Former Cibro Petroleum Terminal Site
Brownfield Cleanup Program Site No. C130153
Brownfield Cleanup Agreement Index No. W1-1075-05-09
Island Park, Nassau County, New York

REMEDIAL WORK PLAN

Submitted to
New York State Department of Environmental Conservation.
Region 1, Stony Brook, New York

Prepared for
Posillico Development Company at Harbor Island, Inc.
1750 New Highway
Farmingdale, New York 11735

Prepared by:
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1430 Broadway, 10th Floor
New York, New York 10018
Phone: (212) 221-7822
TRC Project Number: 163189

August 2012
Revision 1: October 2013

CERTIFICATIONS

I, Steven D. Meersma, am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for the Former Cibro Petroleum Terminal Site New York State Department of Environmental Conservation ("NYSDEC") Brownfield Cleanup Agreement ("BCA") Index No. W1-1075-05-09, Brownfield Cleanup Program ("BCP") Site No. C130153.

I certify that the BCP Site C130153 descriptions presented in this Remedial Work Plan ("RWP") are identical to the descriptions presented in the BCA and related amendments for the site.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for operation and maintenance requirements applicable to the BCP Site C130153. This RWP requires that a Site Management Plan must be submitted, for approval by the NYSDEC, by Posillico Development Company at Harbor Island, Inc. ("PDC") (the "Applicant") for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the BCP Site C130153, including the proper maintenance of all remaining monitoring wells. I certify that this RWP has a plan for transport and disposal of soil, fill, fluids, and other material removed from the property under this plan, and that transport and disposal under my direction will be performed in accordance with all local, State, and Federal laws and requirements. To the extent it is under my control, exported material will be taken to facilities licensed to accept this material in full compliance with all local, State, and Federal laws.

I certify that this RWP has a plan for import of soil and other material and that, activities of this type will be in accordance with all local, State, and Federal laws and requirements.

I certify that that this RWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, and odor suppression plan and that such plan is sufficient to control dust and odors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

CERTIFICATIONS (Continued)

076572	10/31/13	
NYS Professional Engineer #	Date	Signature

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by the New York State licensed engineer identified above in accordance with Section 7209(2), Article 130 of the New York State Education Law.

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3.5 Development of Remedial Alternatives

Three remedial alternatives, consistent with the 6 NYCRR Subpart 375-3 Brownfield Cleanup Program requirements, have been developed for analysis. Descriptions of the alternatives are presented below.

Remedial Alternative 1, Unrestricted Use: Remove Contaminated Soil with Contingent In-Situ Groundwater Treatment and Short-Term Institutional Controls Related to Groundwater

Alternative 1 consists of the excavation and removal of all soil, which exceeds NYSDEC BCP Track 1 Unrestricted Use Soil Clean-up Objectives including petroleum-impacted and PCB-impacted soil. Based on the data presented in the historic remedial investigations, the estimated volume requiring removal for Alternative 1 is approximately 128,000 tons (approximately 80,000 cubic yards in-place volume) of petroleum-impacted soil and 300 tons (approximately 187 cubic yards in-place volume) of PCB-impacted soil.

Existing stockpiles of recycled concrete aggregate and soil, concrete tank containments and foundation slabs, and the anecdotal 3,000-gallon underground storage tank ("UST") present on the Site would be removed. The existing bulkhead would be removed and a new bulkhead would be constructed in conjunction with contaminated soil removal. During remedial construction, controls would be in place to minimize the potential for exposure of workers, the surrounding community, and surface water receptors to contaminants. Controls would be implemented in accordance with a HASP, a Community Air Monitoring Plan ("CAMP"), and a Storm Water Pollution Prevention Plan ("SWPPP"). Following remedial activities, the Site would be backfilled to final grade using Clean Fill.

If monitoring of groundwater following source removal indicates the presence of contaminated groundwater, in-situ treatment will be completed. Additional monitoring and in-situ treatment, if necessary would be required to demonstrate the reduction in groundwater contaminants following source removal.

Consideration of this Alternative 1 satisfies the 6 NYCRR Part 375 requirement of evaluating at least one remedial alternative pursuant to Track 1 (Unrestricted Use).

Remedial Alternative 2: Ex-Situ Treatment Using Chemical Oxidation or Removal of Contaminated Soil to Proposed Track 4 Site-specific Soil Clean-up Objectives ("SSSCOs") with Engineering and Institutional Controls

Alternative 2 consists of the excavation and removal of soil that exceeds the proposed Track 4 SSSCOs and treating the soil using chemical oxidation to reach the SSSCOs. Alternatively, based on the data presented in the historic remedial investigations, the estimated volume of petroleum-impacted soil requiring removal for this alternative is estimated to be approximately 47,000 cubic yards (in-place volume) or 75,000 tons. No PCB-impacted soil would be removed under this alternative. Refer to Figure RWP-10, which shows the estimated extent of excavation required.

This Alternative was subsequently found to be unfeasible when a bench test conducted to obtain design parameters (see ahead) showed that the SSSCOs would not be met. Therefore, Alternative 2 is not considered in the Alternatives Analysis.

Remedial Alternative 3: Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 Site-specific Soil Clean-up Objectives ("SSSCOs") with Engineering and Institutional Controls

Alternative 3 consists of the excavation of soil that exceeds the proposed Track 4 SSSCOs, and treatment using soil washing with reuse of soil that meets the SSSCOs. Grossly contaminated soil and soil that exceeds the SSSCOs after treatment will be disposed offsite at a licensed facility. Based on the data presented in the historic remedial investigations, the estimated volume of petroleum-impacted soil requiring removal for this alternative is estimated to be approximately 47,000 cubic yards (in-place volume) or 75,000 tons. No PCB-impacted soil would be removed under this alternative. Refer to Figure RWP-10, which shows the estimated extent of excavation required.

The NYSDEC commented and conditionally approved a draft RWP that was submitted to them in August 2012. Their comments were in a January 16, 2013 letter. On September 10, 2013, the response to that letter was sent to the NYSDEC after the results of a bench test conducted from September 2012 through July 2013 to obtain design data for the remedial process were obtained. The September 10, 2013 letter reported that the bench test showed chemical oxidation wasn't feasible, whereas soil washing did achieve the SSSCOs. The soil washing process was explained in the letter and presented to the NYSDEC at a September 13, 2013 meeting.

NYSDEC questions raised at the September meeting were answered in a September 16, 2013 letter. Appendix H contains the three letters and the Bench Test Report, all of which provide additional information describing this remedial alternative. The August 2012 draft RWP has been revised to include the soil washing alternative.

The soil washing process consists of mechanical and hydraulic grain size separation, removing the petroleum from the soil granules using surfactants and mechanical abrasion, and hydraulic sorting of the untreatable fraction of soil for subsequent disposal at a licensed facility.

Existing stockpiles of recycled concrete aggregate and soil will be sorted prior to sampling and screening against SSSCOs under this alternative. If concentrations in the soil are detected above the SSSCOs, the soil will be treated as described below. Soil that meets the SSSCOs will be reused as backfill during Site restoration. Concrete tank containments and foundation slabs and the anecdotal UST present in the Site would be removed. As described above, the existing bulkhead would be removed and a new bulkhead would be constructed. After bulkhead replacement, soil will be excavated as shown in Appendix H. The excavated material will be treated through ~~chemical oxidation~~ for placement as reusable backfill if the timeframe to reduce the contamination to the SSSCOs does not impede the construction schedule. Otherwise the excavated material will be transported and disposed of off-Site. Groundwater extracted during excavation (i.e., for dewatering) would be treated prior to discharge in accordance with applicable surface water discharge requirements.

During remedial construction, controls would be in place to minimize the potential for exposure of on-site workers, the surrounding community, and surface water receptors to contaminants. The controls would be implemented in accordance with a HASP and a SWPPP.

Institutional and engineering controls are included in this alternative and would consist of the controls set forth in Sections 7.0 and 8.0 of this RWP.

3.6 Comparative Evaluation of Remedial Alternatives

This section compares the remedial alternatives to the remedy selection factors in accordance with the requirements of 6 NYCRR 375-1.8(f). Based on the results of the comparative analysis, a remedial plan will be selected.

3.6.1 Overall Protectiveness of Public Health and the Environment

The implementation of Alternative 1 – Removal of Contaminated Soil for Unrestricted Use would be protective of public health and the environment through the removal of all contaminated soil, removal of soil/concrete stockpiles, tank containments and foundation slabs and UST, and a reduction in groundwater contamination resulting from source removal and dewatering during soil excavation.

During remedial construction, on-site workers and the surrounding community would be protected from exposure to Site-related contaminants through the implementation of health and safety protocols, and adherence to community air monitoring plans.

Alternative 3 - Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 SSSCOs with Engineering and Institutional Controls would be protective of public health and the environment through the removal of approximately 47,000 cubic yards (in-place volume) or 75,000 tons of impacted soil, removal of soil/concrete stockpiles, tank containments and foundation slabs and UST, and the implementation of engineering and institutional controls including the cover system, the SSDEs, and environmental easements. As described with respect to Alternative 1, under Alternative 3 groundwater contaminant mass would be reduced by source removal during excavation.

Also, under Alternative 3, during construction, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of health and safety protocols and adherence to a work site monitoring plan.

Both alternatives would provide overall protection of public health and the environment. Although impacted soil would remain in place beneath the cover system under Alternative 3, the use of engineering and institutional controls would minimize the potential for exposure to site-

related contaminants. Therefore, both alternatives would be protective of human health and the environment.

3.6.2 Conformance to Standards, Criteria and Guidance

Alternative 1 – Removal of Contaminated Soil for Unrestricted Use would satisfy the remedial action objectives (described in Section 3.2) and the SCGs (described in Section 3.3) developed for the Site. Soil which exceeds BCP Track 1 Soil Cleanup Objectives, soil/concrete stockpiles, tank containment and foundations, and UST would be removed, and groundwater would be treated via dewatering during excavation.

Alternative 3 – Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 SSSCOs with Engineering and Institutional Controls would satisfy the RAOs and SCGs developed for BCP Sites. Impacted soil exceeding the numerical Track 4 SSSCOs will be excavated to the depth at which sheeting or dewatering is not required. In addition, soil/concrete stockpiles, tank containment and foundations, and the UST would be removed, and groundwater would be treated via dewatering during excavation. Institutional and engineering controls included as a part of Alternative 3 would protect future Site users consistent with the RAOs and SCGs.

Under both alternatives, applicable environmental and health and safety laws and regulations would be complied with, and waste would be managed and disposed in accordance with applicable laws and regulations. In summary, both alternatives proposed would conform to the RAOs and SCGs applicable to remediation of the Site.

3.6.3 Long-Term Effectiveness and Permanence

Alternative 1 - Removal of Contaminated Soil for Unrestricted Use would be a long-term effective and permanent alternative since all contaminated soil above BCP Track 1 SCOs would be removed, soil/concrete stockpiles, tank containment and foundation, and UST would be removed, and groundwater would be treated during dewatering. As a contingency, in-situ treatment of the groundwater may be completed after source removal. Reliance on long-term engineering controls would not be required after implementation, because all impacted material would be removed.

Alternative 3 – Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 SSSCOs with Engineering and Institutional Controls would be an effective and permanent alternative for the BCP Site. The removal of approximately 47,000 cubic yards (in-place volume) or 75,000 tons of impacted soil, soil/concrete stockpiles, tank containments and foundations, and UST represents an effective and permanent remedy. The remaining

excavations would be backfilled with approved fill. The Site (excluding the protected wetlands) will be covered with a cover system consistent with 6 NYCRR Part 375-3.8(e)(4)(iii) consisting either of structures such as buildings, pavement and sidewalks comprising the Site development, or a Clean Fill Cover Layer in areas where the two feet of exposed surface soil exceeds the applicable SSSCOs.; and vapor barriers and SSDEs would be installed beneath buildings. Therefore, potential for exposure to remaining soil would be minimized by long-term engineering controls. The use of institutional controls would serve to further minimize potential future exposure pathways over the long term.

Even though soil with contaminant concentrations exceeding the Track 1 SCOs would remain under Alternative 3, the use of engineering and institutional controls would eliminate significant potential for exposure to site-related contaminants. Therefore, both alternatives represent long-term effective and permanent remedies for the Site that are protective of human health and the environment.

3.6.4 Reduction in Toxicity, Mobility or Volume of Contamination

The implementation of Alternative 1 - Removal of Contaminated Soil for Unrestricted Use would reduce the toxicity, mobility, and volume of contamination by removing soil with contaminant concentrations above BCP Track 1 SCOs, removing soil/concrete stockpiles, tank containment and foundation, and UST, and the extraction and treatment of groundwater during excavation. The toxicity and mobility of the soil removed from the Site would be reduced by management at appropriate permitted off-site disposal facilities.

The implementation of Alternative 3 - Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 SSSCOs with Engineering and Institutional Controls would reduce the toxicity, mobility, and volume of contamination by removing an estimated 47,000 cubic yards (in-place volume) or 75,000 tons of impacted soil, soil/concrete stockpiles, tank containment and foundation, and UST, and the extraction and treatment of groundwater during excavation. The toxicity and mobility of the soil removed would be reduced by management at permitted off-site treatment and disposal facilities.

Although both alternatives would serve to reduce the toxicity, mobility, and volume of contamination, Alternative 1 would be more effective since the volume of impacted soil removed would be larger and the volume of groundwater extracted, as a result of the additional excavation, would be greater.

3.6.5 Short-term Impacts and Effectiveness

Potential short-term impacts to the community associated with implementation of Alternative 1 include increased construction noise, increased truck traffic, and the potential creation of objectionable odors, vapors, and/or dust. Potential short-term impacts to on-site workers associated with Alternative 1 include exposure to site-related contaminants and physical hazards associated with working around heavy equipment and large excavations. It is estimated that the remedial phase of Alternative 1 could be completed in 24 months, based on availability of trucking and disposal facility capacity.

During the construction phase for Alternative 1, short-term impacts to the community would be minimized through remediation phase controls such as implementation of an enhanced community air monitoring plan, use of soil erosion controls and adherence to pre-approved truck routes. Decontamination of vehicles and equipment prior to leaving the Site would minimize the potential for off-site soil migration during remediation. Short-term exposures to on-site workers would be minimized through implementation of and adherence to a site-specific health and safety plan, which would establish procedures and personal protective equipment requirements for site work.

The implementation of Alternative 3 represents the potential for similar short term impacts and would include the same impact mitigation strategies as those described for Alternative 1 since both remedies are similar and differ only in the quantity of soil to be removed and the duration of the work. It is estimated that under Alternative 3 on-site remedial activities could be completed in approximately 14 months. The shorter duration of Alternative 3, compared to Alternative 1, represents corresponding decreases in the impacts to the surrounding community, including decreased construction noise, decreased truck traffic, and lower potential for creation of objectionable odors, vapors, and/or dust.

In summary, both alternatives would be effective in the short term, through the removal of contaminated soil, and additionally through the implementation of engineering and institutional controls under Alternative 3. Adherence to appropriate controls would minimize potential short-term impacts to the surrounding community and on-site workers. However, the potential for short-term impacts to the community and on-site workers during construction activities associated with Alternative 1 is greater than with Alternative 3, due to the extended remedial construction timeframe and volume of soil requiring removal.

3.6.6 Implementability

Alternative 1 can be implemented with standard construction techniques, using widely available construction equipment and materials. However, removal of all contaminated soil with contaminant concentrations exceeding Track 1 SCOs may require excavations 15 feet deep to the top of peat in limited areas in the southern portion of the Site; therefore, additional sheeting (for support of deep excavation sidewalls) would be required for Alternative 1. It is expected that required permits, such as NYSDEC SPDES permits, could be obtained in acceptable time frames.

Alternative 3 also can be implemented with standard construction techniques, using widely available equipment and materials. Additional specialized equipment and materials would not be required and it is expected permits would be obtained in an appropriate time frame.

Therefore, due to the need for specialized equipment and the complications of performing excavations up to 15 feet in depth and eight feet below the mean tide, Alternative 1 would be more difficult to implement than Alternative 3.

3.6.7 Cost Effectiveness

Cost estimates were prepared for both alternatives based on recent bids for remediation projects and communications with remedial contractors, material suppliers, waste transporters, and disposal facilities. Remedial Alternative 1 is estimated to cost $16,000,000. Remedial Alternative 3 is estimated to cost $9,400,000.

The cost of Alternative 1 is significantly higher than Alternative 3 due to the larger volume of soil removal and disposal required under Alternative 1.

3.6.8 Community Acceptance

Both alternatives would entail excavation of contaminated soil and the implementation of a remediation phase site management plan to minimize the potential for off-site migration of dust, which would promote community acceptance. However, the extended remedial timeframe and larger volume of soil requiring removal under Alternative 1 elevates the potential for impacts to the community from increased truck traffic and fugitive odors and vapors. Since Alternative 3 has a shorter remedial timeframe, it is likely that this alternative would be more acceptable to the community.

Public comments that are provided during the public comment period on this Remedial Work Plan will be evaluated, and this RWP may be modified as appropriate in response to comments.

3.6.9 Land Use

The contemplated use of the Site is the development of residential buildings with associated clubhouse, courtyards, roads, and utility corridors. Both remedial alternatives allow for this future planned development by removal of contaminated soils, extraction, and treatment of contaminated groundwater during excavation and under Alternative 3 implementation of institutional and engineering controls to minimize the potential for impacts from the Site to future users.

Additional land use factors such as accessibility to infrastructure, proximity to cultural resources, population growth patterns and projections, and proximity to natural resources have been taken into consideration as part of the development plans for the Site and are not considered to be inconsistent with the remedial alternatives and the planned future use of the Site.

Citizens' participation in connection with the Remedial Work Plan and planned future use of the Site will be described in a Citizens Participation Plan.

3.7 Selection of the Preferred Remedy

Both of the remedial alternatives evaluated would be protective of human health and the environment, provide a long term and effective remedy for the Site, and allow for future development. However, Remedial Alternative 1 would result in greater potential short term impacts to the community due to the longer remedial time frame and larger volume of soil removed, would be more difficult to implement due to the greater excavation depths, and is less cost effective when compared to the other remedial alternative. Although Alternative 1 would be more effective in reducing the volume of contaminants at the Site, it would not provide significant additional protection of human health or the environment.

Therefore, based on the evaluation of the remedial alternatives against the nine remedy selection factors in accordance with the requirements of 6 NYCRR 375-1.8(f), Remedial Alternative 3 is the selected remedy for the Site. Remedial Alternative 3, Ex-Situ Treatment Using Soil Washing or Removal of Contaminated Soil to Proposed Track 4 SSSCOs with Engineering and Institutional Controls, satisfies the remedial action objectives for the Site and will be protective of human health and the environment.

The following land use factor evaluation examines whether the alternative is acceptable based on the following criteria (below) as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415. This evaluation applies to the preferred alternative and is addressed in the bulleted items below:

- Zoning – The planned end use for the Site is in conformance with the current zoning for the property.
- Applicable comprehensive community master plans or land use plans – The Supplemental Environmental Studies to the Environmental Assessment Form ("SES") dated December 2006 included discussions of the proposed use with applicable land use plans.
- Surrounding property uses – Residential properties border the Site to the north and northwest, and an operating marina borders the site to the southwest as shown on Figure RWP-3. Figure RWP-3 also identifies schools, residential areas, surface waters, marshland, and sensitive receptors in the surrounding area.
- Citizen participation – Refer to Section 4.1.6 Community Participation Plan.
- Environmental justice concerns – No environmental justice concerns were identified by or studied as part of the Supplemental Environmental Studies to the Environmental Assessment Form dated December 2006.
- Land use designations – See zoning and surrounding property descriptions above.
- Population growth patterns – The impact of the project on population and housing characteristics were studied as part of the SES. No mitigation measures regarding population and housing characteristics were included in the SES.
- Accessibility to existing infrastructure – The impact of the project on existing infrastructure was studied as part of the SES, specifically impacts to public schools, community facilities and services, open space, water supply and wastewater treatment, solid waste and sanitation issues, energy, traffic, and transportation. The findings of the study are detailed in the SES and the planned project will be in conformance with the mitigation measures required by the SES.
- Proximity to cultural resources – No cultural resources within immediate proximity of the Site were identified in the SES.
- Proximity to natural resources – The nearest water bodies abutting the Site include: Island Park Canal, Wreck Lead Channel, and Simmons Hassock Creek. The on-site groundwater is not used as a source of potable water.
- Off-Site groundwater impacts – Potential off-site impacts to groundwater will be addressed by on-Site source removal.
- Proximity to floodplains – The Site is primarily located in Flood Zone AE which is within the 100-year flood zone. A small portion of the northwest corner is in Flood Zone X which is within the 500-year flood zone.
- Geography and geology of the Site – Refer to Section 2.4 Geological Conditions.
- Current Institutional Controls – Currently there are no institutional controls for the Site. Following the completion of remediation, an environmental easement or deed restriction will be in place as described in Section 8.1.

