistant: The integrally applied grit surfaces of Fibergrate pultruded products have unmatched slip resistance for improved worker safety.

Low Maintenance: The corrosion resistant properties of FRP grating and other products reduce or eliminate the need for sandblasting, scraping and painting. Products are also easily cleaned with a high pressure washer.

Fire Retardant: Flame spread rating of 25 or less, as tested in accordance with ASTM E-84, and meets the self-extinguishing requirements of ASTM D-635.

High Strength to Weight Ratio: Less than one-half the weight of steel grating, allowing easy removal for access below floor level and installation with no heavy equipment and less manpower.

Electrically & Thermally Non Conductive: Fiberglass is electrically non conductive for safety and has low thermal conductivity which results in a more comfortable product when physical contact occurs.

Low Install Cost: Due to ease of fabrication and light weight, FRP pultruded grating eliminates the need for heavy lifting equipment.

Long Service Life: Fiberglass products provide outstanding durability and corrosion resistance in demanding applications, therefore providing improved product life over traditional materials.

UV Protection: UV inhibitors in the resin matrix, a synthetic surfacing veil, and grit top surface provide optimum protection from the structural effects of UV weathering. *(Phenolic resin grating does not have the UV inhibitor or veil and therefore must be coated for UV protection)*

NSF® Standard 61-Certified: Fibergrate is now able to offer Safe-T-Span® pultruded gratings assembled from NSF Standard 61-Certified components. These pultruded gratings complement the complete line of NSF Standard 61-Certified Fibergrate® molded gratings, Dynaform® fiberglass structural shapes, and Dynarail® FRP handrail and ladder systems. NSF Standard 61-Certified molded gratings are available in all Fibergrate® molded grating mesh patterns and thicknesses, except Ecograte® and 4 x 12 Micro-Mesh® panels.

Heavy Metal Safe: The EPA, OSHA and other regulatory agencies created to protect our lives and our natural resources have increased legislation to control heavy metals such as lead, chrome, cadmium and other metals in all products where exposure is a health threat. Fibergrate Composite Structures Inc. supports this strengthened legislation and has, for more than 20 years, voluntarily tested for heavy metals in our products and minimized or eliminated heavy metals from our products.

Table of Contents:

Grating Selection and Accessories

Safe-T-Span® Pultruded Industrial Series Grating

6" Tie Bar Spacing Standard										
Series	Panel Depth	Load Bar Spacing	Stocked Sizes		Load Bars/Ft.	Wt/ Sq. Ft.	Open Area	Resin/Color		
			Width	Length				ISOFR	VEFR	PHENOLIC*
I6010	1"	1-1/2"	3', 4'	8', 10', 12', 20', 24'	8	2.4 lbs	60%	Yellow	Dk Gray	—
I5010	1"	1.2"	3', 4'	8', 10', 12', 20', 24'	10	3.3 lbs	50%	Yellow	Dk Gray	—
I4010 ♿	1"	1"	3', 4'	8', 10', 12', 20', 24'	12	3.4 lbs	40%	Yellow	Dk Gray	—
I6015	1-1/2"	1-1/2"	3', 4'	8', 10', 12', 20', 24'	8	2.8 lbs	60%	Yellow	Dk Gray	Brown
I5015	1-1/2"	1.2"	3', 4'	8', 10', 12', 20', 24'	10	3.5 lbs	50%	Yellow	Dk Gray	—
I4015 ♿	1-1/2"	1"	3', 4'	8', 10', 12', 20', 24'	12	4.1 lbs	40%	Yellow	Dk Gray	Brown
T5020	2"	2"	3', 4'	8', 10', 12', 20', 24'	6	3.1 lbs	50%	Yellow	Dk Gray	—
T3320 ♿	2"	1-1/2"	3', 4'	8', 10', 12', 20', 24'	8	4.0 lbs	33%	Yellow	Dk Gray	—

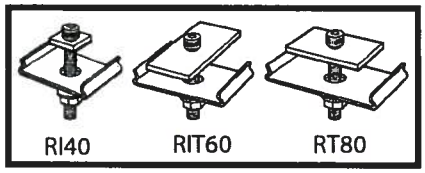
**Phenolic Grating also available with UV coating - Awning Red color*

Safe-T-Span® Pultruded Pedestrian Series Grating

12" Tie Bar Spacing Standard										
Series	Panel Depth	Load Bar Spacing	Stocked Sizes		Load Bars/Ft.	Wt/ Sq. Ft.	Open Area	Resin/Color		
			Width	Length				ISOFR	VEFR	PHENOLIC*
T3810	1"	2.4"	3', 4'	8', 10', 12', 20', 24'	5	1.9 lbs	38%	Dk Gray	Dk Gray	—
T2510 ♿	1"	2"	3', 4'	8', 10', 12', 20', 24'	6	2.3 lbs	25%	Dk Gray	Dk Gray	—
T1210 ♿	1"	1.7"	3', 4'	8', 10', 12', 20', 24'	7	2.7 lbs	12%	Dk Gray*	Dk Gray*	—
T3815	1-1/2"	2.4"	3', 4'	8', 10', 12', 20', 24'	5	2.7 lbs	38%	Dk Gray	Dk Gray	—
T2515 ♿	1-1/2"	2"	3', 4'	8', 10', 12', 20', 24'	6	3.2 lbs	25%	Dk Gray	Dk Gray	—
T1215 ♿	1-1/2"	1.7"	3', 4'	8', 10', 12', 20', 24'	7	3.6 lbs	12%	Dk Gray*	Dk Gray*	—

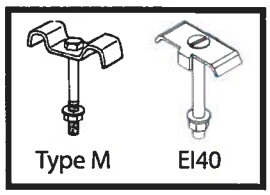
(5' widths and 8', 12' and 24' lengths available with extended lead times) For load/deflection information on pultruded grating, see tables in this brochure.
**Top surface of grating is light gray in color. Bottom of grating is dark gray.*

Clip Assemblies



Fibergrate's patented Type R Hold Down Clip Assembly of Type 316 stainless steel offers effective and easy installation of pultruded grating. Type R Hold Down Clips secure grating below the walking surface. *(RI40 for I4010 and I4015 grating • RIT60 for I6010, I6015 and T3320 grating • RT80 for T5020 grating • RT12 for T1210 and T1215 grating • RT25 for T2510 and T2515 grating)*

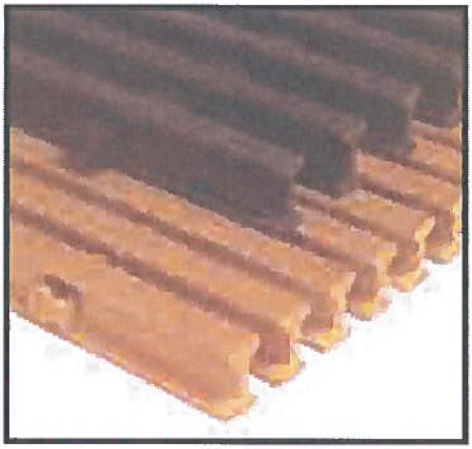
The T12 Spring Clip is designed for specialty applications where grating needs to be removed without removing the hardware. The grating is held securely in place below the surface, but can be released with a firm upward force. *(For the T12 Pultruded Grating Series)*



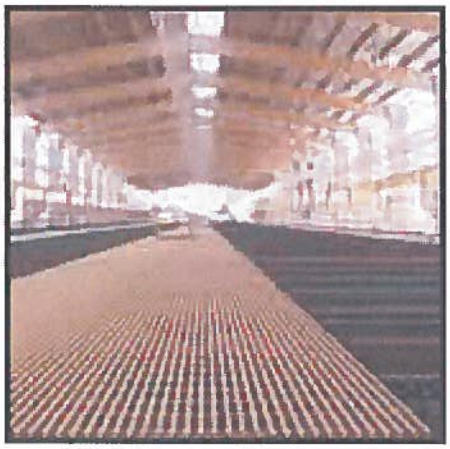
Fibergrate also offers Type M, W and E Hold Down Clip Assemblies for many types of pultruded grating. *(EI40 for I4010 and I4015 grating • MI60 for I6010 and I6015 grating • MT5020 for T5020 grating • MT3320 for T3320 grating • MT3810 for T3810 grating • MT3815 for T3815 grating • MHI47 Clip for HI47 grating • MI60 Clip for HI58 grating)*

Sealing Kits: To maintain corrosion resistance and structural integrity, Fibergrate offers standard resin sealing kits for protecting the exposed ends of cut panels and other components.