3.8 Summary of Selected Remedial Actions

Remedial activities will be performed in accordance with this RWP. The following activities will be performed to achieve the remedial objectives:

1. Implementation of the soil erosion and sediment control plan consistent with the Stormwater Pollution Prevention Plan ("SWPPP");

2. Implementation of a site-specific HASP during remediation, development and future maintenance activities when soil gas, soil or groundwater could become exposed. The HASP will establish procedures for the protection of on-site workers and off-site residents and workers;
3. Sorting and sampling of existing stockpiles of recycled concrete aggregate and soil. Soil with concentrations detected above the Site-specific Soil Cleanup Objective ("SSSCOs") will be either treated on-site or transported off-site for disposal;
4. Removal of concrete tank containments and foundation slabs and the anecdotal 3,000-gallon UST;
5. Investigation of areas under and immediately adjacent to the tank foundation slabs following their removal;
6. Partial removal of existing bulkhead and adjacent soils to allow construction of new bulkhead. Sediment sampling of the channel will also be completed prior to the bulkhead work;
7. Excavation of soil at concentrations above the SSSCOs to the maximum depth at which shoring, dewatering, or disruption of the peat layer are not required and either on-site treatment or off-site transportation and disposal of soil exceeding the numeric SSSCOs. Reasonable efforts will be made in each case to extend excavations to depths that achieve the SSSCOs. Excavation of soil with contaminant levels exceeding numeric SSSCOs may not be achievable below certain depths in the water table due to engineering and health and safety issues;
8. Post-excavation sampling to evaluate performance of the remedy;
9. Backfilling and restoration with reusable material in compliance with the Track 4 SSSCOs and imported material that will meet in the requirements of 6 NYCRR Part 375-6.7(d) or otherwise approved by the NYSDEC, or recycled concrete aggregate from other portions of the Site in compliance with 6 NYCRR Part 360;
10. The horizontal and vertical extent of excavations as well as the locations and elevations of post-excavation soil sampling points will be surveyed and mapped. Additionally, after installation, the location and elevation of the demarcation layer will be surveyed as well as final grade and permanent sheeting lines will be surveyed and mapped;
11. Placement of a cover system consistent with 6 NYCRR Part 375-3.8(e)(4)(iii) will consist either of structures such as buildings, pavement and sidewalks comprising the Site development, or a Clean Fill Cover Layer in areas where the two feet of exposed surface soil will exceed the applicable SSSCOs. Where the Clean Fill Cover Layer is required, it will be a minimum of two feet of soil meeting the requirements for cover material as set forth in 6 NYCRR Part 375-6.7(d) for restricted residential use. The Clean Fill Cover Layer will be placed over the Demarcation Layer. Any fill material brought to the Site will meet the requirements for the identified Site use as set forth in 6 NYCRR Part 375-6.7(d);
12. Preparation and submission of a FER to NYSDEC following implementation of the Remedial Action. The FER will provide the documentation that the remedial work required under this RWP was completed and performed in compliance with this plan;
13. The SMP will describe the engineering controls to be implemented following the completion of the Remedial Action;
14. All routinely occupied buildings will be constructed with sub-slab vapor barriers and sub-slab depressurization elements should soil vapor present a concern;

15. Implementation of a Site Management Plan that will describe the institutional and engineering controls ("ICs/ECs") includes: (1) an Engineering and Institutional Control Plan for implementation and management of IC/ECs; (2) a Monitoring and Management Plan for implementation of Site Monitoring including long-term and remedial performance groundwater monitoring; (3) a plan to activate the SSDEs should concerns with soil vapor intrusion arise. That will include the requirements for energizing the elements and preparing an operations and maintenance plan specifically for the equipment utilized to energize the piping; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. ICs will be put in place that restrict the use of groundwater, the use of the property as a farm or vegetable garden, and preventing the use of the property for a less restrictive use and enforce the requirements of the Site Management Plan;
16. Recording environmental easements on the land, as appropriate, requiring implementation of all SMP activities; and,
17. Groundwater monitoring to assess performance of the remedy and attainment of groundwater standards and remedial action objectives.

Appendix G
Cost Estimate

HARBOR ISLE ESTATES
ENVIRONMENTAL CLEAN-UP COST ESTIMATE

ITEM DESCRIPTION	TOTAL COST
BOOM\MAINTENANCE	$ 3,000.00
ASBESTOS ABATEMENT	$ 5,000.00
3000-GAL TANK REMOVAL	$ 15,000.00
BULKHEAD RECONSTRUCTION	$ 2,000,000.00
SOIL	$ 900,000.00
DEMOLITION AND REUSE	$ 750,000.00
EX SITU SOIL REMEDIATION INCLUDING EXCAVATION	$ 2,250,000.00
GROUNDWATER MANAGEMENT	$ 3,000.00
FILL FOR EXCAVATIONS	$ 150,000.00
FILL TO RAISE GRADE	$ 1,065,000.00
CLEAN FILL COVER	$ 1,800,000.00
INSITU WATER TREATMENT(ORC) - CONTINGENCY	$ 60,000.00
SAMPLING AND LABORATORY ANALYSIS	$ 150,000.00
MONITORING WELLS (SHALLOW)	$ 6,000.00
CONSULTING ENGINEERING	$ 125,000.00
FER/SMP/EA	$ 50,000.00

TOTAL ESTIMATED ENVIRONMENTAL CLEAN-UP COSTS $ 9,390,000.00

Appendix H
NYSDEC Conditional Approval Letter and Soil Washing Documentation

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Spill Prevention and Response
Stony Brook University
50 Circle Road, Stony Brook, NY 11790-3409
Phone: (631) 444-0320 • **Fax:** (631) 444-0328
Website: www.dec.ny.gov

Joe Martens
Commissioner

January 16, 2013

Mr. Michael Posillico
Posillico Development Company at Harbor Island, Inc.
1750 New Highway
Farmingdale, NY 11735

Re: BCP C130153, Former Cibro Terminal, Washington Avenue, Island Park

Dear Mr. Posillico:

The New York State Department of Environmental Conservation (the "Department" or "DEC") and the New York State Department of Health ("NYS DOH") have completed the review of the Applicant, Posillico Development Company at Harbor Island, Inc.'s August 2012 *"Remedial Work Plan"* (RWP) prepared by TRC Engineers, Inc. for the above referenced site.

The Department has determined that the Applicant has substantially satisfied the requirements in the development of the Remedial Work Plan (RWP) for this BCP Site. Therefore, this office hereby grants a *conditional approval* of the RWP based on the following comments:

1. Page XII – Remedial Summary, Items 7 and 11 and Page 3-7, Section 3.6.2 Conformance to Standards, Criteria and Guidance, Alternative 2.

Although these sections discuss management of contaminated soil, the proposed actions are unacceptable as written. The report states in part "Impacted soil exceeding the numerical Track 4 SSSCO's will be excavated to the depth which sheeting and shoring is not required". Please note that in accordance with 6NYCRR Part 375-1.8(c) "grossly contaminated soils" must be removed/addressed to the extent practicable before any engineering or institutional controls can be proposed/implemented. The removal/treatment of "grossly contaminated" or source area soils is necessary to prevent continued migration of contaminants into the groundwater. Therefore, these sections must be amended accordingly.

2. Page 3-4, Section 3.4, Remedial Technologies Screening and Page 3-5, Section 3.5, Remedial Alternative 2: Ex-Situ Treatment or Removal of Contaminated Soil to Proposed Track 4 Site Specific Soil Clean-up Objectives (SSSCO's) with Engineering and Institutional Controls".

Although these sections discuss the proposed remedial actions which include "ex-situ" treatment for the contaminated soils, the report is generic and provides no detailed design criteria. Therefore, a conceptual design plan for the proposed work must be submitted to the Department for review prior to implementation. The plan must contain all specific details for the proposed treatment, a contingency plan should treatment(s) fail, the expected number of treatment events and confirmatory sampling plan to confirm the soil meets both the SCO's and SSSCO's before re-using on site.

3. In addition, you are reminded of the following:

- Pursuant to Part 375, the BCP requires that a completed site must have a single entity ownership (i.e. Condominium Board, Homeowners Association, etc.) that will be responsible for any engineering or institutional controls implemented at the site and/or the SMP.

- All soils either imported to the site or exported off site must be sampled in accordance with DER-10. Table 5.4(e).

- Where "grossly contaminated soils" are encountered, strict adherence to the Community Air Monitoring Plan (CAMP) as outlined in Volume II – Appendix B, Section 8.2.1: Community Air Monitoring Plan is required to minimize any odor and/or dust complaints that may arise during excavation, stockpiling and/or on-site treatment activities.

Please amend the RWP as necessary and resubmit the revised Sections only as an addendum to the conceptual remedial design plan. Should you have any questions, please contact me.

Sincerely,

Nick Acampora
Environmental Program Specialist II

ec: P. Scully
K. Gomez
W. Parish
J. Harrington
S. McLelland, NYS DOH
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September 10, 2013

Mr. Nick Acampora
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Stony Brook Univiersity
50 Circle Road
Stony Brook, New York 11790-3409

Re: January 16, 2013 Letter BCP C130153, Former Cibro Terminal
Washington Avenue, Island Park, New York

Dear Mr. Acampora:

On behalf of the "Applicant", Posillico Development Company at Harbor Island, Inc., this letter addresses the NYSDEC comments in the referenced conditional approval letter concerning the August 2012 Remedial Work Plan. It has been prepared for discussion purposes at the upcoming September 13, 2013 meeting. A formal addendum to the RAWP will be prepared after the proposed remediation approach is discussed and any questions are answered.

Comment 1 – Grossly Contaminated Soil

The grossly contaminated soil will be removed/addressed to the extent practicable as required in 6NYCRR Part 375-1.8(c).

Comment 2 – Ex-Situ Treatment

A conceptual design plan for the proposed soil washing treatment technology is included with this letter, along with the results of bench-scale testing supporting the effectiveness of this process. The selected technology is soil washing using surfactants and various screening, scrubbing, and separation equipment.

Soil washing is considered a viable technology for achieving the cleanup goals at the site. This technology has been used in the U.S. since the early 1990's and in Europe earlier than that. The technology relies on standard soil processing equipment and surfactants. Positive results have been achieved for many classes of chemicals including metals, inorganic and organic chemicals and hydrocarbons.

Bench tests using various types of surfactants and degreasers were carried out from October 2012 through July 2013 to ascertain which products most effectively produced the desired cleanup results. The report entitled *Results of Bench Test Using Soil Washing Technology*, prepared by Posillico Consulting and dated August 30, 2013 is enclosed with this letter for your information. It describes the October 2012 - July 2013 tests that were the basis for the design the soil washing plant.

Site soil with a relatively high TIC concentration was used in the bench tests to simulate worst-case conditions. The results show that the high TIC-content soil will meet the SCOs and SSSCOs after treatment.

Several different combinations of surfactants were tested with the results showing that, depending on the TIC content of the soil, the surfactant mix and concentration along with the length of time the soil is exposed to the various processes can produce different results; and the operation of the equipment will be manipulated to achieve the desired effect on the results as surfactant mix and concentration.

As soil washing has been used for a multitude of soil cleanup projects for more than 20 years, the industry has accumulated sufficient information to design a facility that will separate the size fractions, route them to various disposal, washing and dewatering machinery, separate oil and suspended particles from the waste stream, and stockpile soil for reuse as well as disposal. Based on the grain size analyses (described in the Bench Test Report) manufacturers and distributors were contacted to select the components that would achieve the remediation objectives.

The general plan of action will be to:

- Construct the work pad;
- Install and test the components;
- Run initial operations to collect information needed to optimize the process;
- Operate the plant until the endpoints are reached;
- Breakdown the equipment and remove it from the site;
- Breakdown the work pad and test the underlying soil to verify it's condition (replace any soil that has been affected by the remedial operations); and,
- Closeout the cleanup operations.

The plant has been designed to operate at a rate of 100 TN/hr. The treated soil will be tested according to DER-10 guidance at a frequency of one sample for every 500 cubic yards (750 TN) processed to demonstrate that it meets the criteria for reuse.

TRC

Any soil that doesn't pass the testing will be evaluated for further treatment or offsite disposal depending on the parameters that caused the exceedance.

A summary of the steps that will be implemented to set up the plant and perform the soil washing process is provided below.

Drawing No. PDC-1 shows how the site work will be staged to accomplish the soil washing. The plant will be installed in the southwestern portion of the site, after the soil in this area exceeding the SSSCOs and SCOs has been excavated, the pad backfilled with clean fill, and an impermeable work pad and berm system installed to capture any liquids discharged on the pad during the subsequent soil washing process.

Soil excavated from the preparation of the soil washing treatment area and the bulkhead replacement project will be stockpiled and covered for subsequent treatment. Drawing No. PDC-2 shows the remainder of the planned excavation limits as presented in the RWP which will comprise Phase 2 of the treatment. As addressed in the RWP, contaminated soils in these areas will be sequentially excavated for treatment.

Drawing No. PDC-3 is the process flow diagram that shows how the treatment system will operate and the interconnection of the various components. The attached Soil Washing Plant Process Description provides a narrative description of the process. Drawing No. PDC-4 shows the physical layout of each proposed piece of processing and liquid or soil storage area equipment.

Fine-grained material separated at the initial screen, in the hydrocyclone, and settling tanks will be stockpiled for offsite disposal. Based on sieve analyses (see the Bench Test Report) approximately 30% of the fine-grained soil will be separated from the stockpiled waste stream and disposed. Similarly, materials greater than two inches in dimension will be segregated for decontamination by power washing and will not be subject to the soil washing process.

The time to treat the soil delineated in the RWP by soil washing has been estimated to be six months excluding approximately three months that will be needed to prepare the work pad and mobilize the equipment.

In summary, the bench test results show that the process will achieve the objectives while minimizing exposure of chemicals to the environs. At the same time the soil washing process has environmental and sustainability benefits that are not available if the site was completely excavated such as:

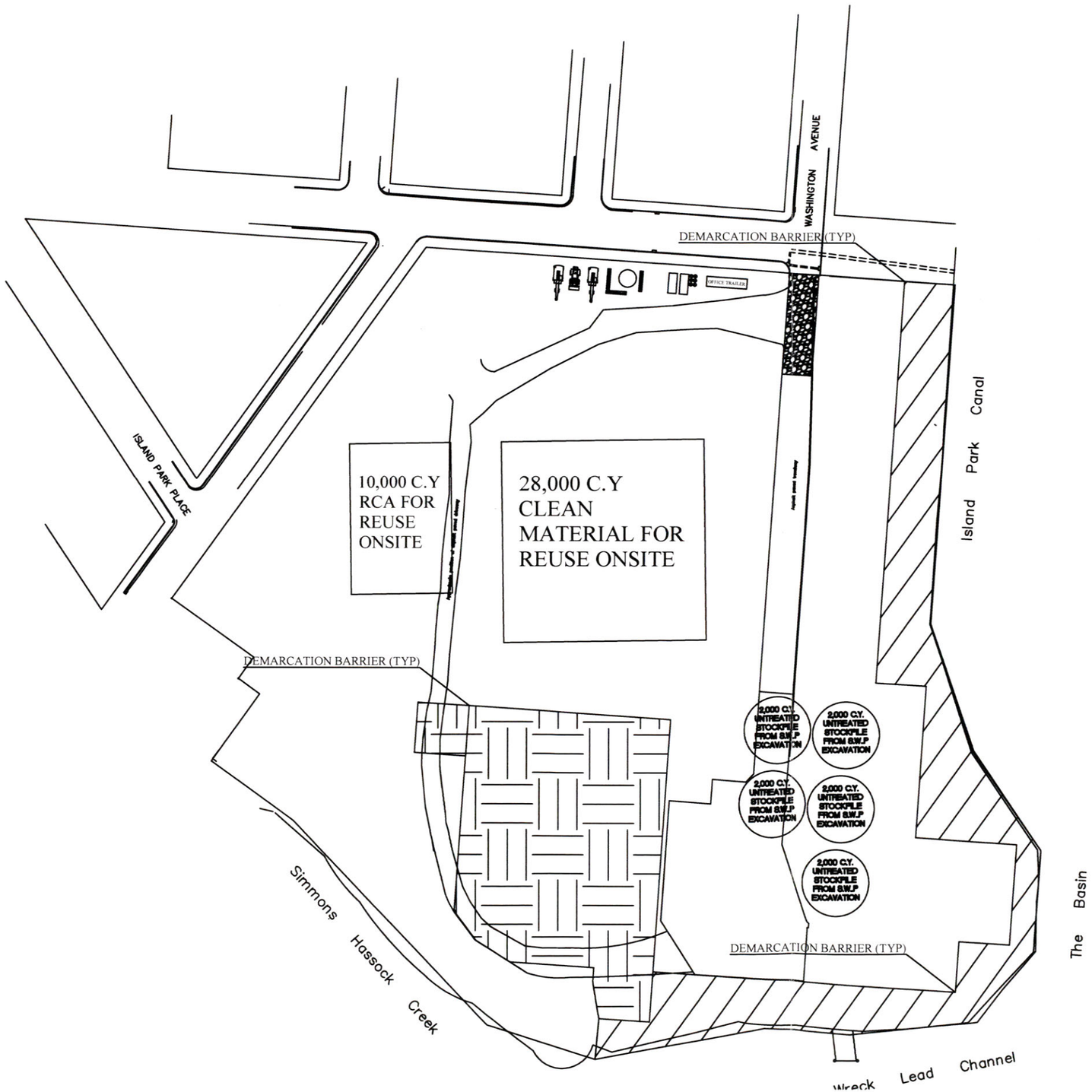
- Reducing the impacts of truck traffic to and from the site for removing soil and delivering clean fill.
    - Emissions and noise from truck traffic through the neighborhood are reduced.
    - Energy use is reduced proportionately to the number of trucks that are not needed for soil transportation from and to the site.
- Natural resources are conserved by reusing the soil onsite, not filling up a landfill with contaminated soil, and not excavating clean soil from a greenfield to use as fill.
- Emissions to the surrounding neighborhood are reduced as the water process tends to capture any gases not release them. Soil will be excavated as needed reducing the size of open holes and released odors.

We look forward to discussing the soil washing process and implementation of the RWP at our September 13, 2013 meeting in your offices. Please contact Mr. Ellis Koch or me if you have any questions before then.

Sincerely,
TRC Engineers, Inc.

Steven D. Meersma, P.E.
Director

cc: Karen Gomez, NYSDEC
Jim Harrington, NYSDEC
Walter Parish, NYSDEC
Peter Scully, NYSDEC
Sharon McLelland, NYSDOH
Ellis Koch, Posillico



NOTES

BULKHEAD EXCAVATION AREA

SOIL WASH PLANT EXCAVATION AREA

Revisions/Issues

No	Date	By	Description
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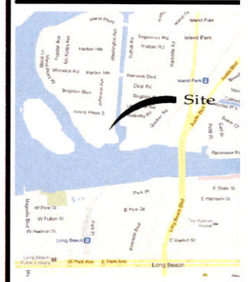
Farmingdale, NY 11735
(631) 249-1872



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Title

PHASE 1 EXCAVATION LIMI

Project

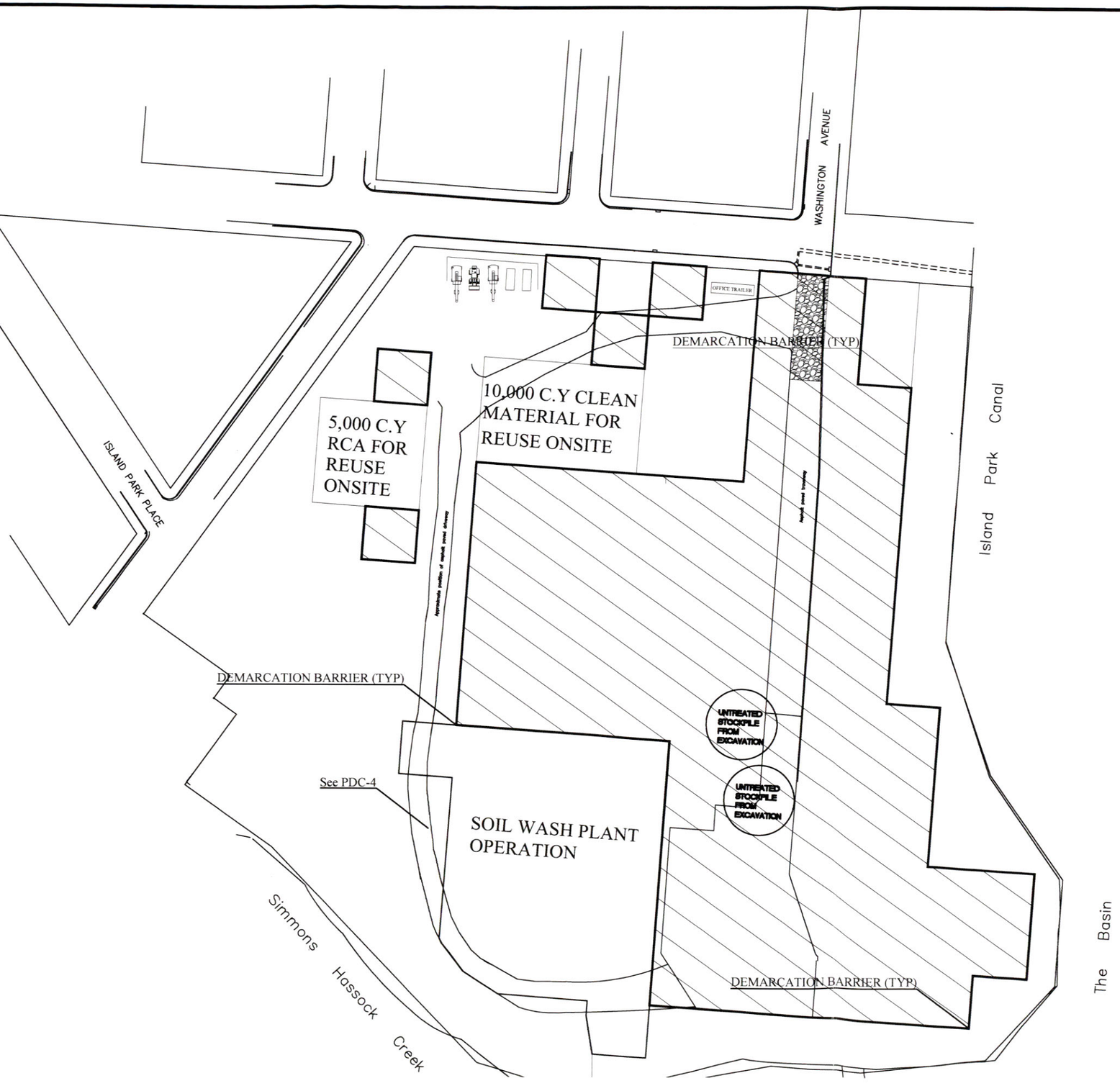
PDC @ HARBOR ISLE REMEDIATION

Date

JULY 24, 2013

Scale

AS NOTED



NORTH

NOTES

EXCAVATION OF REMAINING SITE

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PHASE 2 EXCAVATION LIMIT

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Date
JULY 24, 2013

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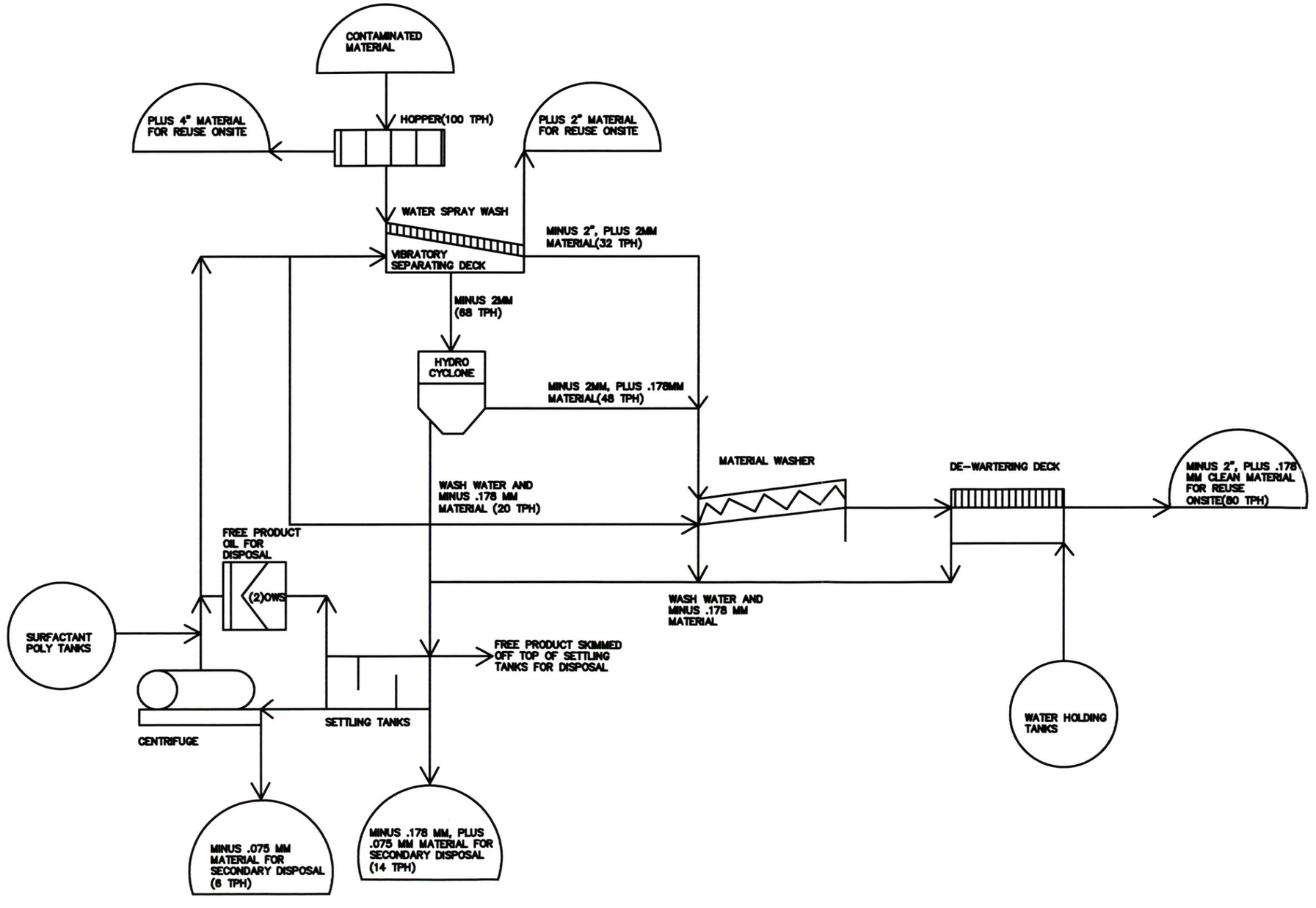

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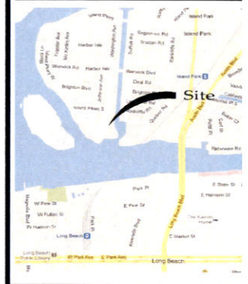

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Signature:_____ Date

Title

PROCESS FLOW DIAGRAM
SOIL WASHING PLANT

Project

PDC @ HARBOR ISLE
REMEDIATION

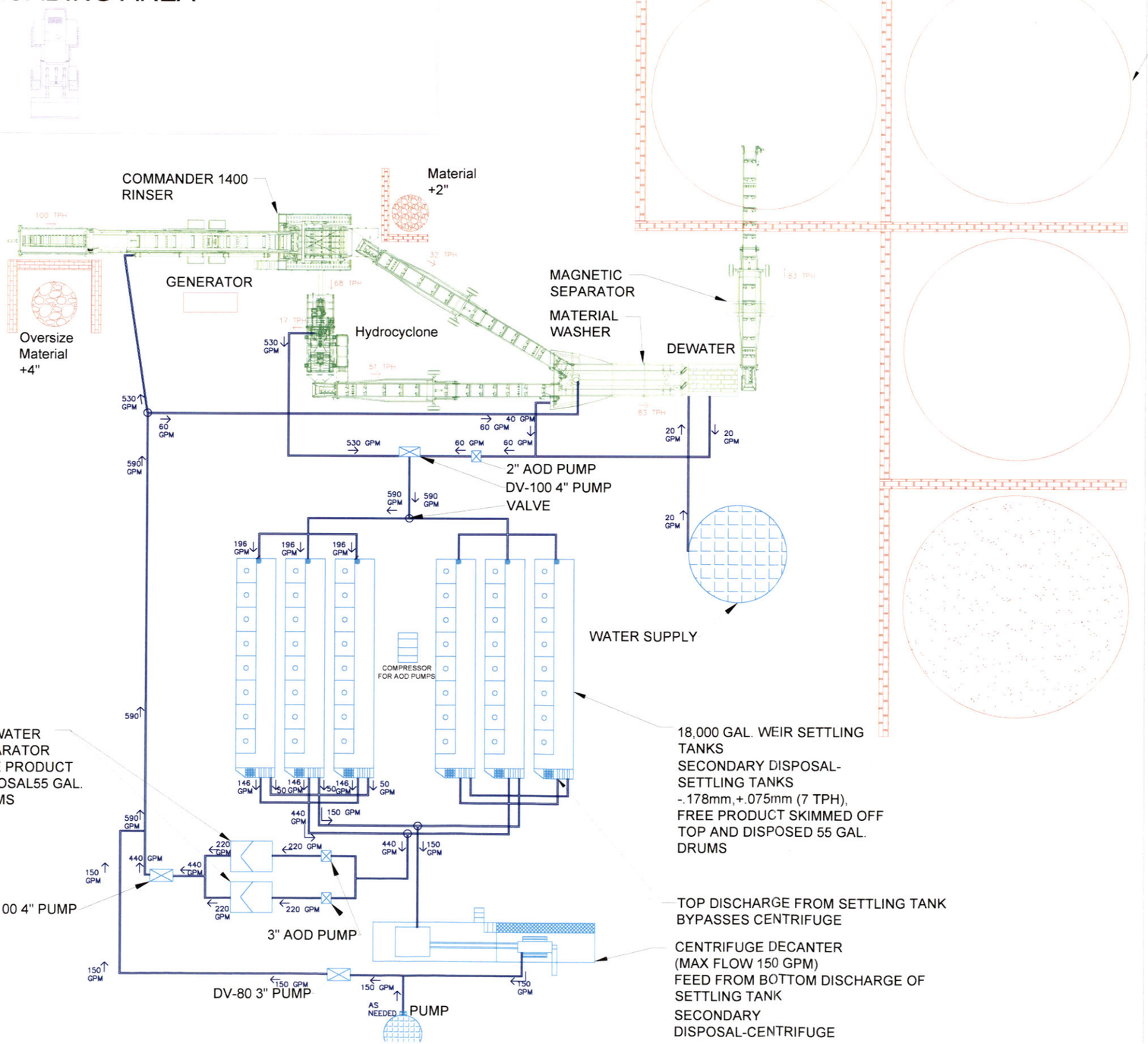
Date

JULY 24, 2013

Scale

AS NOTED

LOADING AREA



CLEAN MATERIAL FOR REUSE ONSITE
+.178MM, -2" (83 TPH)
250 CY STOCK PILE

227.28

Revisions/Issues

No	Date	By	Description
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Signature:_____ Date:

Title
SOIL WASH PLANT PROCES

Project
PDC @ HARBOR ISLE REMEDIATION

Date
JULY 24, 2013

Scale
AS NOTED

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September 9, 2013

Mr. Nick Acampora
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, New York 11790-3409

Re: BCP C130153, Former Cibro Terminal, Washington Avenue, Island Park, New York:
September 10, 2013 Letter and September 13, 2013 Meeting Follow-up

Dear Mr. Acampora,

This letter has been written to provide additional information requested by NYSDEC at the September 13, 2013 meeting during which the responses to the NYSDEC January 16, 2013 letter concerning the Remedial Action Work Plan (RAWP) for the referenced site were discussed.

The responses are ahead. Also enclosed are a revised project schedule, a revised drawing PDC-4, cut sheets for the equipment, and an MSDS sheet for the surfactant that will be used to enhance the washing process.

The schedule now includes permits, bulkhead, demolition, bulkhead sediment sampling, post remediation confirmation sampling, environmental, and post environmental work to be completed.

Responses:

1. Odor control during remediation was mentioned as a concern that should be addressed in the RAWP. The Community Air Monitoring Plan is included in Section 5.6.12 of the RAWP.

2. Sediment sampling in the canal adjacent to the bulkhead is a component of the RAWP. The sampling locations are shown in Figure RWP-9. At the meeting you pointed out that the schedule for collecting these samples wasn't on the master schedule. That has now been added and the revised Master Schedule is enclosed with this letter.

3. Additional information describing the soil-washing process :

    a. The soil washing process is a closed-loop system of 65,000 gallons of water and surfactant. The flow rate is approximately 590 gallons per minute.

    b. Process water will be obtained from the existing onsite, permitted supply well.

c. The process water quality will be monitored for dissolved constituents and surfactant viability. Surfactant will be added as needed. If the process water needs to be replaced, the spent wash water will be disposed as required to a designated offsite water treatment facility or be treated onsite. Only NYSDEC-approved onsite treatment procedures will be implemented should this option be chosen to manage the process water.

d. As shown on enclosed drawing PDC-4, the process water will pass through two banks of three settling tanks connected by valves to the circulation system. Each bank of tanks will be run independently of the other and, if the process water needs to be changed, the tank holding the spent water can be taken offline while the water is removed or treated. Once the process is complete, that bank of tanks will be returned to service. Moreover, as sediment accumulates in a bank of tanks it will be taken out of service so sediment can be removed.

4. Tomadol 901 and Tomakleen G-12 are surfactants produced by Air Products Corporation that were used for the bench test and will be used during the wash process. A mixture of the two products was manually made during the bench test (see Bench Test Report for details). Air Products has recently created a new product called Tomadol SGW for this project containing both surfactants. The MSDS sheet for this product is enclosed.

At the meeting, the bulkhead construction permit was discussed, and you mentioned that you would coordinate approval of the permit with Ms. Sherril Aicher the contact person for the permit review, to expedite its approval. Approval of the permit is on our critical path to begin executing the RAWP and, as such, the expeditious review and approval of the application that was submitted in April 2013 is of utmost importance.

Our understanding is that the NYSDEC will consider this letter and the September 10, 2013 letter and Bench Test Report the response and revisions to the August 7, 2012 RAWP, and you will distribute them to other NYSDEC personnel for review.

Lastly, we are reaching out to the Nassau County Health Department to discuss setting up a progress meeting the first two weeks of October.

Please contact Steven Meersma or me if you have any additional questions.

Sincerely,

Ellis Koch

C: Michael Posillico
Joseph Posillico
Steven Meersma, TRC

	Activity Name	Duration (Days)	Start Date	Finish Date	Predecessors	2013 M J J A S O
1	PRE-CONSTRUCTION	**65.00**	**9/9/13**	**12/6/13**		
2	Renew Demo Permit	30.00	9/9/13	10/18/13		
3	Meeting with NYSDEC	1.00	9/13/13	9/13/13		
4	Finalize RAWP	15.00	9/16/13	10/4/13	3	
5	TOH NYSDEC Notice for Public Comment	45.00	10/7/13	12/6/13	4	
6	TOH Public Hearing Zoning	1.00	10/1/13	10/1/13		
7	TOH Public Hearing Review Zoning	30.00	10/2/13	11/12/13	6	
8	Approved Modification to the Existing Covenant	1.00	11/13/13	11/13/13	7	
9	DEMOLITION EXISTING SITE	**68.00**	**11/14/13**	**2/17/14**		
10	Mobilize - Erosion Control/C+G	26.00	11/14/13	12/19/13	2, 8	
11	Demo + Haul Onsite Large Pad #1, #2, #3 Med Pad #1, Small Pad #1	15.00	12/20/13	1/9/14	10	
12	Demo + Haul Onsite Conainment Wall Large Pad #1,#2,#3, Med Pad #1, Misc	8.00	1/10/14	1/21/14	11	
13	Demo + Dispose Asphalt, Concrete Road	2.00	12/20/13	12/23/13	10	
14	Demo + Dispose Bldg #1, Bldg #2	2.00	12/24/13	12/25/13	13	
15	Demo Existing Piles	19.00	12/26/13	1/21/14	14	
16	Haul Material to Crusher Existing Stock Pile,and Concrete Road	12.00	1/22/14	2/6/14	12	
17	Mob/Crush/Demob Concrete Crusher	14.00	1/22/14	2/10/14	12	
18	Soil Sampling Demo Work	5.00	2/11/14	2/17/14	17	
19	BULKHEAD	**92.00**	**12/20/13**	**4/28/14**		
20	Sediment Sampling Bulkhead	2.00	12/20/13	12/23/13	10	
21	Excavation /Stock Pile Contaminated	8.00	12/24/13	1/2/14	20	
22	Install Bulkhead	90.00	12/24/13	4/28/14	21SS	
23	Backfill Clean Material	8.00	4/17/14	4/28/14	22FF	
24	ENVIROMENTAL	**145.00**	**2/11/14**	**9/1/14**		
25	Purchasing Equipment	30.00	2/11/14	3/24/14	17	
26	Excavate/Stock Pile Wash Plant Area	8.00	2/11/14	2/20/14	17	
27	Backfill/Footprint Containment for Wash	11.00	2/21/14	3/7/14	26	
28	Mobilize Wash Plant	10.00	3/25/14	4/7/14	25, 27	
29	Processing Un-Treated Stock	100.00	4/8/14	8/25/14	28	
30	Excavate/Backfill R. Site to Base Grade	38.00	7/3/14	8/25/14	28, 29FF	
31	Demobilize Wash Plant	5.00	8/26/14	9/1/14	29, 30	
32	POST-ENVIROMENTAL SITE WORK	**120.00**	**9/2/14**	**2/16/15**		
33	Backfill R. Site to Development Grade	20.00	9/2/14	9/29/14	31	
34	TRC Closure Report	30.00	9/2/14	10/13/14	31	
35	NYSDEC Closure Report Review	90.00	10/14/14	2/16/15	34	
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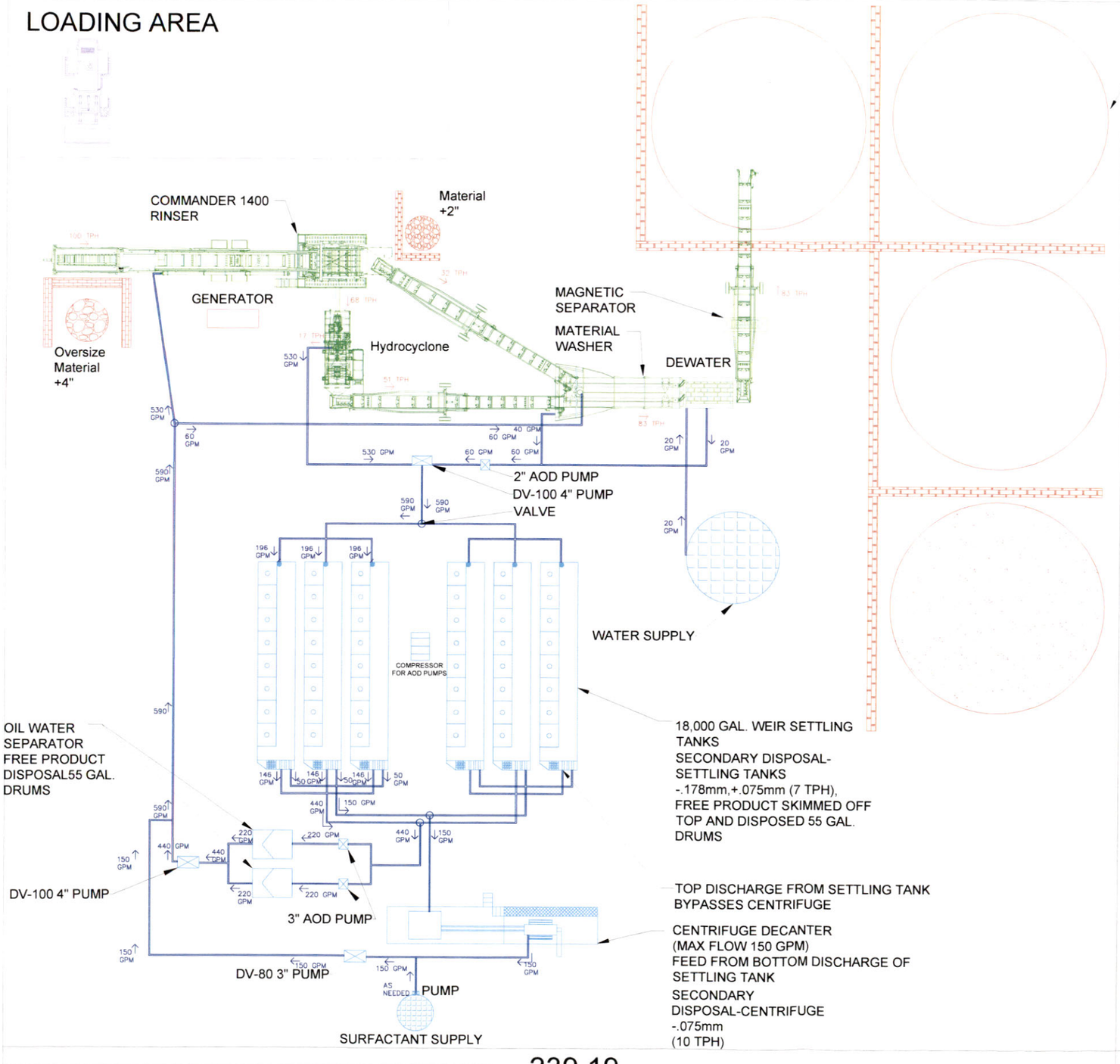

CLEAN MATERIAL FOR
REUSE ONSITE
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250 CY STOCK PILE

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Revisions/Issues			
No	Date	By	Description
			COMMENTS

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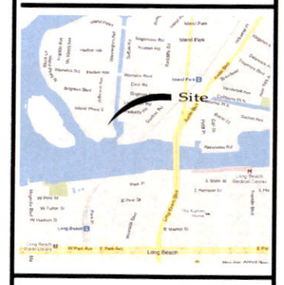

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Title
SOIL WASH PLANT PROCESS

Project
PDC @ HARBOR ISLE
REMEDIATION

Date
JULY 24, 2013

Scale
AS NOTED

Drawn by
JEP

Checked by
N/A

Drawing No
PDC-4

Material Safety Data Sheet

Version 1.0
Revision Date 08/16/2013

MSDS Number 300000050220
Print Date 08/16/2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	TOMADOL™ SGW Surfactant
Product Use Description	:	Surfactant
Manufacturer/Importer/Distributor	:	Air Products and Chemicals, Inc 7201 Hamilton Blvd. Allentown, PA 18195-1501 GST No. 123600835 RT0001 QST No. 102753981 TQ0001
Telephone	:	1-610-481-4911 Corporate 1-800-345-3148 Chemicals Cust Serv 1-800-752-1597 Gases/Electronics Cust Serv
Emergency telephone number (24h)	:	800-523-9374 USA +1 610 481 7711 International

2. HAZARDS IDENTIFICATION

Emergency Overview

Harmful if swallowed.
Severe eye irritant.
Mild respiratory tract irritant.
Mild skin irritant.
Risk of serious damage to eyes.
Harmful by inhalation.

Potential Health Effects

Inhalation	:	May cause nose, throat, and lung irritation. Inhalation of vapors and/or aerosols in high concentration may cause irritation of respiratory system. Harmful if inhaled.
Eye contact	:	Severe eye irritation.
Skin contact	:	Mild skin irritation.
Ingestion	:	Harmful if swallowed.
Chronic Health Hazard	:	This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater.

Exposure Guidelines

Target Organs : Eyes.

Symptoms : Repeated and/or prolonged exposure to low concentrations of vapors and/or aerosols may cause: Sore throat.

Aggravated Medical Condition

Eye disease Asthma.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Weight)
Ethoxylated Alcohols	Not Available	100 %

CHEMICAL FAMILY: Alcohol Ethoxylate

4. FIRST AID MEASURES

General advice : Seek medical advice. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately.

Eye contact : Rinse immediately with plenty of water also under the eyelids for at least 20 minutes. Remove contact lenses.

Skin contact : Wash off immediately with plenty of water for at least 20 minutes. Wash off with soap and water. Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay.

Ingestion : Never give anything by mouth to an unconscious person. If a person vomits when lying on his back, place him in the recovery position. Prevent aspiration of vomit. Turn victim's head to the side.

Inhalation : If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Move to fresh air.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Alcohol-resistant foam.
Carbon dioxide (CO2).
Dry chemical.
Dry sand.
Limestone powder.

Specific hazards : Incomplete combustion may form carbon monoxide. Burning produces noxious and toxic fumes. Downwind personnel must be evacuated.

Special protective equipment for fire-fighters : Use personal protective equipment. Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.
Environmental precautions	:	Construct a dike to prevent spreading.
Methods for cleaning up	:	Contact Air Products' Emergency Response Center for advice. Approach suspected leak areas with caution. Place in appropriate chemical waste container.
Additional advice	:	Open enclosed spaces to outside atmosphere. If possible, stop flow of product.

7. HANDLING AND STORAGE

Handling

Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Use only in well-ventilated areas. Avoid contact with eyes. Avoid breathing vapors and/or aerosols. Use personal protective equipment. When using, do not eat, drink or smoke.

Storage

Keep away from direct sunlight. Overheating of an ethoxylate stored under air should be avoided. When an ethoxylate is vigorously mixed in the presence of air or oxygen at temperatures >125 F (50 C), it can degrade product quality. Storage under an inert atmosphere is recommended.
Keep containers tightly closed in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide readily accessible eye wash stations and safety showers.
Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.

Personal protective equipment

Respiratory protection	:	Wear appropriate respirator when ventilation is inadequate.
Hand protection	:	Neoprene gloves. Nitrile rubber. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection	:	Chemical resistant goggles must be worn.
Skin and body protection	:	Long sleeve shirts and trousers without cuffs.
Special instructions for	:	Wash at the end of each workshift and before eating, smoking or using the toilet.

protection and hygiene	Provide readily accessible eye wash stations and safety showers.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquid.
Color	: Water White.
Odor	: Mild.
Vapor pressure	: 7.81 mmHg at 70 °F (21 °C)
Density	: 61.179 lb/ft3 (0.98 g/cm3) at 70 °F (21 °C)
Boiling point/range	: 349 °F (176.1 °C)
Melting point/range	: 17 °F (-8.6 °C)
Flash point	: > 100 °C closed cup
Water solubility	: Completely soluble.
Viscosity	: 34.7 mPa.s at 77 °F (25 °C)

10. STABILITY AND REACTIVITY

Chemical Stability	: Stable under normal conditions.
Materials to avoid	: Reactive metals (e.g. sodium, calcium, zinc etc.). Materials reactive with hydroxyl compounds. Copper alloys Strong acids. Oxidizing agents.
Hazardous decomposition products	: Carbon monoxide. Carbon dioxide (CO2). Aldehydes Flammable hydrocarbon fragments.

11. TOXICOLOGICAL INFORMATION

Acute Health Hazard

Ingestion	: No data is available on the product itself.
Inhalation	: No data is available on the product itself.