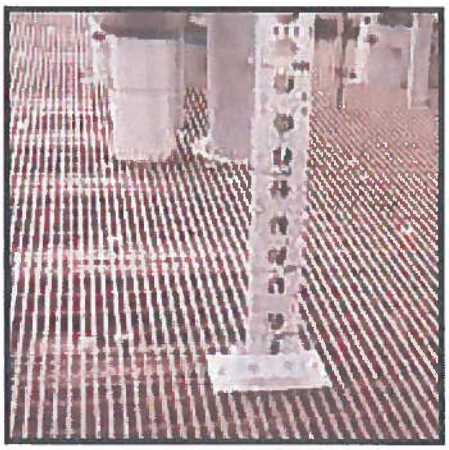
Safe-T-Span® Industrial Grating Details



I4010 & I6010 Grating



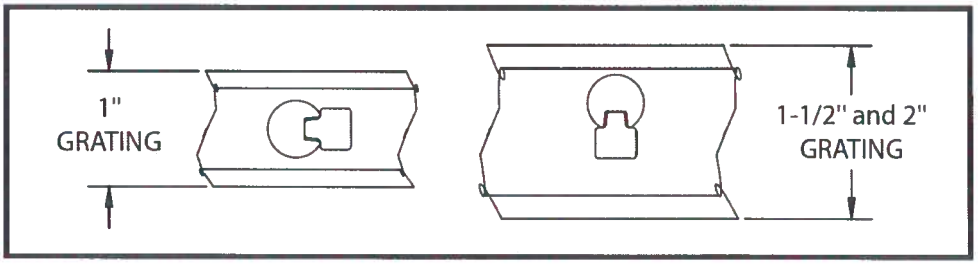
Copper Mining Facility

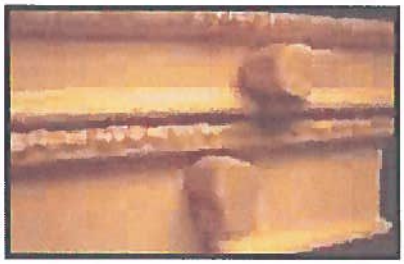


Offshore Oil & Gas Platform

Safe-T-Span industrial grating is available in 1", 1-1/4" and 1-1/2" depths in an I-bar configuration with 40%, 50% and 60% open areas. 2" depth T-bar configuration with 33% or 50% open area is also available for applications which require wider spans or lower deflections. *For details and load charts for 1-1/4" depth products, please visit our website at www.fibergrate.com > Products > Pultruded Grating > Custom Pultruded Gratings*

Tie Bar Representation



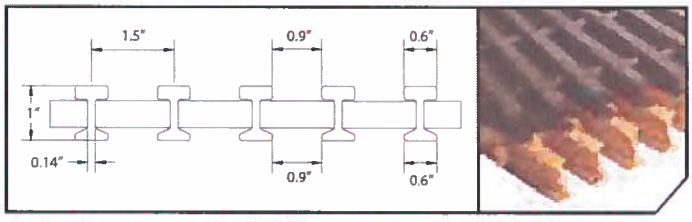


Grating Details

Refer to chart on page 4 for Grating Selection.

1" Deep I6010

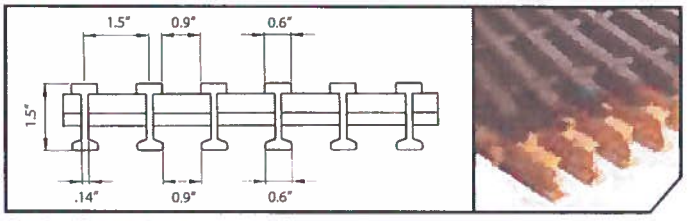
# of Bars/ Ft of Width	Load Bar Depth	Open Area	Load Bar Centers	Approximate Weight
8	1"	60%	1-1/2"	2.62 psf



Section Properties per Ft of Width: A = 2.64 IN² I = 0.33 IN⁴ S = 0.63 IN³
Average EI = 1,700,000 lb - in² (SPAN ≥ 24")

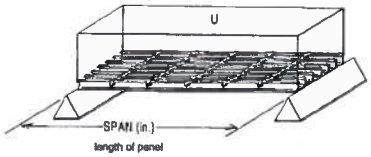
1-1/2" Deep I6015

# of Bars/ Ft of Width	Load Bar Depth	Open Area	Load Bar Centers	Approximate Weight
8	1-1/2"	60%	1-1/2"	2.83 psf



Section Properties per Ft of Width: A = 3.2 IN² I = 0.94 IN⁴ S = 1.2 IN³
Average EI = 4,600,000 lb - in² (SPAN ≥ 24")

Industrial Series Uniform Load Chart



IMPORTANT: Load information is different for Phenolic resin gratings. Please contact Fibergrate for Phenolic load information.

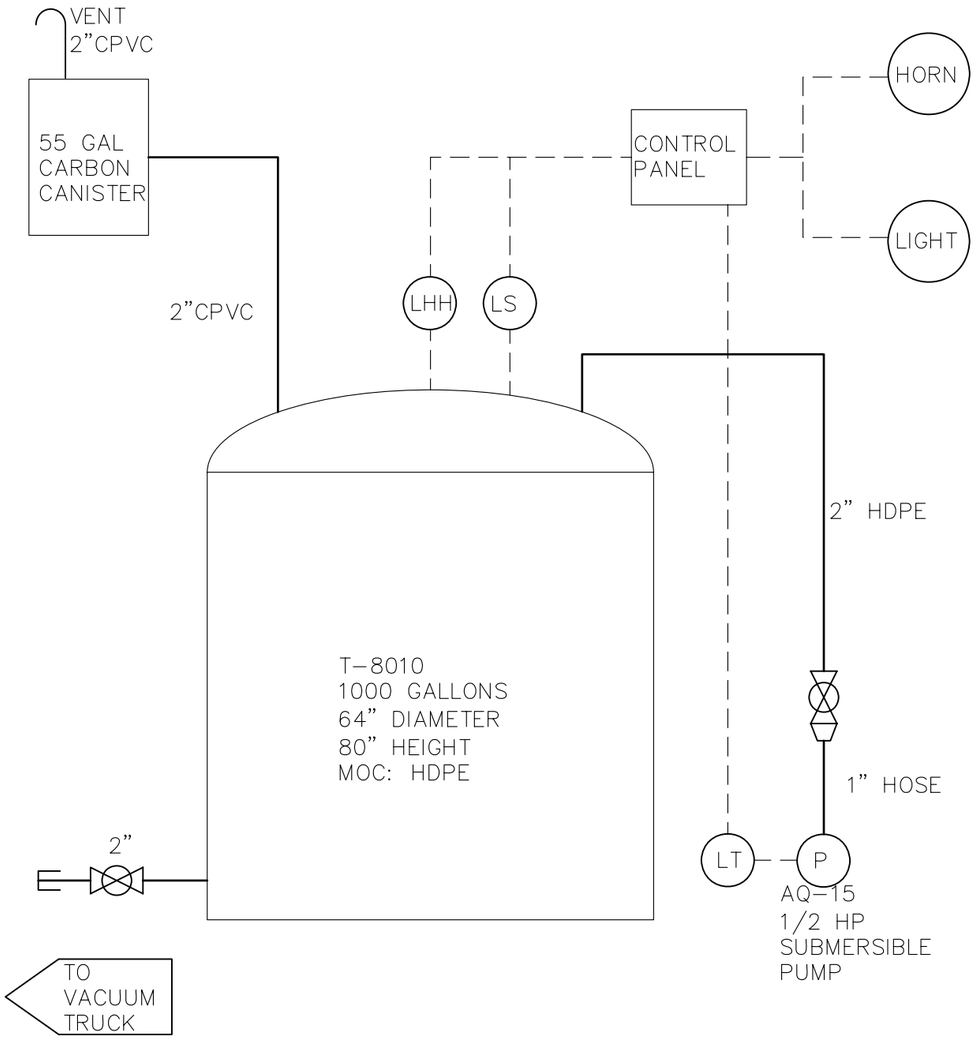
INDUSTRIAL SERIES SAFE-T-SPAN UNIFORM LOAD TABLE - DEFLECTIONS IN INCHES

CLEAR SPAN (in)	STYLE	LOAD (psf) 50	100	200	300	500	1000	2000	MAXIMUM RECOMMENDED LOAD (psf)	ULTIMATE CAPACITY (psf)
12	I6010	<.01	<.01	<.01	<.01	0.01	0.02	0.04	7140	14280
	I6015	<.01	<.01	<.01	<.01	<.01	0.01	0.02	15240	30480
	I5010	<.01	<.01	<.01	<.01	<.01	0.01	0.03	8920	17840
	I5015	<.01	<.01	<.01	<.01	<.01	<.01	0.01	19050	38100
	T5020	<.01	<.01	<.01	<.01	<.01	<.01	0.01	15120	30240
	I4010	<.01	<.01	<.01	<.01	<.01	0.01	0.02	10700	21400
	I4015	<.01	<.01	<.01	<.01	<.01	<.01	0.01	22860	45720
	T3320	<.01	<.01	<.01	<.01	<.01	<.01	0.01	20160	40320
18	I6010	<.01	0.01	0.02	0.02	0.04	0.08	0.16	4520	9040
	I6015	<.01	<.01	<.01	0.01	0.02	0.03	0.06	9820	19650
	I5010	<.01	<.01	0.01	0.01	0.03	0.06	0.12	5640	11290
	I5015	<.01	<.01	<.01	<.01	0.01	0.02	0.04	12280	24560
	T5020	<.01	<.01	<.01	<.01	0.01	0.02	0.05	10080	20160
	I4010	<.01	<.01	0.01	0.02	0.03	0.05	0.11	6770	13540
	I4015	<.01	<.01	<.01	<.01	0.01	0.02	0.04	14740	29490
	T3320	<.01	<.01	<.01	<.01	0.01	0.02	0.04	13440	26880
24	I6010	0.01	0.02	0.05	0.07	0.12	0.24	—	2840	5680
	I6015	<.01	0.01	0.02	0.03	0.04	0.09	0.17	4880	9760
	I5010	<.01	0.01	0.04	0.05	0.09	0.19	—	3550	7100
	I5015	<.01	<.01	0.01	0.02	0.03	0.07	0.13	6100	12200
	T5020	<.01	<.01	<.01	0.02	0.03	0.05	0.11	5940	11880
	I4010	0.01	0.02	0.03	0.05	0.08	0.16	0.31	4260	8520
	I4015	<.01	<.01	0.01	0.02	0.03	0.06	0.11	7310	14620
	T3320	<.01	<.01	<.01	0.01	0.02	0.04	0.08	7920	15840
30	I6010	0.03	0.05	0.11	0.16	0.27	—	—	1840	3680
	I6015	0.01	0.02	0.04	0.06	0.10	0.20	0.41	3600	7200
	I5010	0.02	0.04	0.08	0.12	0.21	0.44	—	2300	4600
	I5015	<.01	0.01	0.03	0.04	0.08	0.16	0.32	4500	9000
	T5020	<.01	0.01	0.02	0.03	0.06	0.13	0.25	4160	8320
	I4010	0.02	0.04	0.07	0.11	0.18	0.36	—	2760	5520
	I4015	<.01	0.01	0.03	0.04	0.07	0.14	0.27	5400	10800
	T3320	<.01	0.01	0.02	0.03	0.05	0.09	0.19	5540	11080