Dermal	:	No data is available on the product itself.
Eye irritation/corrosion	:	Severe eye irritation.
Skin irritation/corrosion	:	Mild skin irritation.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity	:	No data is available on the product itself.
Toxicity to other organisms	:	No data available.

Persistence and degradability

Biodegradability	:	No data is available on the product itself.
Mobility	:	No data available.
Bioaccumulation	:	No data is available on the product itself.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products	:	Contact supplier if guidance is required.
Contaminated packaging	:	Dispose of container and unused contents in accordance with federal, state, and local requirements.

14. TRANSPORT INFORMATION

DOT

Not dangerous goods

IATA

Not dangerous goods

IMDG

Not dangerous goods

TDG

Not dangerous goods

Further Information

Not classified as dangerous in the meaning of transport regulations. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

OSHA Hazard Communication Standard (29 CFR 1910.1 200) Hazard Class(es)
Irritant.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on EINECS inventory or polymer substance, monomers included on EINECS inventory or no longer polymer.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification
Acute Health Hazard

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level
None.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

WHMIS Hazard Classification
Toxic Material Causing Other Toxic Effects

16. OTHER INFORMATION

HMIS Rating

Health	: 2
Flammability	: 1
Physical hazard	: 0

Prepared by : Air Products and Chemicals, Inc. Global EH&S Product Safety Department

Telephone : 1-610-481-4911 Corporate
1-800-345-3148 Chemicals Cust Serv

1-800-752-1597 Gases/Electronics Cust Serv

Preparation Date : 08/16/2013

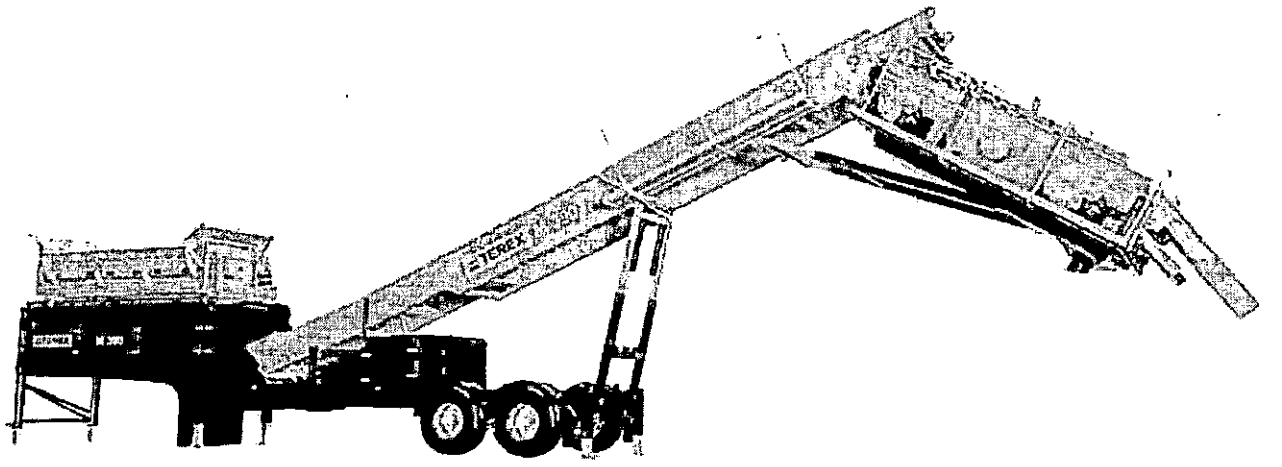
For additional information, please visit our Product Stewardship web site at http://www.airproducts.com/productstewardship/

TEREX®

WASHING SYSTEMS

TECHNICAL SPECIFICATION

M 390

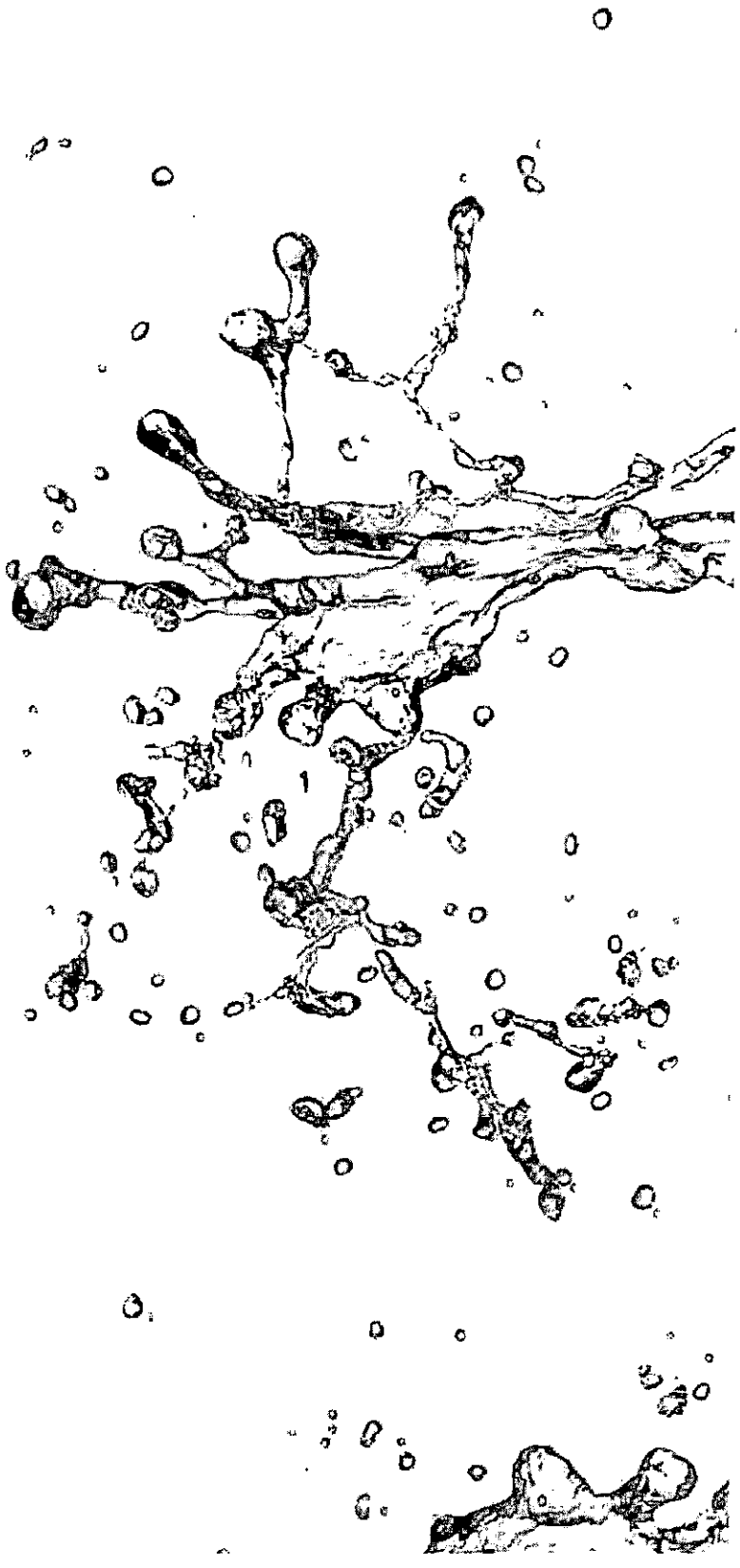


FEATURES

- High capacity mobile washing unit that has been engineered for quick installation and ease of relocation making it ideal for applications including sand, gravel, coal and crushed stone.
- Includes a feed hopper complete with reject grid, feed conveyor, washing screen and fully enclosed power unit.
- Twin break and suspended axels
- Hydraulic jacking legs, king pin towing facility and site drawbar

OPTIONS

- Electric/hydraulic drive - (37kW) (No coupling facility) (not including electric control panel)
- Electric/hydraulic drive - (37kW + 18.5kW) complete with 1 x T 150 / T 200, 2 x TC 5032 stockpiler drive facility (not including electric control panel)
- Deutz Water Cooled Engine (100hp/75kW) complete with x T 150 / T 200 and 4 x stockpiler drive facility
- No grid but hopper deadplate fitted
- 4" double deck vibrating grid complete with abrasion resistant plate on wear surface of T bars top deck and mesh in bottom deck and Deutz water cooled engine (100hp/75kW)
- 20mm thick rubber lining of standard stone chute (price per deck)
- 6mm thick rubber lined sand box (single product)
- Side tensioned rubber mats top deck of screen
- End tensioned rubber mats bottom deck of screen
- End tensioned rubber mats middle deck of screen (3 deck only)
- Hydraulic tensioning (bottom deck screen mesh)
- 3-deck screen box (3.66m x 1.52m - 12' x 5') complete with spray bars & chutes (may be separate load)
- Catwalk on 1 x side of std conveyor and 2 x side of screen box with 1 set of access steps and 1 access ladder
- Catwalk 2 sides of std conveyor & 2 sides of screenbox with 2 sets of access steps
- 3.2m extension on main conveyor
- Dust covers on main belt
- Light board
- Hydraulic jacking legs at screen box end
- Twin product sand box (unlined/lined)
- Fresh water 6" in line strainer "Y" type
- Top Deck Polymodule Frame complete with Polymodules (Price dependent on aperture)
- Middle Deck Polymodule Frame complete with Polymodules (3-Deck Only) (Price dependent on aperture)
- Bottom Deck Polymodule Frame complete with Polymodules (Price dependent on aperture)



FEEDER/HOPPER

8.0m³ hopper (10.5cu yards) 14'

1.5m (3'4") wide belt variable speed

MAIN CONVEYOR

1m (3'3") wide belt.

Washbox with 5 adjustable water jets

Hydraulically adjustable conveyor angle

STANDARD POWER UNIT

Deutz air cooled engine

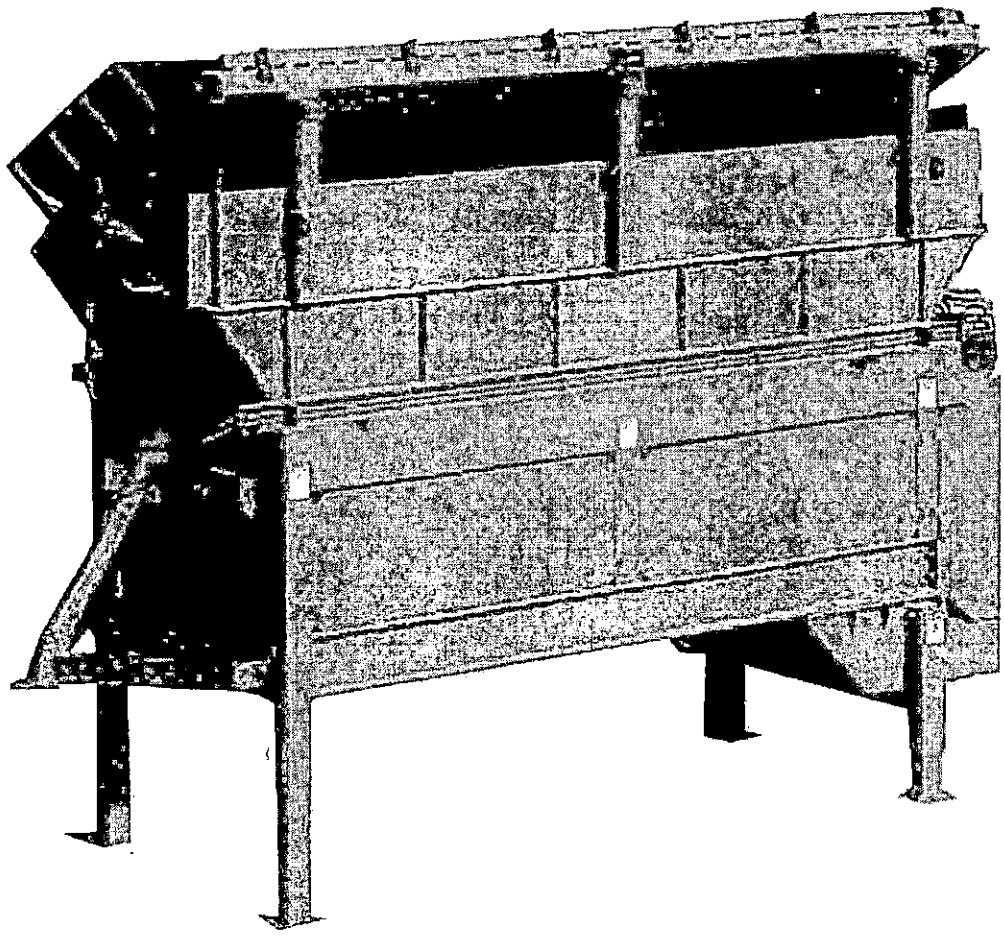
71hp/53kW

Vandal proof guards

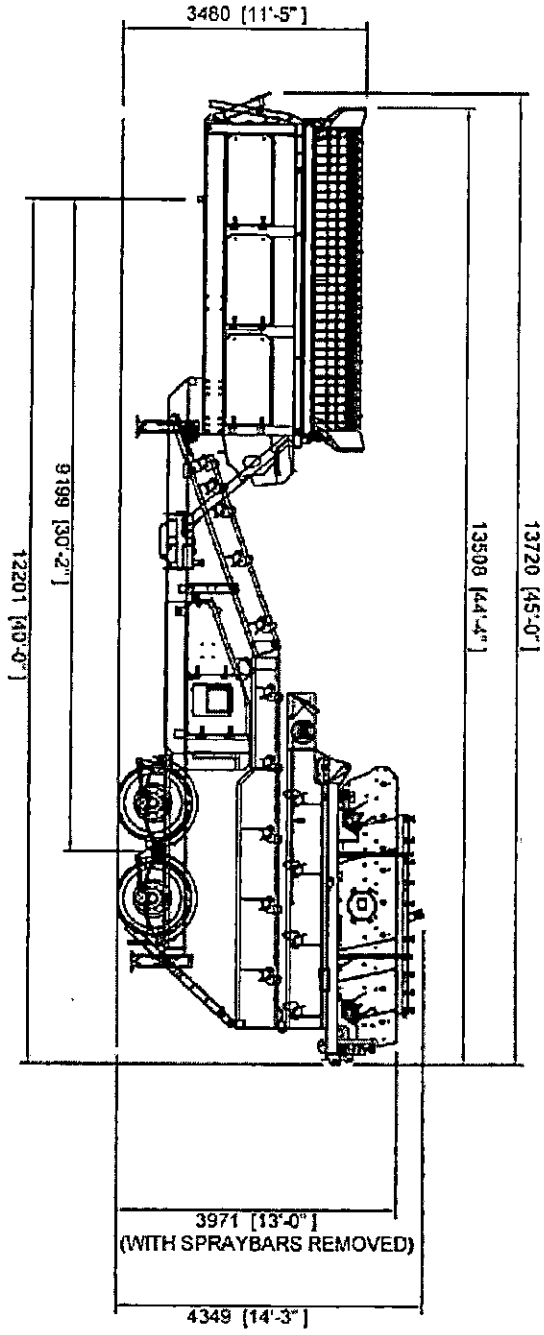
TIPPING GRID

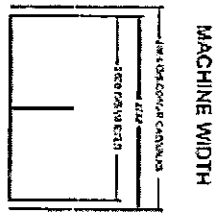
Remote tipping

100mm (4") aperture



M 390 TRANSPORT DIMENSIONS





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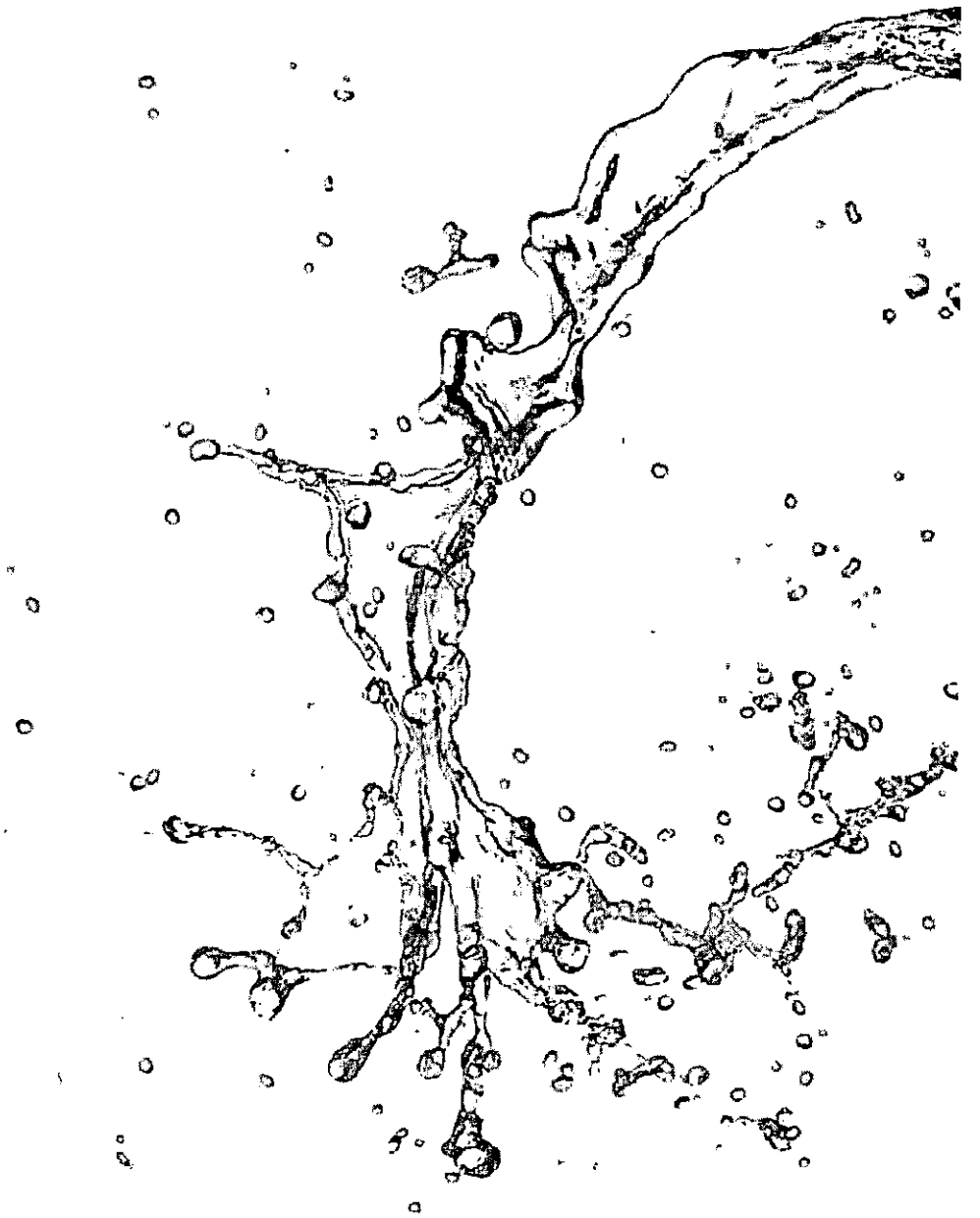
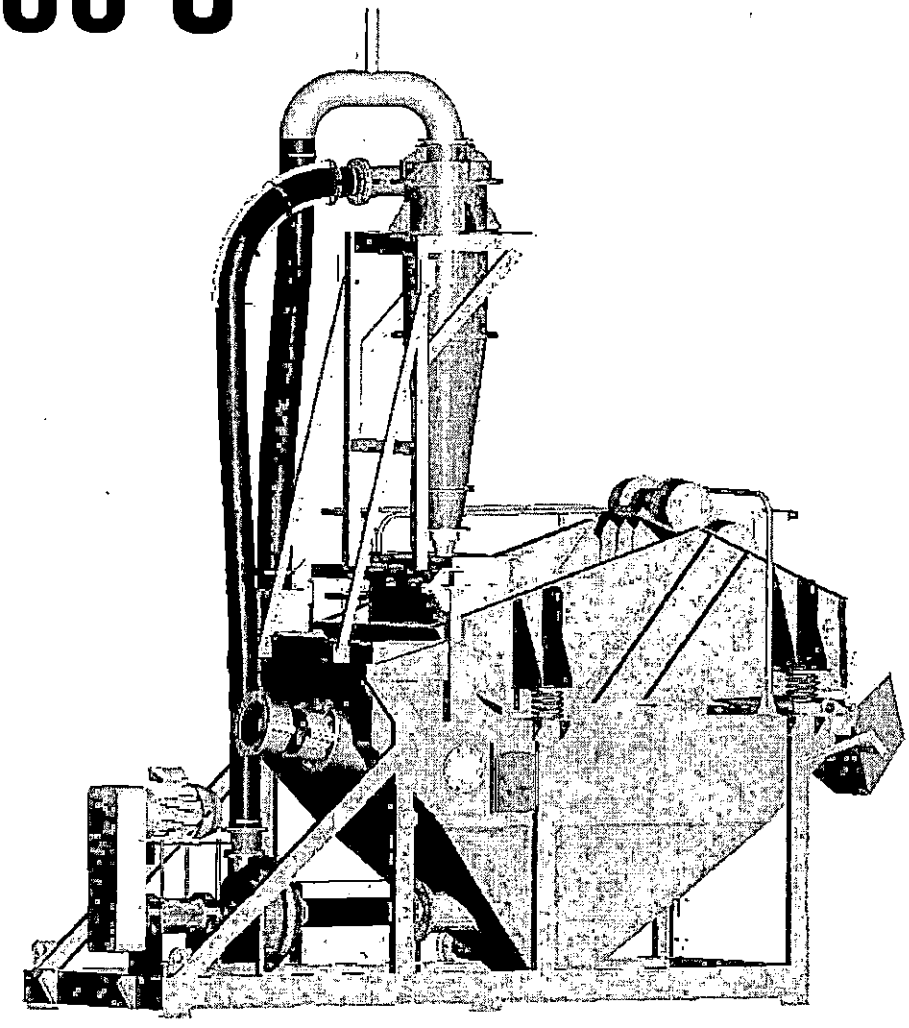


TEREX®

WASHING SYSTEMS

TECHNICAL SPECIFICATION

FM 60 C



FEATURES

- Static sand recovery unit
- One chassis
- Centrifugal slurry pump
- Hydrocyclone
- Collection tank
- 8 X 4 dewatering screen
- Produce one grade of sand
- Designed to work in conjunction with the Terex Washing Systems Range

CYCLONE

One 18" G4 500 hydrocyclone

Spigot discharge

All wear areas rubber lined

Underflow collection box

Pressure flange with pressure gauge and protector

150mm (6") rubber lined slurry delivery hose

CENTRIFUGAL PUMP

Size 150/125mm (heavy duty rubber lined)

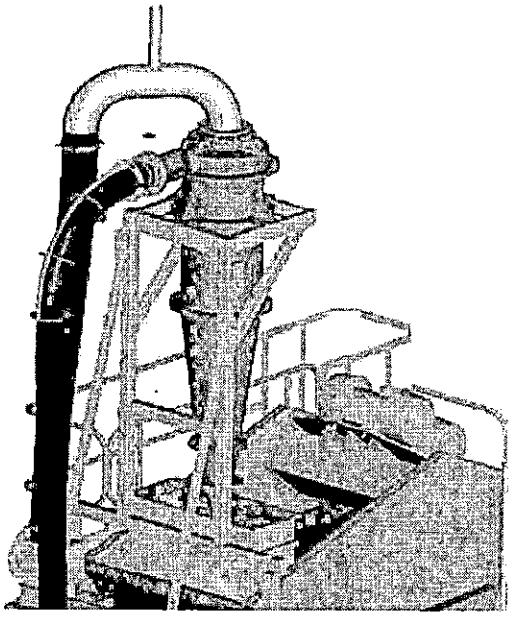
Motor 18.5kW (25hp) (ip55 enclosure)

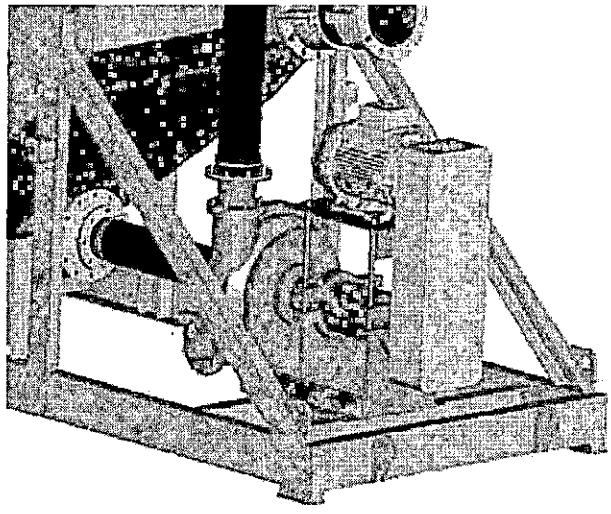
Max working pressure 6 bar

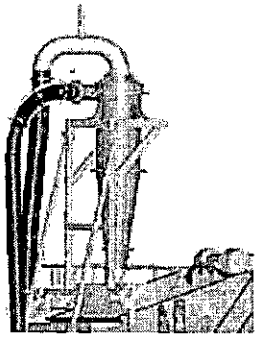
Abrasion resistant liners

Moulded rubber impeller

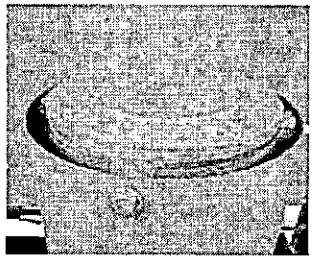
Excellent serviceability





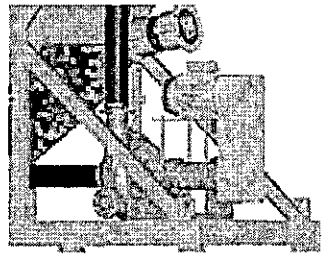


Rubber lined sealed slurry transfer pipe complete with heavy duty clamps

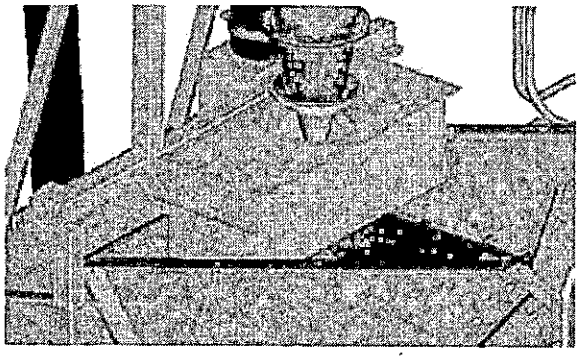


Rubber lined spigot

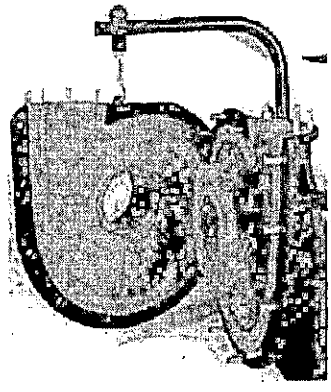
Pump drain for cold climate applications



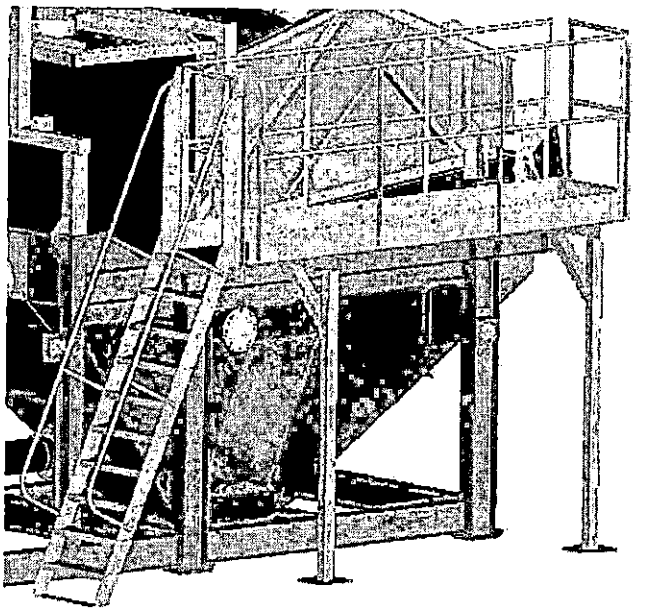
Easy access for ease of maintenance



Full width underflow distribution box giving even feed to the screen



Fully rubber lined for increased wear life



CHASSIS

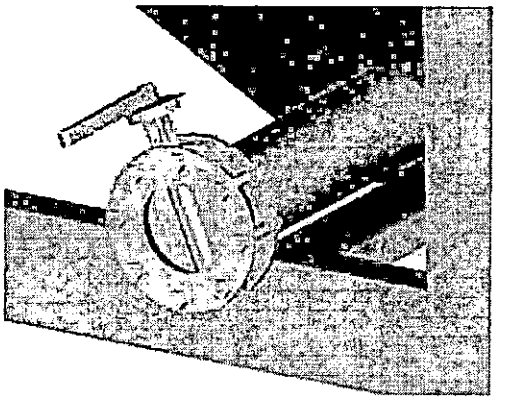
Self regulating cyclone tank complete with built in float system

Build in anti-turbulence sections

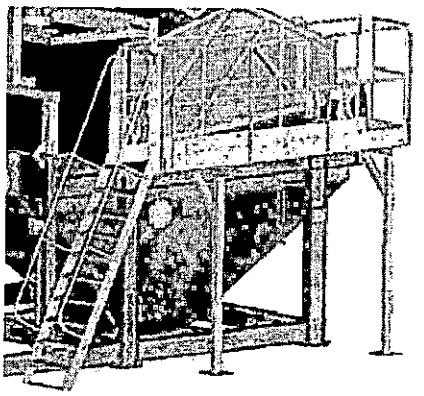
Heavy duty steel construction

Easy access to serviceable areas

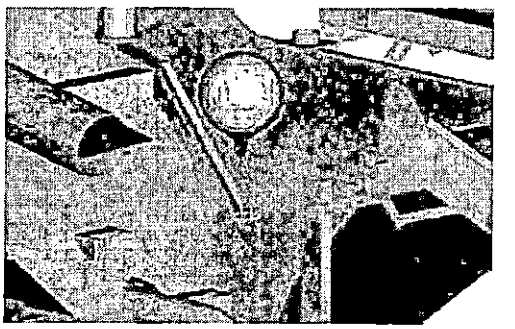
Access steps and walkway for ease of maintenance



Integrated tank drains for ease of maintenance

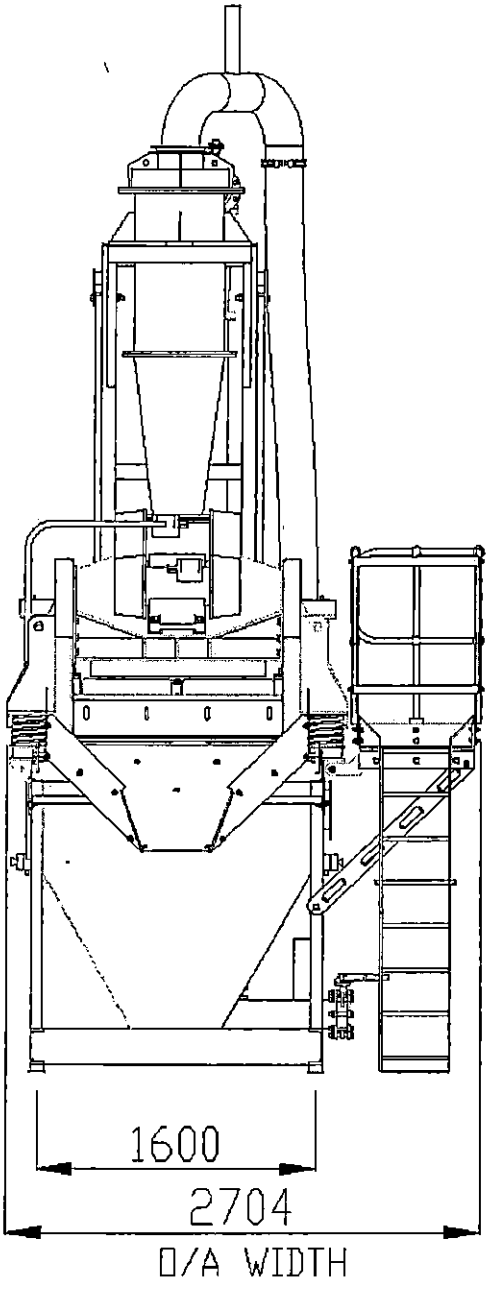


Access steps and walkway for ease of maintenance.



Float system for self regulation of tank water level

FM 60 C – WORKING DIMENSIONS



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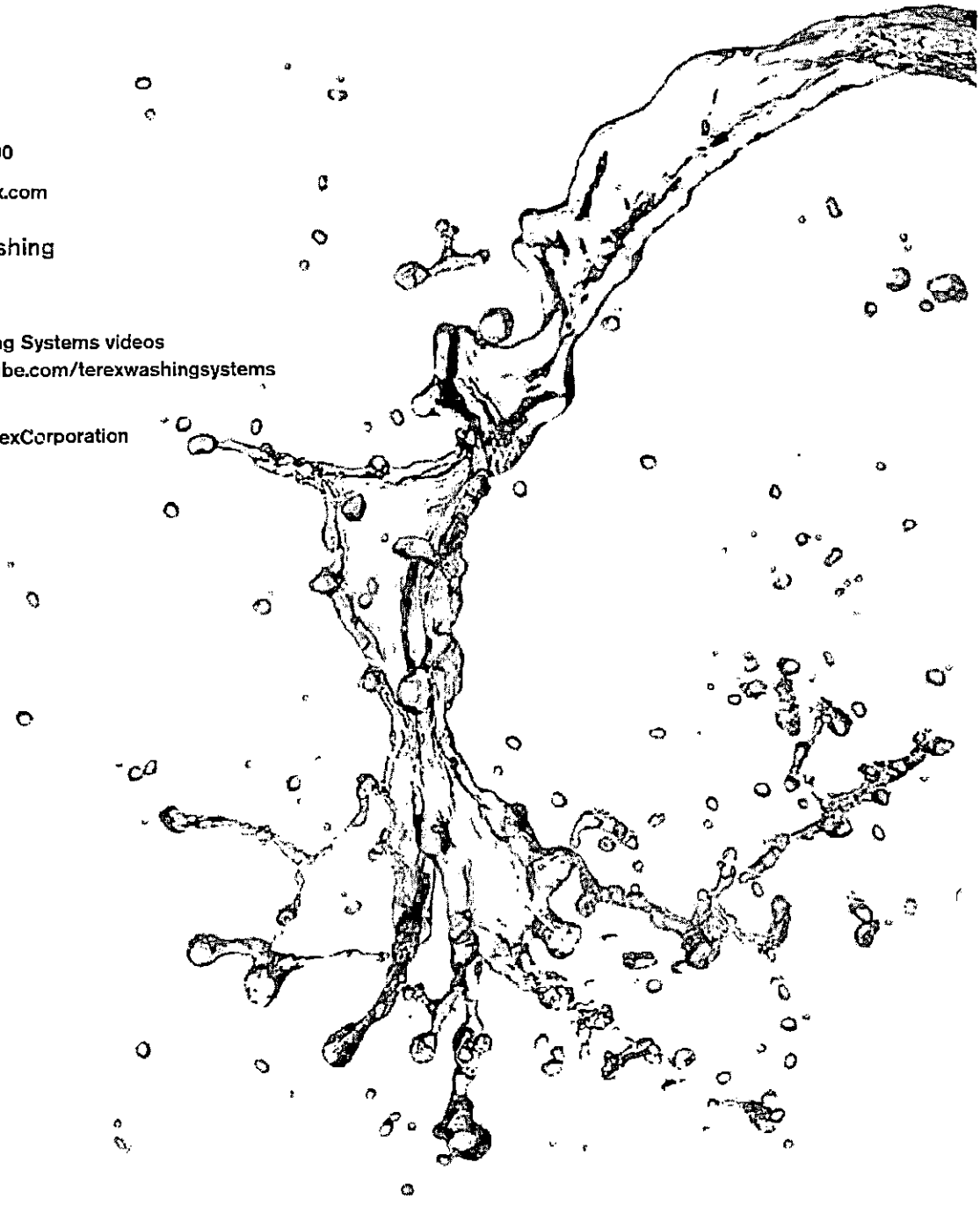

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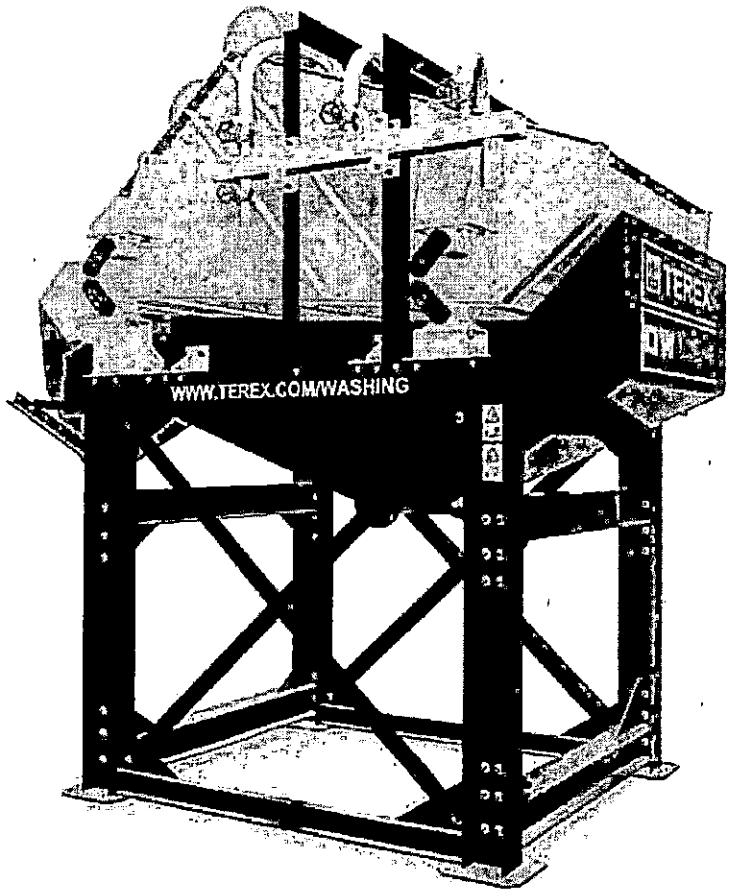
WASHING SYSTEMS

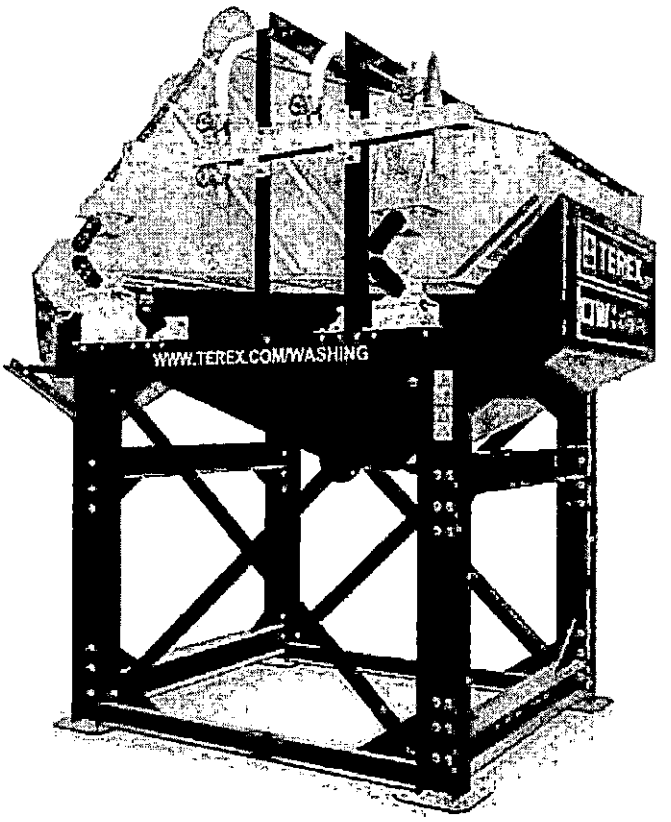
TECHNICAL SPECIFICATION

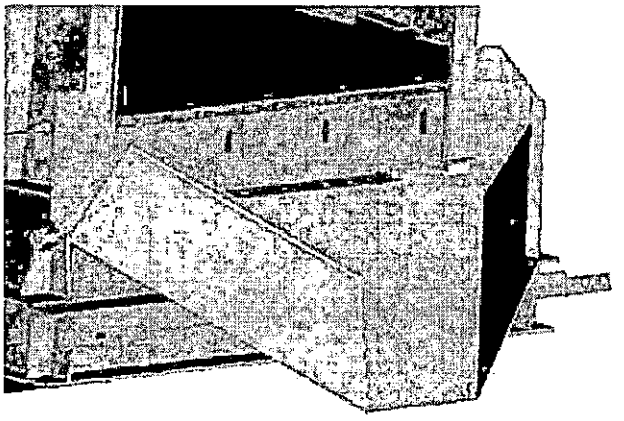
DW RANGE



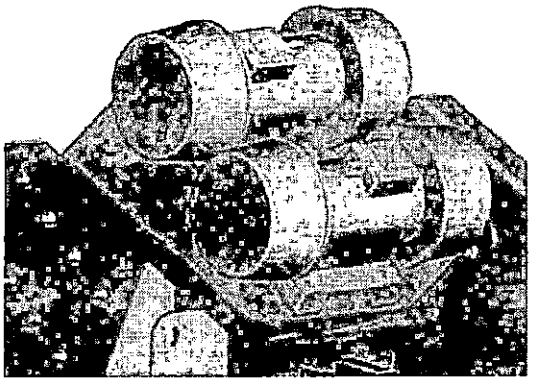
FEATURES

- High frequency vibrating dewatering screen complete with polyurethane decks
- Robust stressed relieved frame
- Fitted with high efficiency outer balance vibrating motor
- Supported on heavy duty long life oscillating mounting

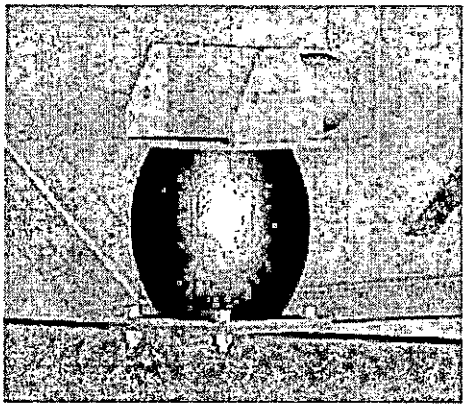




Rubber lined chute



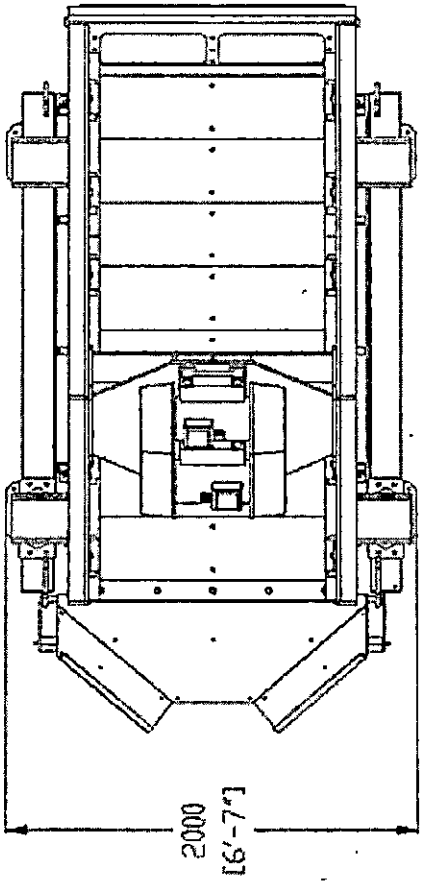
Low noise vibrating motor

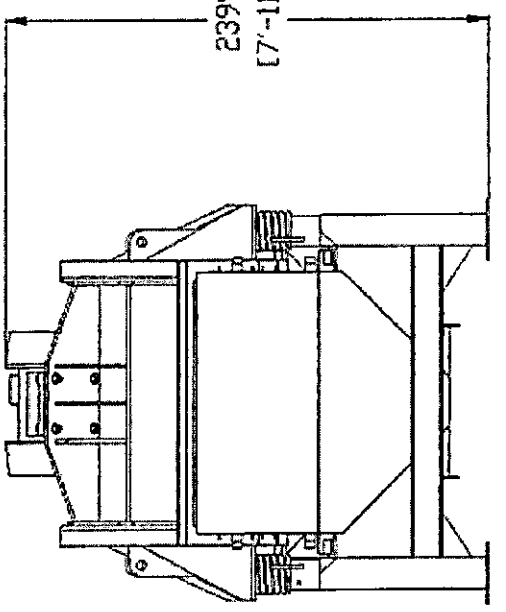


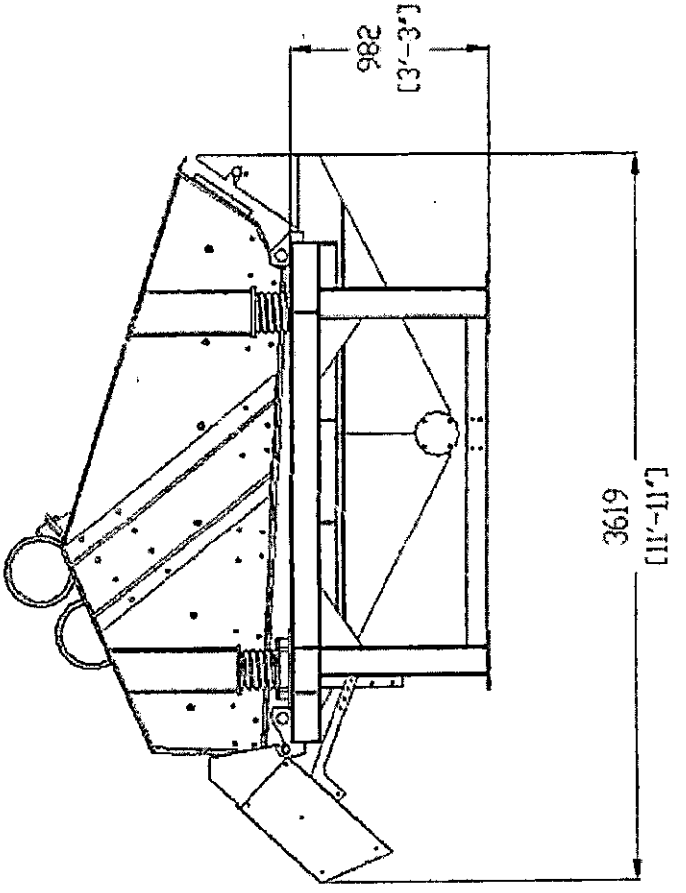
High efficiency rubber screen mount for minimal vibration