36	I6010	0.05	0.10	0.21	0.31	—	—	—	1310	2620
	I6015	0.02	0.04	0.08	0.11	0.19	0.38	—	2500	5000
	I5010	0.04	0.08	0.16	0.24	—	—	—	1640	3280
	I5015	0.01	0.03	0.06	0.08	0.15	0.30	—	3120	6240
	T5020	0.01	0.02	0.05	0.07	0.12	0.23	0.47	2880	5760
	I4010	0.03	0.07	0.14	0.21	0.35	—	—	1960	3930
	I4015	0.01	0.03	0.05	0.08	0.13	0.25	0.50	3750	7500
	T3320	0.01	0.02	0.04	0.05	0.09	0.18	0.35	3840	7680
42	I6010	0.09	0.19	0.37	—	—	—	—	950	1900
	I6015	0.04	0.07	0.14	0.21	0.35	—	—	1840	3680
	I5010	0.07	0.15	0.29	0.44	—	—	—	1190	2380
	I5015	0.03	0.05	0.11	0.16	0.28	—	—	2300	4600
	T5020	0.02	0.05	0.09	0.14	0.23	0.45	—	2120	4240
	I4010	0.06	0.12	0.25	0.37	—	—	—	1430	2860
	I4015	0.02	0.05	0.09	0.14	0.23	0.47	—	2760	5520
	T3320	0.02	0.03	0.07	0.10	0.17	0.34	—	2820	5650
48	I6010	0.14	0.29	—	—	—	—	—	720	1440
	I6015	0.06	0.11	0.23	0.34	—	—	—	1410	2820
	I5010	0.11	0.23	0.45	—	—	—	—	900	1800
	I5015	0.04	0.08	0.18	0.27	0.45	—	—	1760	3520
	T5020	0.04	0.07	0.14	0.21	0.36	—	—	1620	3240
	I4010	0.10	0.19	0.38	—	—	—	—	1080	2160
	I4015	0.04	0.08	0.15	0.23	0.38	—	—	2110	4220
	T3320	0.03	0.05	0.11	0.16	0.27	—	—	2160	4320
54	I6010	0.25	—	—	—	—	—	—	570	1140
	I6015	0.10	0.19	0.39	—	—	—	—	1110	2220
	I5010	0.20	0.40	—	—	—	—	—	710	1420
	I5015	0.08	0.15	0.31	0.46	—	—	—	1380	2770
	T5020	0.06	0.12	0.24	0.36	—	—	—	1280	2560
	I4010	0.17	0.34	—	—	—	—	—	850	1700
	I4015	0.06	0.13	0.26	0.39	—	—	—	1670	3340
	T3320	0.04	0.09	0.18	0.27	0.45	—	—	1680	3360
60	I6010	0.42	—	—	—	—	—	—	460	920
	I6015	0.15	0.31	—	—	—	—	—	900	1800
	I5010	0.33	—	—	—	—	—	—	570	1150
	I5015	0.12	0.24	0.49	—	—	—	—	1120	2250
	T5020	0.09	0.18	0.36	—	—	—	—	1040	2080
	I4010	0.28	—	—	—	—	—	—	690	1380
	I4015	0.10	0.21	0.41	—	—	—	—	1350	2700
	T3320	0.07	0.14	0.27	0.41	—	—	—	1360	2720
72	I6015	0.34	—	—	—	—	—	—	630	1260
	I5015	0.27	—	—	—	—	—	—	780	1570
	T5020	0.18	0.35	—	—	—	—	—	720	1440
	I4015	0.23	0.45	—	—	—	—	—	940	1880
	T3320	0.13	0.26	—	—	—	—	—	950	1900