Sloped back panel for maximum water removal

DW 084 - WORKING DIMENSIONS







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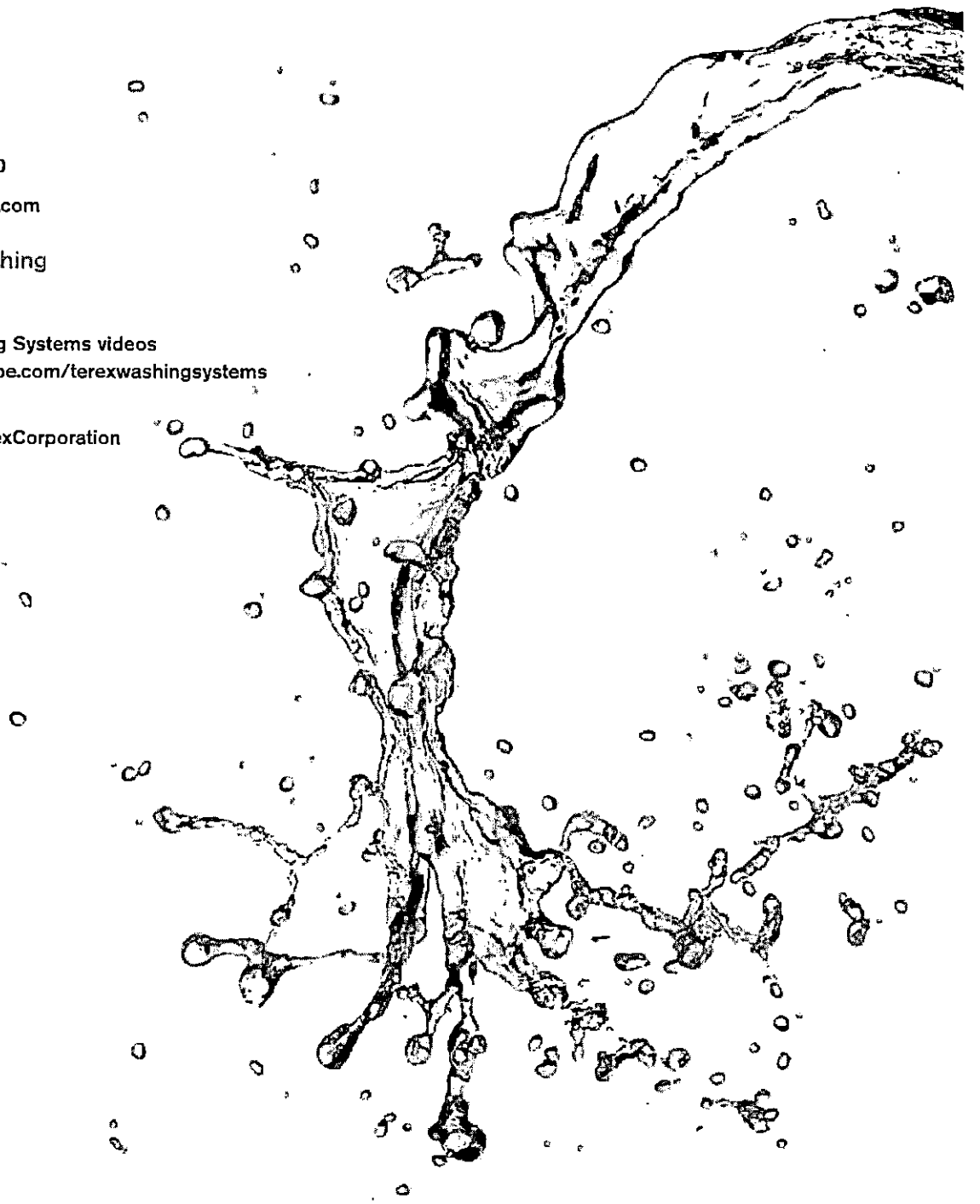

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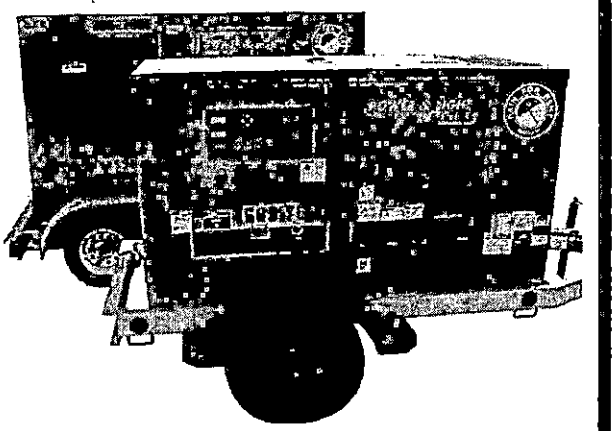
Portable Generator 20KW

Overview:

Diesel powered portable 20KW generator in a trailer-mounted sound-attenuated package. This Genset features a self-contained fuel system and is Registered for California operation with the California Air Resources Board.



Features:

- 240/480V, 3-phase, 4-wire
- 120/240V, 1-phase, 3-wire

Specs:

Footprint	10'4" x 4'6" x 4'4"
Dry Weight	2,043 lbs
Amperage @ 480V	41.67
Amperage @ 240V	83.33

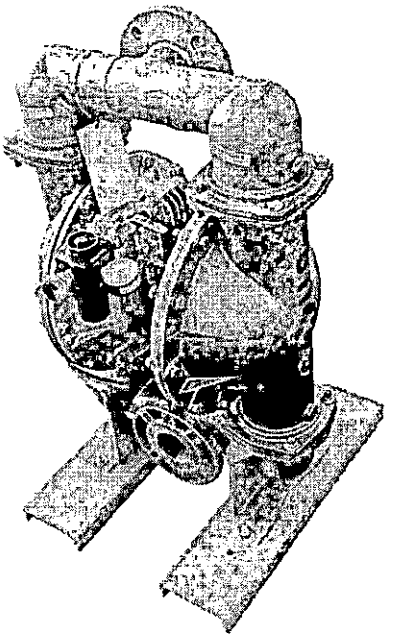
Accessories:

- Nurse Fuel Tank
- Spillguard

Air Operated Diaphragm Pump 3"

Overview:

Air-Operated Diaphragm (AOD) pumps are versatile and able to withstand caustic and abrasive liquids. Their simple design provides energy-efficient operation, and safe operation in Class I Division 2 environments. AOD pumps are trusted in many industries for their ability to handle wide varieties of liquids; from high viscosity fluids not suitable for centrifugal pumps to low viscosity fluids too challenging for positive displacement pumps.



Features:

Applications for AOD pumps include:

- Chemical Processing: Solvents, Alkalides, Magnesium Hydroxide, Resins, Electrolytes, Sulfuric Acid
- Environmental: Wastewater, Oil Skimming, Stabilizers, Effluent Sludge, Sewage Treatment, Waste Oil
- Paint and Ink Manufacturing: Titanium Dioxide Slurry, Primer, Enamels, Alkaloid Resin, Stain, Varnishes
- Liquid Handling: Fluid Transfer, Oil/Water Separators, Sump and Pit Draining, Suspensions/Dispersions
- Marine: Tank and Bilge Drainage, Water Treatment, Oil Skimming,
- Fuel Transfer
- Metal and Steel
- Mines and Quarries
- Construction
- Paper and Wood
- Clay and Ceramics
- Electrical and Appliance
- Food Processing
- Aircraft and Automotive
- Beverages
- Glass and Fiberglass

Accessories:

- Spillguard
- Suction and Discharge Hoses
- Genset
- Light Towers

Specs:

- Runs on compressed air
- Low shear flow for fragile liquids like paint, ink and clay slips.
- Explosion proof: No motors, no control panels, no batteries, no alternators, no wires
- Used in Class I Division 2 environments
- Runs dry without damage
- Self Priming: above or below liquid or even submerged
- Portable: Small size and easily moved from one application to another
- Liquids: Light end hydrocarbons, heavy slurries and dry powders
- Solids handling: Easily and efficiently handles solids 1/4" to 3"
- No packing, no mechanical seals
- Variable flow and discharge pressure up to 125 psi with a simple adjustment of the air supply
- Operates on demand systems without expensive pressure relief and bypass accessories
- Quiet operation
- Can operate against a closed discharge

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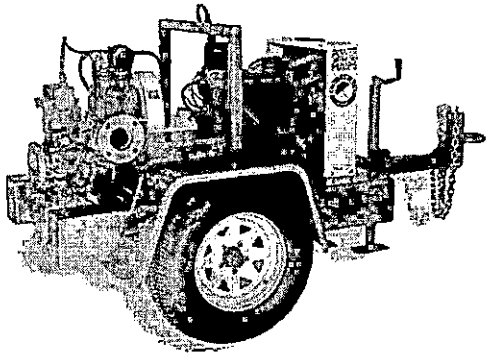
Sewage and Trash Pump DV80

Overview:

The 3" suction x 3" discharge self-priming centrifugal DV80 trash pump provides up to a maximum of 500 gallons per minute pumping and up to 138 feet of head. This pump is usually mounted on a trailer and features the standard PowerPrime Clean Prime Venturi priming system which allows it to run continuously, unattended and even run dry.



Features:

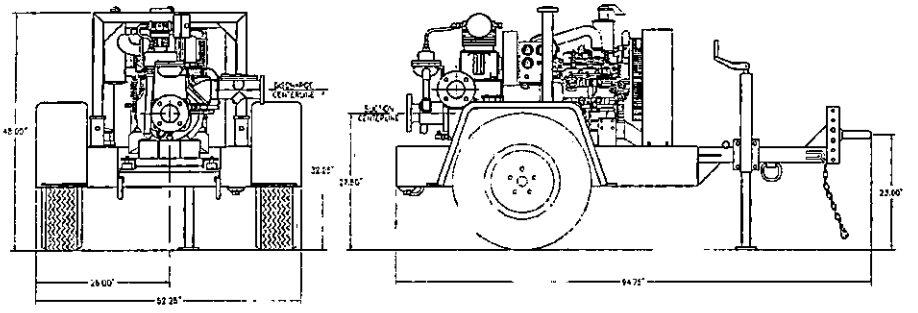
- Suction lift to 28 feet
- Continuous self-priming
- Runs dry unattended
- Auto-start capable control panel
- Electric Drive option

Specs:

Maximum Flow	500 GPM
Maximum Head	138 feet
Pump Size	3" x 3"
Maximum Solids Handling	1.25 inches
Dry weight	1,300 lbs.
Footprint: Trailer mounted model	94.75" x 52.25"

Accessories:

- Spillguard
- Suction and Discharge Hoses
- Fuel Nurse Tank



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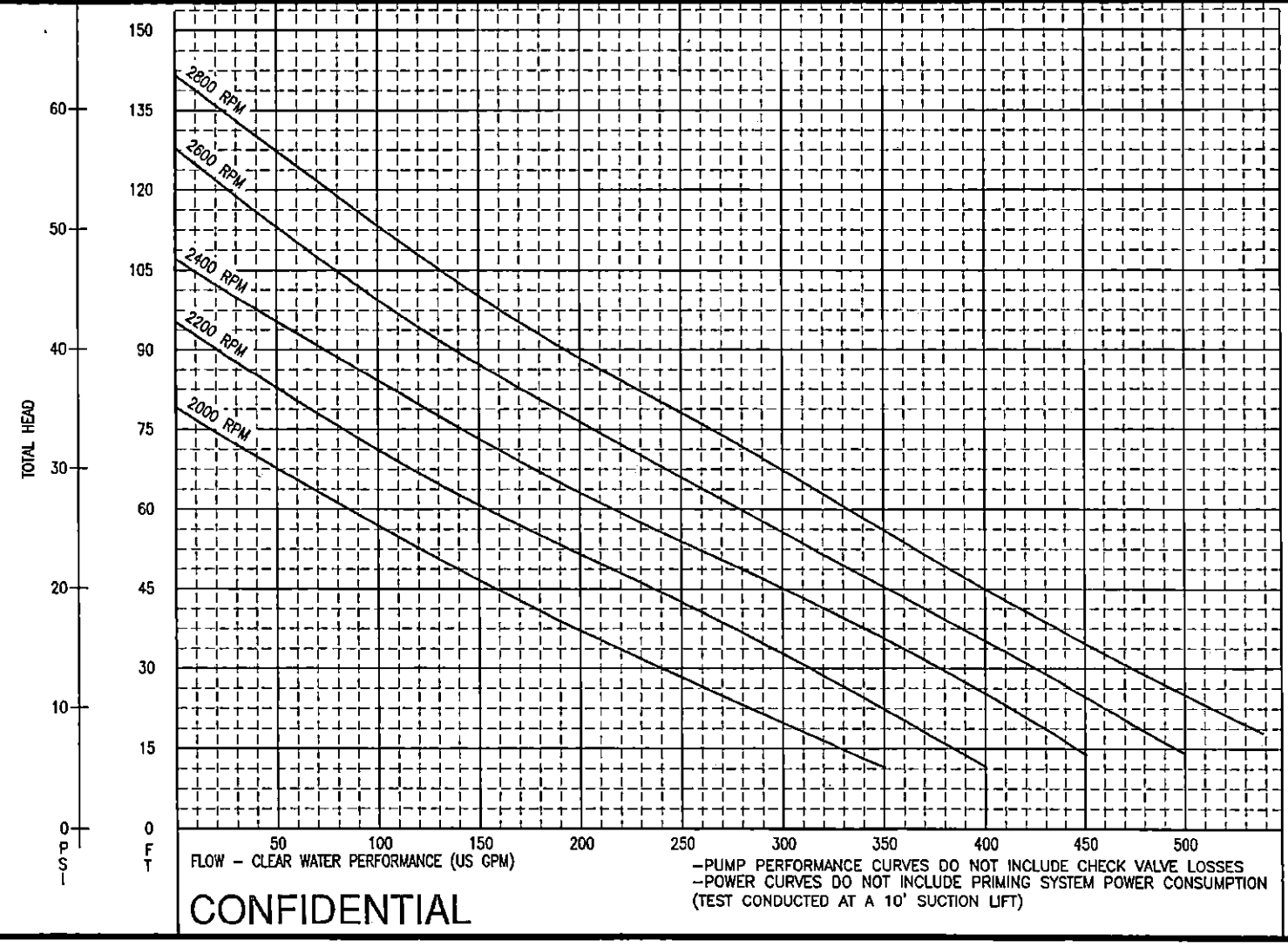
CURVE: 01-0133-02-15

PUMP : DV-80

SUCTION	DISCHARGE	MAX. SPHERE	IMPELLER	IMPELLER	IMPELLER & WEAR RINGS
3"	3"	1.25"	3 VANE	7.64"	316 S/S



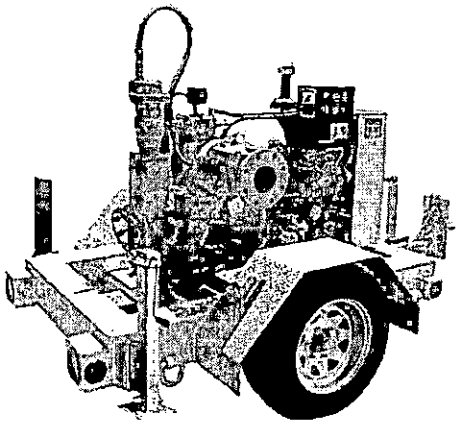
CONFIDENTIAL

-PUMP PERFORMANCE CURVES DO NOT INCLUDE CHECK VALVE LOSSES
-POWER CURVES DO NOT INCLUDE PRIMING SYSTEM POWER CONSUMPTION
(TEST CONDUCTED AT A 10' SUCTION LIFT)

Sewage and Trash Pump DV100

Overview:

The 4" suction x 4" discharge self-priming centrifugal DV100 trash pump provides up to a maximum of 820 gallons per minute pumping and up to 115 feet of head. This pump is usually mounted on a trailer and features the standard PowerPrime Clean Prime Venturi priming system which allows it to run continuously, unattended and even run dry.



Features:

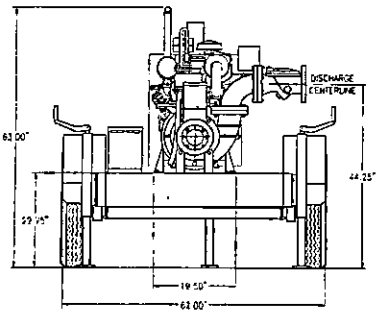
- Suction lift to 28 feet
- Continuous self-priming
- Runs dry unattended
- Auto-start capable control panel
- Electric Drive option
- Sound Attenuated option

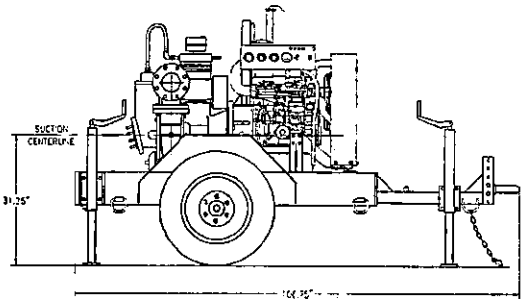
Specs:

Maximum Flow	820 GPM
Maximum Head	115 feet
Pump Size	4" x 4"
Maximum Solids Handling	2.25 inches
Dry weight	1,900 lbs.
Footprint: Trailer mounted model	106.75" x 62"

Accessories:

- Spillguard
- Suction and Discharge Hoses
- Fuel Nurse Tank





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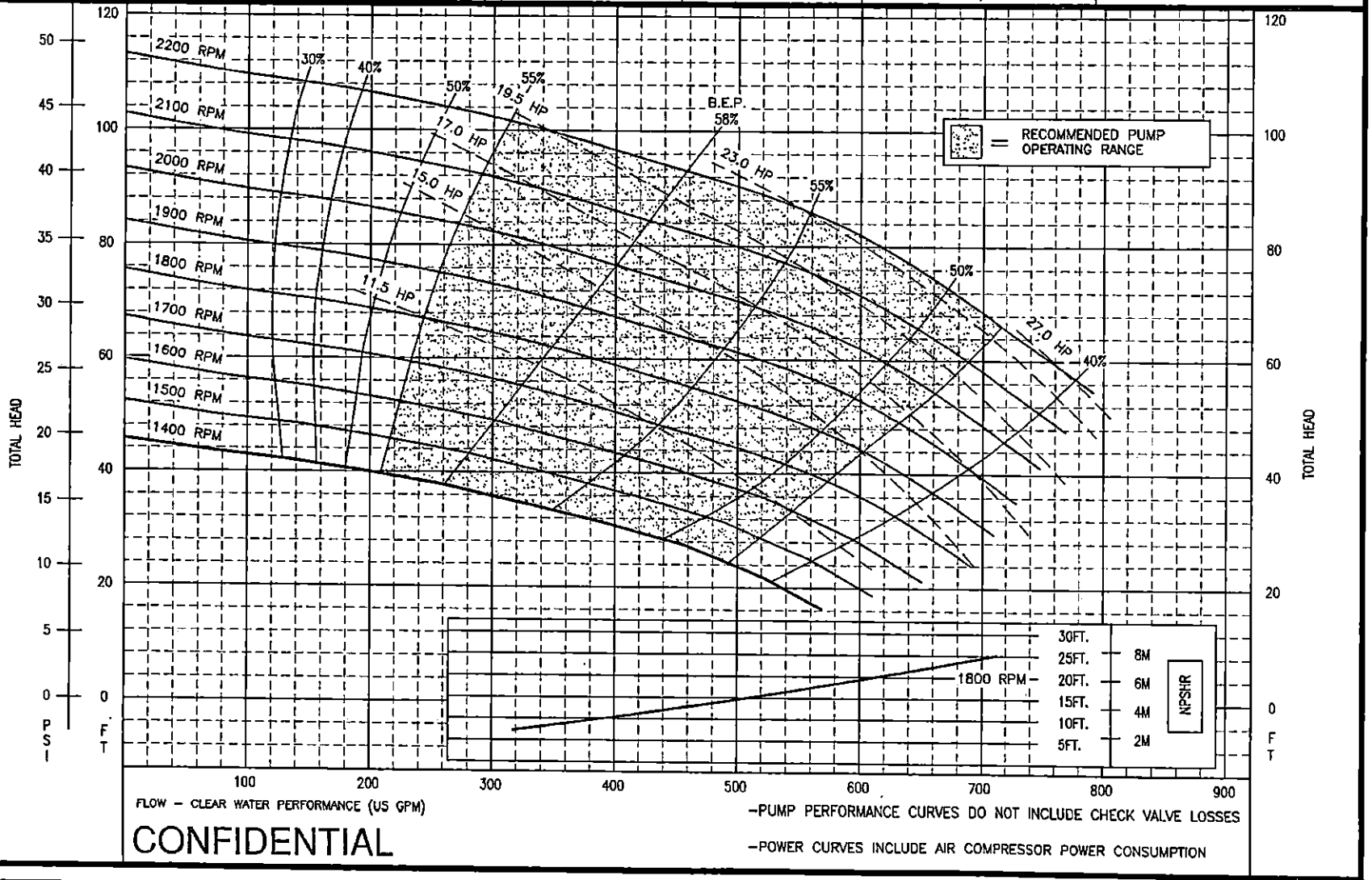
CURVE: 01-0133-02-05

PUMP : DV-100

SUCTION	DISCHARGE	MAX. SPHERE	IMPELLER	IMPELLER	IMPELLER & WEAR RINGS
4"	4"	1.77	3 VANE	8.7"	316 S/S



CONFIDENTIAL

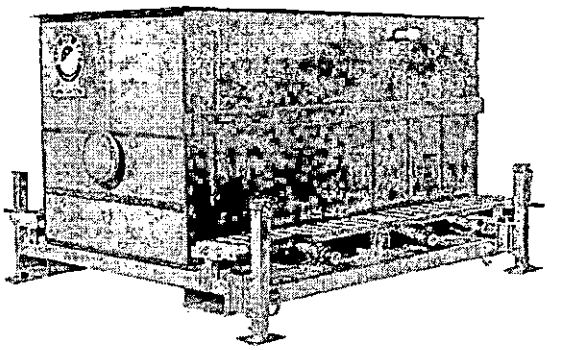
-PUMP PERFORMANCE CURVES DO NOT INCLUDE CHECK VALVE LOSSES

-POWER CURVES INCLUDE AIR COMPRESSOR POWER CONSUMPTION

Oil Water Separator OWS200

Overview:

The OWS200 is a parallel corrugated plate gravity displacement type separator designed in accordance with API 421 to remove free and dispersed non emulsified oil and settleable solids. It is skid mounted with leveling jacks. It requires no power and features no moving parts for ease and reliability.



Features:

The OWS200 removes free and dispersed non-emulsified oil, settleable solids and additionally functions as a gravity flow oil-skimmer for flows up to 300 GPM with a 0.7 specific gravity.

- 5 cubic feet sludge capacity
- 0.5 inch coalescing pack or oil attracting media
- One tank requiring 12 coalescing packs

Specs:

Max Flow	300 GPM
Material	Stainless Steel
Dry weight	2700 lbs.
Footprint:	102" x 82"
Inlet x outlet	6" x 6" Flange

Accessories:

- Spillguard
- Suction and Discharge Hoses

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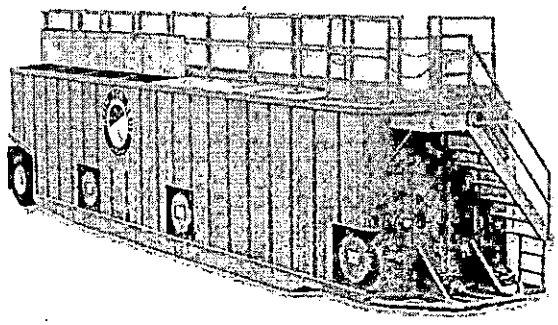
Steel Tank

Flip Top Weir

Overview:

18,100 gallon flip top weir tanks from Rain for Rent have a standard "V" shaped floor for ease of draining all stored liquids completely through a 4" butterfly valve with Buna seals standard.



Features:

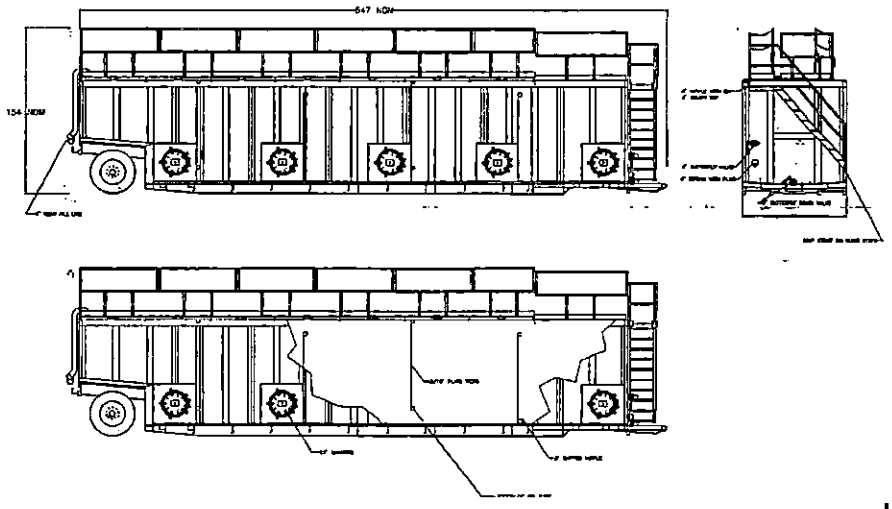
Store liquids with confidence with Rain for Rent's 18,100 gallon flip top weir tank. Permanently attached axels for maximum maneuverability allow this 18,100 gallon tank to be moved with ease on the jobsite and a safety staircase ensures proper protection for workers on site. Internal weirs allow for extra filtration and settling of materials.

Specs:

Manways	Four 22" hatches
Material	Steel
Capacity	18,100 gallons
Dry weight	27,000 lbs.
Footprint:	516" x 96" x 126"

Accessories:

- Spillguard
- Suction and Discharge Hoses
- Level gauges



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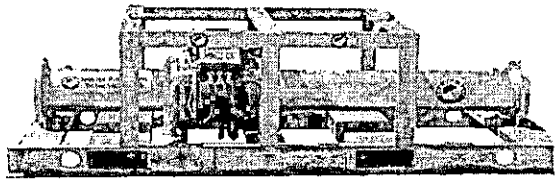
Measurement

MAG200

Overview:

The MAG200 magnetic flow meter provides accurate and reliable flow monitoring and data logging for flows between 255 GPM and 5,100 GPM through an 8 inch flanged connection and EPDM lined flow measurement section. Because there are no moving parts and a weather sealed data logging unit, the MAG200 performs reliable in all weather and environments.



Features:

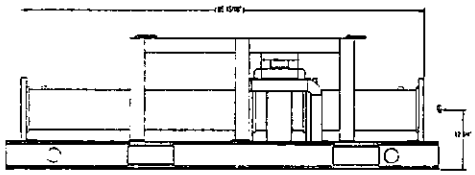
- +/- 0.5% accuracy
- No moving parts
- Mounted on a galvanized skid
- Provides digital contacts to trigger equipment or telemetry
- Dual output: Pulse and Analog 4-20 mA
- Plug and play connectors allow for fast and easy set-up
- Nema 4X enclosure for outdoor use
- Inlet and outlet straightener spool pieces provided for accuracy
- Programing can be used to control pumps and send alarms based on flow

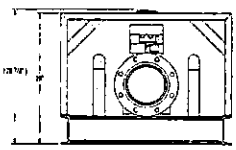
Specs:

Maximum Working Pressure	200 PSI
Flow Measured	255 to 5,100 gpm
Connection	8" Flange
Temperature Range	32°F to 200°F
Dry weight	900 lbs.
Footprint	36" x 96" x 28"
Power Consumption @ 120 VAC	24 watts

Accessories:

- Spillguard
- Suction and discharge hoses
- SolidGround Traction Mat
- Battery powered data logger
- Alarm agent





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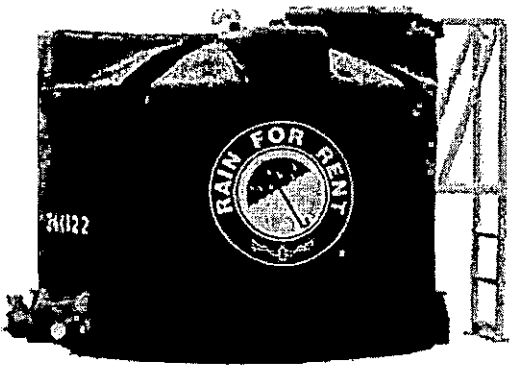
Poly Tank

EZ KLEEN® 2400

Overview:

The EZ KLEEN® 2400 Gallon Tank is made from cross-linked polyethylene for superior durability and safety. This tank is ideal for temporary storage of water, chemicals and other liquids. The EZ KLEEN 2400 is portable lightweight and ideal for use in construction, manufacturing, power plants and a variety of industrial applications.



Features:

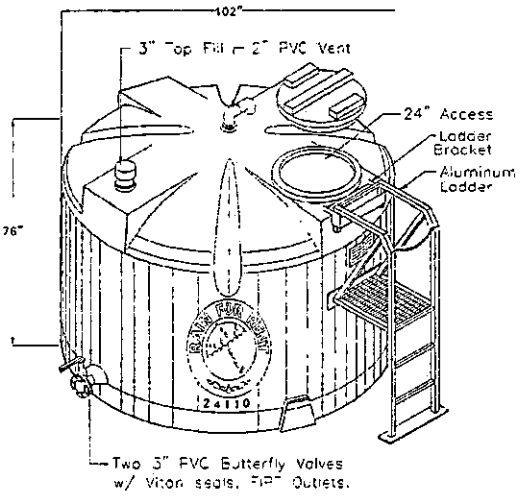
EZ KLEEN Poly Tanks have two molded in 3 inch flanges on the bottom of every tank for superior drainage and ease of cleaning. Each EZ KLEEN tank comes with a pad standard.

Specs:

Material	Cross linked polyethylene
Capacity	2400 gallons
Dry weight	960 lbs.
Footprint:	102" x 75.6"

Accessories:

- Spillguard
- Suction and Discharge Hoses
- AOD pumps
- Level gauges



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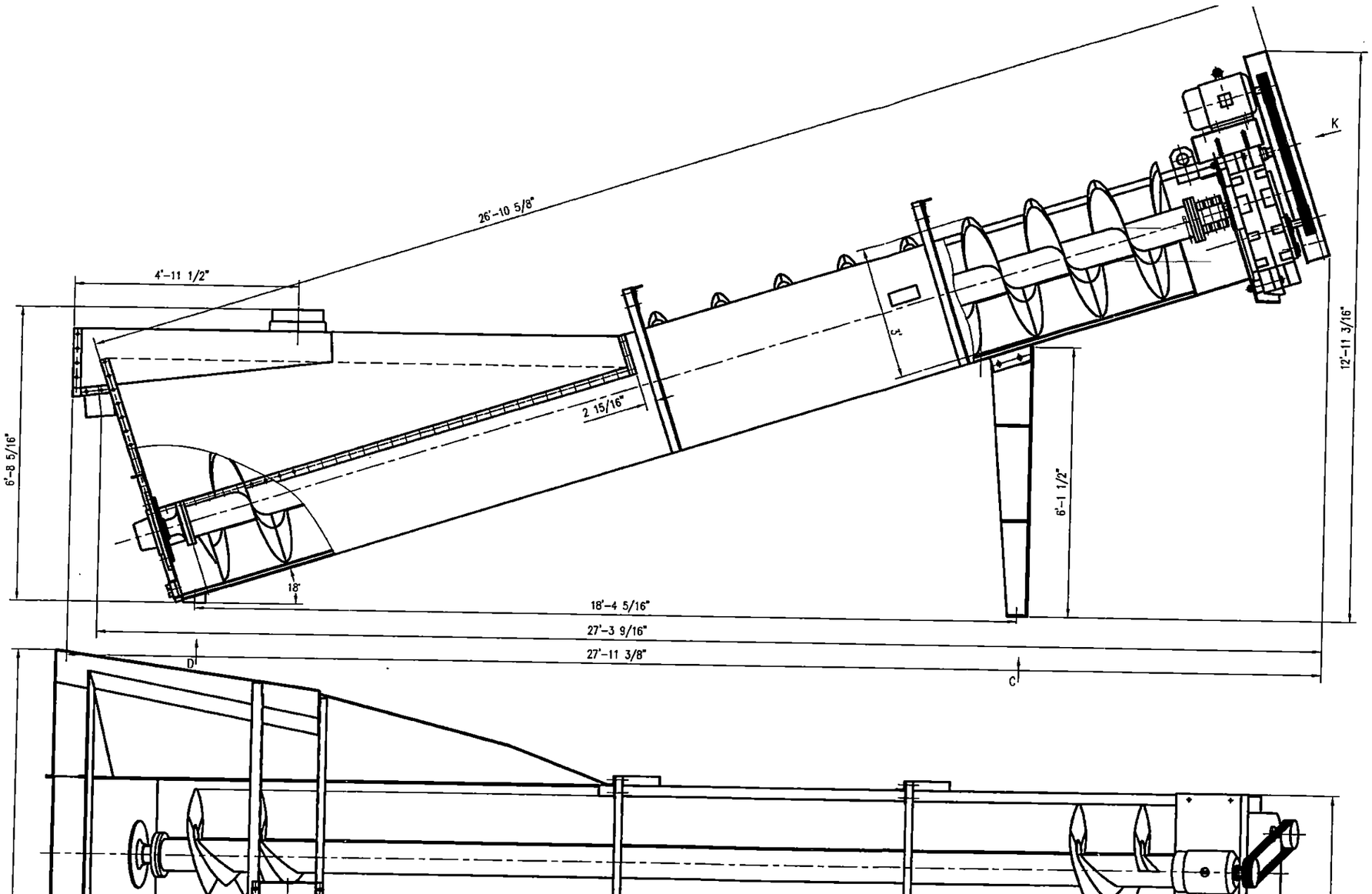
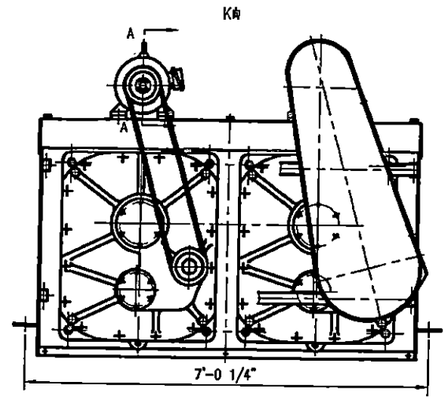
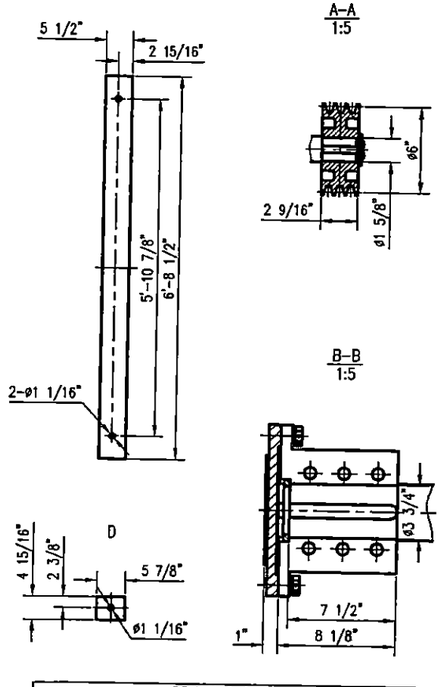






SPECIFCATIONS		
Screw diameter	36	in
Tub length	25	ft
Capacity	200	TPH
Max feed size	3/8	in
Required motor	15X2	HP
Motor speed	1760	RPM
Screw speed	21	RPM
water requirement	105~620	GPM
Weight	25500	LB
Overall dimension(LXWXH)	336X148X155	in

DES.	DATE: 2008.11.6	GATOR	
APPD.			
MACHINE MODEL: PSST3625	QUANTITY:	DWG. NO. GS01-A7	REV.

Harbor Isle

7 Washington Avenue

Island Park, NY

Results of Bench Test Using Soil Washing Technology

August 30, 2013

Prepared by Posillico Consulting

For

Posillico Development At Harbor Isle

1750 New Highway

Farmingdale, NY 11735

Results of Bench Test Using Soil Washing Technology, August 30, 2013

Table of Contents

Introduction

A bench test to measure the effect of soil washing using anionic surfactants to remove excessive tentatively-identified volatile and semivolatile compounds (TICs) was conducted in the first half of 2013 using soil showing the highest TIC content at Harbor Isle as shown in the Remedial Action Work Plan. In order to make sure that soil with the highest TIC content was used for the test, six locations shown on Figures 1 and 2 were selected based on their VOC and/or SVOC TIC results reported in the RAWP. Four of the locations had the exceedances at the 6-inch to 3-foot depth, and two had the exceedances at the 3-ft to 7-ft depth.

Sample Collection Procedure:

On September 28, 2012, at each location a backhoe excavated to the top of the target depth and then two to three backhoe buckets of the target soil horizon were deposited in a single pile on land surface.

In order to reduce the variability of the sample from each location the soil was homogenized by turning over the pile three times with shovels. Two people manned the shovels and worked on opposite sides of the pile mixing the soil from one end to the other.

Two, new, clean 5-gal, plastic pails were then placed next to the mixed pile and filled by alternating adding a shovel of soil from each side of the pile until the pails were full. This took approximately three shovelfuls from each side of the pile. The pails were covered with snap-on lids and transported to 1750 New Highway (1750) where the initial bench tests were conducted. A total of 12 pails were collected, representing six samples.

At 1750 the covered pails were moved to an unused kitchen where the samples were prepared and the testing was done.

Sample Preparation:

Prior to running the initial bench tests the two buckets of soil for each location were mixed together to further homogenize them. A sample was taken from each set of buckets to establish the baseline TIC content and identify which of the six locations had the highest content. The samples with the highest TIC load would be selected for the tests.

Baseline Characterization:

The six sample locations were numbered 1-6 for identification purposes. Two 5-gal pails from each location were thoroughly mixed with each other by combining half of each and mixing with a trowel from the bottom to the top. Three to four scoops in equal amounts were transferred with a clean trowel from each bucket to the sample jars. A 4-oz and 8-oz jar was collected for each sample location to analyze for the Methods 8260 and 8270, respectively.

Each bottle was put into a bubble wrapper envelope and placed in the bottom of the cooler. The 12 bottles exactly covered the bottom of the cooler. A clean polyethylene bag was folded and placed on

top of the bottles. A 1-gal bag of ice was placed on top of the poly and the cooler was given to a courier from the TestAmerica laboratory Edison NJ facility, where the baseline analyses were done. See Laboratory Protocol Section ahead for a description of the specific procedure followed to eliminate cross-contamination from non-petroleum compounds.

The analytical results for the baseline samples are shown in Appendix 1.

The total TIC content is shown in the following table:

Sample #	#1	#2	#3	#4	#5	#6
Total Top 10 VOC TICS- PPM	***16****	0.011	7.7	0	6.8	0.357
Total Top 20 SVOC TICs-PPM	83	4.2	***166***	***695***	55	34

* Italics indicate the TIC sum exceeds the cleanup standards: 10/100 PPM total top 10/20 TICs VOCs/SVOCs.

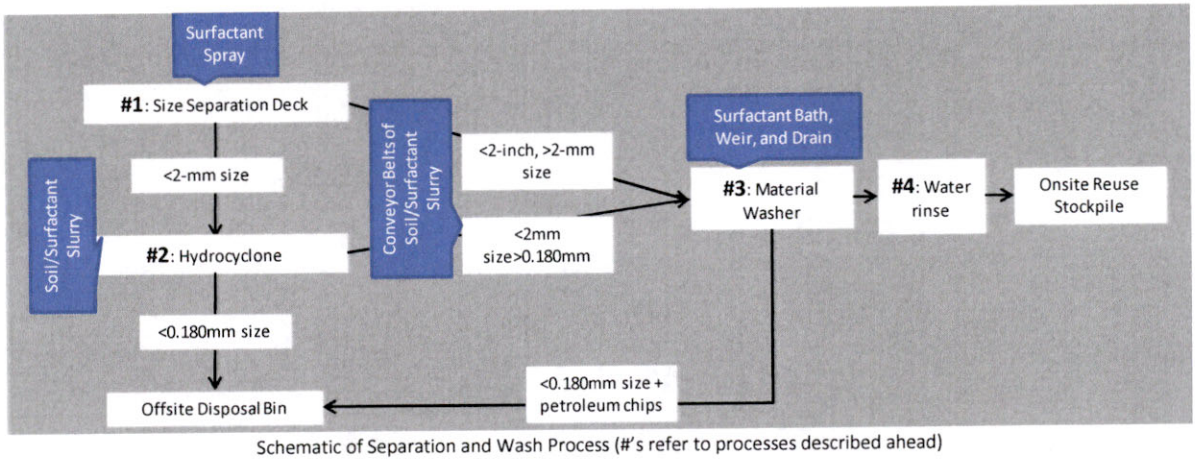
The Soil Cleanup Objectives (SCOs) in the Stipulation of Discontinuance (the agreement with the NYSDEC directing the site cleanup) above which soil has to be removed or treated are 10 PPM total VOC TICs for the highest concentration 10 TICs (VOC TICs), and 100 PPM total SVOC TICs (SVOC TICs) for the highest concentration 20 TICs. As shown in the table above, samples #2, #5 and #6 are below the SCOs and would pass the screening criteria. The remaining three samples exceed the SCOs for one of the criteria. It should also be noted that the results for the 8260/8270 Methods showed that no individual constituent exceeded the Restricted Residential criteria in 6 NYCRR Part 375. The soil in bucket #4 was chosen for the bench tests, as it had the highest SVOC TIC content and should have been the most challenging to remediate.

Bench Test Design

The objective of the first tests was to see if the concentration of residual petroleum could be reduced to acceptable levels through oxidation using oxygen-releasing compounds. This process was too complicated and potentially expensive to be a viable remediation technique for this site, so another approach was developed using more conventional soil washing technologies.

Soil washing machinery is readily available from the sand-processing and mining industries. Commercial, large-scale, soil washing remediation companies have been using this approach since the early 1990's. The only chemicals that would be needed are surfactants that would enable the residual petroleum in the soil to become emulsified and also to lose its molecular attraction to the sediment grains and become entrained in the water flow processes of the soil-washing equipment.

A process-flow diagram was created from which the soil-washing components and their relationship to each other could be identified and engineered. The bench test was designed to replicate the anticipated large-scale soil washing process shown on the process flow diagram, Figure 3 and summarized in the following diagram. A summary of the proposed soil washing process is in Appendix 4. In the field the soil would initially be screened to remove large debris. The soil would then pass through a multi-stage sorting process using a water-surfactant solution that would separate the > 2-in fraction, which would be power washed to clean it. Then the fines (<#80 sieve, 0.180mm) would be removed, dewatered and stockpiled for disposal, as that portion was expected to be the hardest to restore. As shown on the depiction, the sediments will contact surfactant water throughout the process with a final clean water rinse at the end of the process. The bench test was designed to reproduce the material flow, surfactant contact, and size separation equipment as described ahead.



Schematic of Separation and Wash Process (#'s refer to processes described ahead)

Industry experience shows that the very fine silt to clay-sized particles are the hardest to wash clean, so these fractions are usually separated from the mass of soil and disposed offsite. The remainder of the soil mass is the portion that responds the best to the washing process.