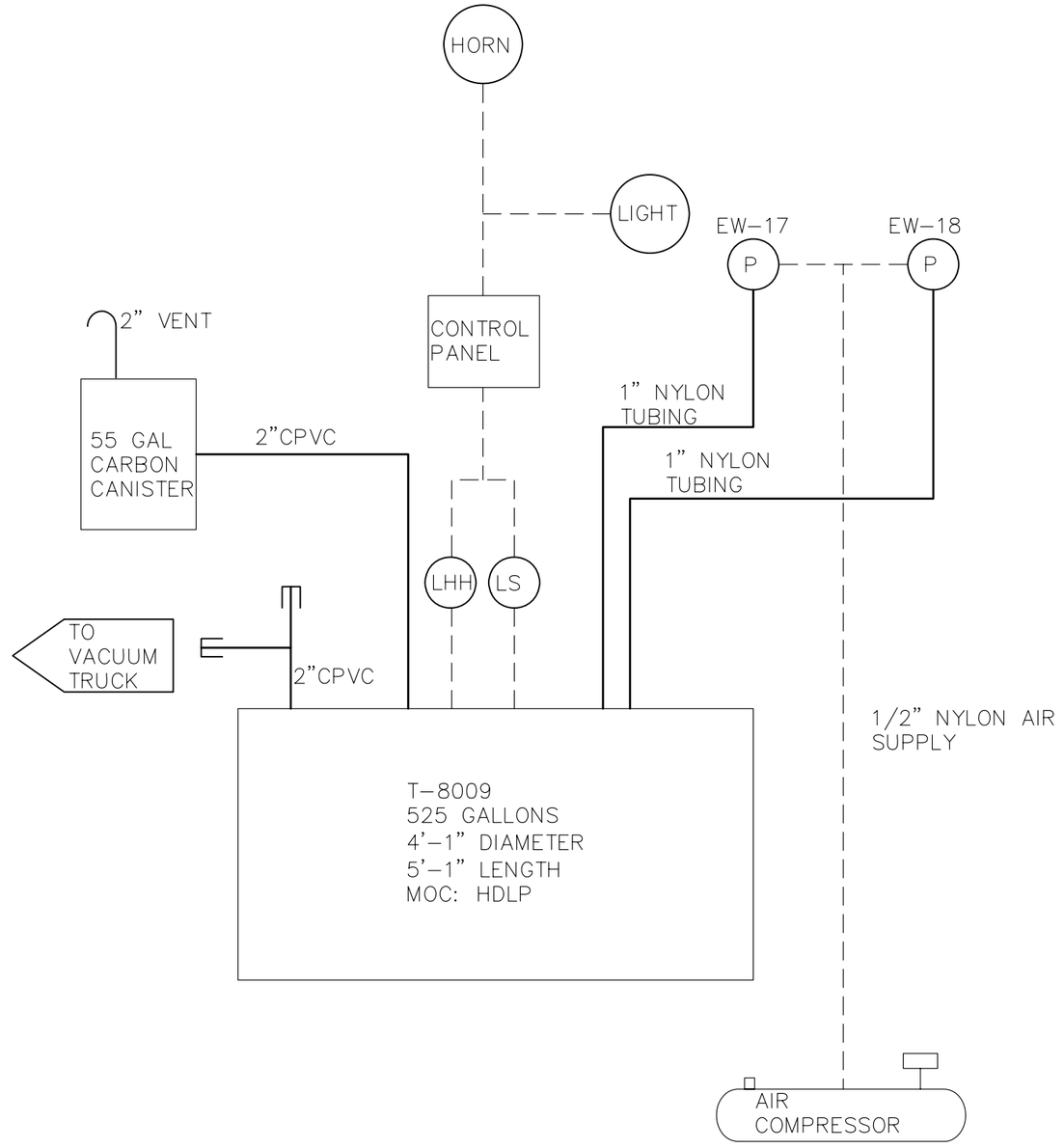
NOTES:
1. The designer should not exceed the MAX RECOMMENDED LOAD at any given span. MAX RECOMMENDED LOAD represents a 2.1 factor of safety on ULTIMATE CAPACITY.
2. ULTIMATE CAPACITY represents a complete and total failure of the grating. Values are provided to illustrate the reserve strength of the grating at a given span and are NOT to be used for design. Functionality of grating is limited to MAX RECOMMENDED LOAD.
3. Walking loads, typically 50-65 PSF maximum are recommended for pedestrian traffic. Deflections for worker comfort are typically limited to the lesser of 3/8" or CLEAR SPAN divided by 125; for a firmer feel, limit deflection to the lesser of 1/4" or CLEAR SPAN divided by 200.
4. The allowable loads in this table are for STATIC LOAD CONDITIONS at ambient temperatures only. Allowable loads for impact or dynamic conditions should be a maximum of ONE-HALF the values shown. Long term loads will result in added deflection due to creep in the material and will also require higher safety factors to ensure acceptable performance. For applications at elevated temperatures, consult factory. The designer is further referenced to the ASCE Structural Plastics Design Manual.
5. All gratings were tested in accordance with the proposed standard of the Fiberglass Grating Manufacturers Council of the American Composites Manufacturers Association (ACMA).

APPENDIX C

PROCESS AREA III PROCESS AND INSTRUMENTATION DIAGRAM



PROCESS AREA III
(SOUTH OF TRAILER PARK AREA)



PROCESS AREA IV
(T.O. BUILDING)

REVISION	NO.	BY	DATE

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.

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PROJECT NO:	12-7008
SCALE:	NOT TO SCALE
DWG:	D08A-12-7008-C-GWA-SHT8A.dwg
DRAWN BY: JCD	CHECKED BY: BDS
DATE:	APRIL 2012

TITLE: GROUNDWATER PUMPING SYSTEM PA III AND PA IV
PROCESS AND INSTRUMENTATION DIAGRAM

PROJECT: CWM FACILITY P&ID UPDATES

PREPARED FOR: CWM CHEMICAL SERVICES, LLC. MODEL CITY FACILITY

TOWN OF PORTER | COUNTY OF NIAGARA | STATE OF NEW YORK

DRAWING
C-GWA
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