On April 1, 2013 the Posillico Materials laboratory performed a sieve analysis of the six soil samples used in the baseline test to determine the range in grain size at the site based on the available samples. The results are shown in the following table which duplicates the data provided by the lab. The approximate amount of each size fraction for the six sampled locations, as shown in the table ahead, is 10-40% and 10% for the >#8 and <#80 sieves respectively. The optimal size range chosen for the process is the portion that was smaller than the 2-in. diameter size range and larger than the 0.180-mm (#80 sieve). According to the sieve analysis this should comprise 50-60% of the soil load at the site. When the >#8 sieve (>2.2mm) portion is added to this the amount of soil that will be treated and reused could be as high as 90% of the contaminated amount.

Gradation Analysis for Contaminant Soil at Island Park, NY																		
Sample #		1			2			3			4			5			6		
MM	Sieve	WT.	% Retained	% Passing	WT.	% Retained	% Passing	WT.	% Retained	% Passing	WT.	% Retained	% Passing	WT.	% Retained	% Passing	WT.	% Retained	% Passing
19.000	3/4"	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00
12.500	1/2"	0.00	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	17.90	3.00	97.00	0.00	0.00	100.00	0.00	0.00	100.00
9.500	3/8"	43.00	6.70	93.30	120.50	18.50	81.50	0.00	0.00	100.00	16.30	2.70	94.30	60.80	9.60	90.40	25.50	4.00	96.00
6.300	1/4"	14.00	2.20	91.10	91.80	14.10	67.40	8.00	1.20	98.80	56.10	9.40	84.80	61.10	9.60	80.80	16.80	2.60	93.40
4.750	#4	19.00	3.00	88.10	57.30	8.80	58.60	9.80	1.50	97.30	35.90	6.00	78.80	38.70	6.10	74.80	30.60	4.80	88.70
2.360	#8	58.80	9.20	79.00	97.00	14.90	43.70	21.90	3.30	93.90	53.40	9.00	69.90	78.20	12.30	62.50	48.00	7.50	81.20
2.000	#10	25.40	4.00	75.00	22.70	3.50	40.20	9.80	1.50	92.40	17.50	2.90	66.90	25.50	4.00	58.50	17.40	2.70	78.50
1.180	#16	60.80	9.50	65.50	51.50	7.90	32.30	29.50	4.50	87.90	39.60	6.60	60.30	53.60	8.40	50.00	37.00	5.80	72.70
0.600	#30	83.30	13.00	52.50	60.60	9.30	23.00	63.30	9.70	78.20	69.90	11.70	48.60	80.00	12.60	37.50	76.70	11.90	60.80
0.300	#50	174.60	27.20	25.30	66.40	10.20	12.80	269.30	41.20	37.10	162.00	27.20	21.40	107.80	16.90	20.50	183.30	28.50	32.30
0.180	#80	89.70	14.00	11.30	24.70	3.80	9.00	26.60	4.10	33.00	64.70	10.90	10.50	47.40	7.40	13.10	48.30	7.50	24.80
0.150	#100	19.20	3.00	8.30	5.20	0.80	8.20	168.20	25.70	7.30	12.70	2.10	8.40	9.90	1.60	11.50	61.70	9.60	15.20
0.075	#200	31.60	4.90	3.40	13.70	2.10	6.10	35.40	5.40	1.90	24.10	4.00	4.30	23.50	3.70	7.80	55.20	8.60	6.60
	Pan	21.60	3.40		39.40	6.10		12.20	1.90		25.90	4.30		49.90	7.80		42.60	6.60	
	Totals	641.00	100.00		651.10	100.00		654.00	100.00		596.00	100.00		636.40	100.00		643.10	100.00	

Surfactant Selection and Preparation

Several surfactants and petroleum cleaners were tried until the desired results were achieved. Dawn ™ detergent, Sodium Laureth sulfonate, Bio-Solve™ (proprietary petroleum and grease emulsifier), and Mastery™ (another proprietary oil stain remover) didn't achieve the cleanup objectives.

Air Products Corporation produces various types of surfactants and some of its products have been used to clean beachfront marine petroleum spills. They suggested testing the products called Tomadol 901, Tomadol 91-6, and an additive called G-12 to see how each of them worked by themselves and combined with the G-12 additive. Air Products suggested a 2 %surfactant concentration by volume for each surfactant should achieve the SCOs. They also suggested a test using the 2% surfactant concentration plus 0.5% G-12 in case the surfactant alone didn't reach the SCOs.

In addition to the Air Products recommended mixtures, additional mixtures were prepared using a surfactant concentration of 5% for each surfactant, and two more tests using the 5% surfactant concentration plus 0.5% G-12 to see if there was any difference using a higher surfactant content.

Test Description

Bench tests were conducted on June 21, 2013 and July 29, 2013. The samples prepared in June were solvent extracted according to the Method 8270 procedures for sediment, whereas the July samples were first extracted using the Synthetic Precipitation Leaching Procedure (SPLP) to represent the effect of residual SVOCs on groundwater quality. The SPLP leachate was then analyzed using Method 8270 for water samples.

June 21, 2013 Tests

Eight tests were conducted on June 21, 2013 and numbered as shown in the following table. Two additional samples were also sent to the lab: a Control Sample to characterize the TIC content of the untreated soil: and a sample of several pieces of an unknown substance that was seen during the wash process, as explained ahead.

The samples and surfactant mix and matrix were labeled as follows:
Control Sample: Untreated soil in bucket #4
#1- 2% 91.6
#2- 5% 91.6

#3-2% 91.6 + 0.1% G12 (TWICE THE AMOUNT OF G-12 WAS ADDED BY ACCIDENT)
#4- 5% 91.6 + 0.05% G12
#5- 2% 901
#6- 5% 901
#7- 2% 901+0.5% G12
#8- 5% 901+0.5% G12
#9- Black, low density pieces (see ahead for description of this fraction)

Two gallons of water were used in each test and the surfactant solutions were prepared as follows:

- A 2% solution of surfactant to water is 256 oz. water combined with 5.12 oz. surfactant.
- A 5% solution of surfactant to water is 256 oz. water combined with 12.8 oz. surfactant.
- A 0.5% solution of G-12 is 1.28 oz. G-12 to the resulting 901 or 91-5 solution.

The water and surfactant were measured out for each test and mixed together in a clean five-gallon pail before any soil was added to the solution.

Surfactants and measuring cups

Sieves and buckets

Analytical Procedure

As mentioned earlier, the SCOs for VOC TICs and SVOC TICs are listed in the Stipulation. However, as the soil in bucket #4 didn't exceed the SCO for VOC TICs and the soil washing process will expose the sediment to the atmosphere and extensive water washing that will virtually remove all VOCs from the sediment, the VOC TICs were not analyzed for in the bench test. During the remediation process both cleanup objectives will initially be analyzed for and used to determine when the soil meets the cleanup goals. If the initial data shows that after the washing process VOC TICs are not present, or when detected are less than the standards, this part of the analysis will be discontinued and only SVOC TICs will be used to demonstrate that the soil meets the SCOs.

Laboratory Protocol

Two sources of error were identified in the Method 8270 analytical procedure that was used to quantify the SVOCs in the samples and the top 20 TICs. The extraction process in this method extracts all SVOC

chemicals from the sample regardless of whether they are petroleum-related or not, which could increase the reported total TIC content if non-petroleum SVOCs were present in the soil sample.

Another source of error in the Method 8270 reporting protocol is that the mass spectrometer reads all TICs in the chromatogram including unknown compounds that aren't related to petroleum species, unknown alcohols, surfactants, etc. and other non-petroleum spikes such as unknown hydrocarbons.

The lab was asked for its recommendation on how to eliminate the non-petroleum TICs from the report. It recommended using a silica gel cleanup prior to the extraction phase, which would eliminate the non-petroleum organic chemicals from the sample extract; and to only report the hydrocarbon-related TICs, which requires a chemist to read the GC scans and spectrometer results and remove the non-petroleum TICs from the report leaving the top 20 petroleum TICs. In this way the highest concentration peaks would more closely represent the actual content of petroleum-related SVOCs plus unknown hydrocarbons.

One other component of the sediment at the Harbor Isle Site is iron precipitate occurring as small particles in the sediment. A hypothesis developed that theses porous particles created nooks and crannies where SVOCs could not be affected by the surfactant, but could be extracted by the solvent used in the analytical method. Originally it was hoped that these particles could be removed from the sample prior to the extraction phase of the analysis and analyzed separately to see if the hypothesis was valid. The Denver TestAmerica lab was recommended as the lab where the particle removal could be tried. However, not enough particles were present in the sample for a separate SVOC analysis to see if they would add to the TIC load.

Once the samples were sent to Denver for the particle separation test, we found out that that lab didn't do silica gel cleanups, so that part of the analysis was not done either.

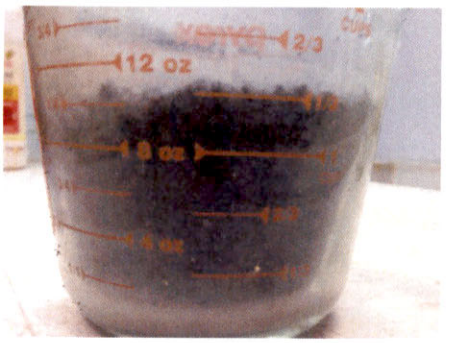
The result is that the standard 8270 analysis was done on the samples and only the petroleum hydrocarbon TICs were reported.

Bench Test

Soil from bucket# 4 was used for the tests as it had the highest SVOC TIC content. Ten ounces of soil was used for each test. A Control Sample was taken to establish the baseline SVOC TIC content of untreated soil.

The test was run as follows:

1. 10 ounces of soil was taken from the bucket using a clean glass cup.



2. This soil was dry-screened through a #10 sieve to separate the >2 mm sized grains from the smaller fraction. The smaller fraction passed through the sieve directly into the bucket with the surfactant solution.

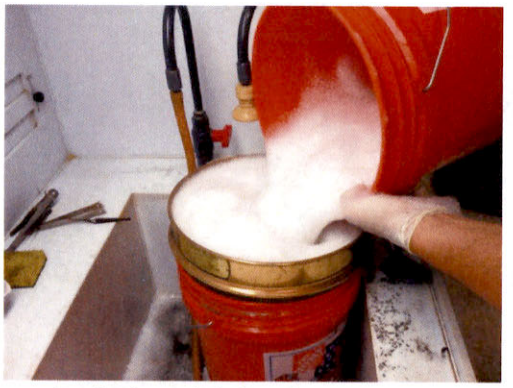
Dry screening the unwashed soil

The portion retained by the sieve was placed on the lab bench for use later in the test, and the portion in the bucket was stirred for approximately 30 seconds, which made the total time exposed to the surfactant solution 60 seconds. This was done to simulate the wet screening, transfer of the wet slurry to the hydrocyclone, and separation process in the hydrocyclone identified in the diagram above as **#1** and **#2**.

Stirring the <2-mm soil fraction

3. After approximately 60 seconds contact time, the solution and soil was poured through a #80 sieve to drain the water along with particles <0.180-mm. As not all of the smaller particles passed through the sieve and the stirring didn't fully replicate the agitation that would occur

from the actual equipment, the fraction retained by the sieve was hand scrubbed to loosen any of the finer particles and any petroleum sticking to the grains. The partially used surfactant solution in the bucket was set aside so that the <0.180-mm fraction would settle to the bottom of the bucket.



Pouring the washed <2-mm fraction into Sieve

Hand scrubbing the <2-mm fraction

4. The #80 sieve and the retained soil fraction was water washed to remove any <0.180-mm particles that didn't pass through the sieve and any fine petroleum particles that may have come loose during the hand scrubbing . Although water washing isn't in the process, the hydrocyclone will remove the smaller sized fraction that is moving with the surfactant solution along with any petroleum particles that may have separated from the sand grains. The water wash approximates this part of the process, #2 in the diagram above and the movement of the slurry extruded from the hydrocyclone onto the conveyor belt that will take the soil to the material washer where it will be combined with the >2-mm fraction separated in process #1.

Water washing retained sediment >#80 sieve

Cleaned, washed sediment from #80 sieve

5. The retained surfactant from the initial wash was then decanted into a clean bucket to remove any particles that settled to the bottom. In the field, this fraction that is <0.180-mm will be ejected from the hydrocyclone and placed in the disposal bin.

Decanting partially-spent surfactant

Sediment in left bucket, surfactant in right

6. The >2-mm fraction was combined with the >0.180-mm fraction and added to the bucket containing the surfactant solution to reproduce the material washer process, identified in the diagram above as #3.

Transferring the >0.180-mm washed sediment to a glass cup. The >2-mm sediment on the left will also be transferred to the cup. The cup in the picture on the right contains both sizes of soil.

Adding sediment in the cup to surfactant solution.

Vigorously stirring sediment in the surfactant.

7. The surfactant solution and soil was mixed vigorously for 60 seconds after which the sediment was separated from the surfactant by passing it through the #80 sieve. Black, low density floating particles were seen in the screened soil. In the field, these particles will be removed by the hydrocyclone and weir-material washer machine. The bench test removed these particles by transferring the sediment in the #80 mesh sieve to a 2-liter bucket in which a strong stream of

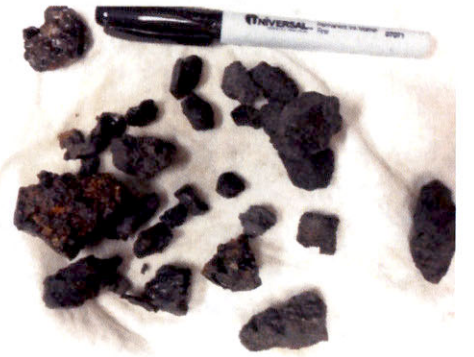
water from the faucet was used to wash the surfactant and emulsified petroleum from the sediment and float the lighter particles over the lip of the bucket. The clean water wash simulates step #4 in the earlier diagram- water rinse.

Transferring sediment from #80-mesh screen to bucket

Floating lighter particles over bucket lip using water stream

During the "floating process" part of the floaters consisted of larger pieces of what appeared to be weathered asphalt. These were manually removed for analysis. The washed sediment in the 2-liter bucket was then transferred to a sampling jar and sent to the lab for analysis.

Washed soil in 2-liter bucket



Larger, low density pieces saved for lab analysis

The Control Sample and Samples #1 and #2 were collected on June 20, 2013. The remaining samples were collected the next day, Friday and delivered to TestAmerica, Denver via overnight delivery in a chilled insulated plastic cooler.

July 29, 2013 Test

The procedure summarized in the June 21, 2013 Bench Test results (previous section) were used for this test. The only difference was the amount of sample the laboratory required was twice as large as that used in the earlier test. Therefore, the amount of water and surfactants was doubled as follows:

Soil stock: 20 oz. (volume)
Water: 4 gallons
Surfactant 901: 25.6 oz. for 10% strength
Surfactant G-12: 2.56 oz. for 0.5% strength

The sieving and mixing times were a bit longer due to the larger amount of soil:
- First sieving and surfactant mixing: 60 seconds+30 seconds= 90 seconds total.
- Second surfactant mixing: 78 seconds.

No untreated soil was analyzed for this test as previous tests of soil from Bucket #4 have shown TICs were approximately 1000 PPM.

Results

TICs-

The following table shows the total TIC content for the top 20 petroleum-related TICs. The lab report is in Appendix 2.

The untreated Control sample had a TIC content of 1,125 PPM, whereas the washed samples had significantly lower contents ranging from 205-94 PPM. The results show that soil washing is a viable process that can remove the weathered petroleum from the soil matrix.

Sample #8 was washed with the highest surfactant concentration and met the SCO. However, sample #1 used the lowest surfactant concentration and had the second best performance with a result just above the SCO.

These results were achieved under laboratory conditions using the most contaminated soil, which isn't representative of field conditions. In addition, not all of the tarry, weathered petroleum pieces were removed, as they would not float over the lip of the pail. More effort was taken to float off these particles in the July 29, 2013 test and the 8270 results show that the added effort reduced the total TICs to less than the SCOs.

June 21, 2013 TIC Content (mg/kg, PPM)	
Sample #	TIC Content
Control	1125
#1- 2% 91.6	138
#2- 5% 91.6	205
#3-2% 91.6 + 0.1% G12	119
#4- 5% 91.6 + 0.05% G12	196
#5- 2% 901	184
#6- 5% 901	147
#7- 2% 901+0.5% G12	119
#8- 5% 901+0.5% G12	94
#9- Black, low density pieces (see ahead for description of this fraction)	809

In the field several factors will need to be considered as the soil is washed:

1. Not all of the soil at the site is as contaminated as the test sample. Soil with lower weathered petroleum loads will perform better than the most contaminated soil.
2. Less contaminated soil will meet the SCOs using lower surfactant concentration.
3. The contact time for the soil with the surfactant and the agitation/abrasion portions of the treatment system will need to be adjusted based on field readings and changing conditions. This may result in some treated soil being rewashed if the first washing didn't meet the SCOs.
4. Rewashed soil that doesn't meet the SCOs may need to be disposed offsite.

Results SPLP

The laboratory report for the SPLP test is in Appendix 3.

The results are shown in the following table.

July 29, 2013 TIC Content (mg/kg, PPM)	
Sample #	TIC Content
Soil (Top 20 TICs)	78
SPLP Leachate (13 TICs in extract)	2.7

The first observation is that the washed soil meets the cleanup standards. This result confirms the earlier test result showing that soil washing is a viable technology to clean the soil. As mentioned in the previous section, more care was taken to remove the weathered petroleum pieces in this test.

The second observation is that even though approximately 80 PPM of TICs were in the washed sample, the effect on dissolved components that could enter the groundwater are negligible as the TIC content of the SPLP extract was less than 3 PPM for the 13 detected TICs.

Moreover, as discussed ahead, the results for both the washed soil and SPLP extract show that very few of the constituents in the Part 375.6.8(b) SCOs are detected and none are exceeded.

Part 375.6.8(b), Soil Cleanup objectives

In addition to analyzing for the TICs, the SVOC constituents in the Part 375-6.8(b) Soil cleanup Objectives were also determined and compared to the SCOs. The Executive Summary tables for the nine samples in the June 21, 2013 bench test and the July 29, 2013 SPLP samples are shown below and the laboratory data packages are in Appendices 2 and 3.

The specific SCOs for the detected chemicals are also listed ahead to compare the results to the standards.

The results show that none of the samples exceeded the Part 375 SCOs for Residential and Restricted Residential use.

June 21, 2013 Bench Test Results Summary

EXECUTIVE SUMMARY - Detections

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-43694-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-43694-1	**CONTROL**					
2-Methylnaphthalene		2900	J	6200	ug/Kg	8270C
Acenaphthene		7800		6200	ug/Kg	8270C
Chrysene		920	J	6200	ug/Kg	8270C
Dibenzofuran		3000	J	6200	ug/Kg	8270C
Fluoranthene		3800	J	6200	ug/Kg	8270C
Fluorene		8200		6200	ug/Kg	8270C
Naphthalene		1600	J	6200	ug/Kg	8270C
Phenanthrene		13000		6200	ug/Kg	8270C
Pyrene		4400	J	6200	ug/Kg	8270C
280-43694-2	**#1**					
2-Methylnaphthalene		230	J	310	ug/Kg	8270C
Acenaphthene		640		310	ug/Kg	8270C
Benzo[a]anthracene		48	J	310	ug/Kg	8270C
Benzo[b]fluoranthene		34	J	310	ug/Kg	8270C
Chrysene		78	J	310	ug/Kg	8270C
Dibenzofuran		270	J	310	ug/Kg	8270C
Fluoranthene		350		310	ug/Kg	8270C
Fluorene		700		310	ug/Kg	8270C
Naphthalene		130	J	310	ug/Kg	8270C
Phenanthrene		1200		310	ug/Kg	8270C
Pyrene		360		310	ug/Kg	8270C
280-43694-3	**#2**					
2-Methylnaphthalene		320	J	1600	ug/Kg	8270C
Acenaphthene		1200	J	1600	ug/Kg	8270C
Anthracene		1100	J	1600	ug/Kg	8270C
Chrysene		130	J	1600	ug/Kg	8270C
Fluoranthene		560	J	1600	ug/Kg	8270C
Fluorene		1300	J	1600	ug/Kg	8270C
Phenanthrene		2300		1600	ug/Kg	8270C
Pyrene		650	J	1600	ug/Kg	8270C

EXECUTIVE SUMMARY - Detections

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-43694-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-43694-4	**#3**					
2-Methylnaphthalene		180	J	320	ug/Kg	8270C
Acenaphthene		570		320	ug/Kg	8270C
Anthracene		560		320	ug/Kg	8270C
Benzo[a]anthracene		37	J	320	ug/Kg	8270C
Benzo[b]fluoranthene		30	J	320	ug/Kg	8270C
Chrysene		52	J	320	ug/Kg	8270C
Fluoranthene		290	J	320	ug/Kg	8270C
Fluorene		610		320	ug/Kg	8270C
Phenanthrene		1100		320	ug/Kg	8270C
Pyrene		330		320	ug/Kg	8270C
280-43694-5	**#4**					
2-Methylnaphthalene		290	J	1600	ug/Kg	8270C
Acenaphthene		950	J	1600	ug/Kg	8270C
Anthracene		930	J	1600	ug/Kg	8270C
Dibenzofuran		350	J	1600	ug/Kg	8270C
Fluoranthene		470	J	1600	ug/Kg	8270C
Fluorene		1100	J	1600	ug/Kg	8270C
Phenanthrene		1900		1600	ug/Kg	8270C
Pyrene		580	J	1600	ug/Kg	8270C
280-43694-6	**#5**					
2-Methylnaphthalene		340	J	1600	ug/Kg	8270C
Acenaphthene		1100	J	1600	ug/Kg	8270C
Anthracene		1100	J	1600	ug/Kg	8270C
Dibenzofuran		390	J	1600	ug/Kg	8270C
Fluoranthene		510	J	1600	ug/Kg	8270C
Fluorene		1200	J	1600	ug/Kg	8270C
Phenanthrene		2200		1600	ug/Kg	8270C
Pyrene		660	J	1600	ug/Kg	8270C
280-43694-7	**#6**					
2-Methylnaphthalene		210	J	330	ug/Kg	8270C
Acenaphthene		730		330	ug/Kg	8270C
Anthracene		310	J	330	ug/Kg	8270C
Benzo[a]anthracene		51	J	330	ug/Kg	8270C
Benzo[b]fluoranthene		42	J	330	ug/Kg	8270C
Chrysene		79	J	330	ug/Kg	8270C
Fluoranthene		370		330	ug/Kg	8270C
Fluorene		750		330	ug/Kg	8270C
Phenanthrene		1300		330	ug/Kg	8270C
Pyrene		410		330	ug/Kg	8270C

EXECUTIVE SUMMARY - Detections

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-43694-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-43694-8	**#7**					
2-Methylnaphthalene		240	J	320	ug/Kg	8270C
Acenaphthene		800		320	ug/Kg	8270C
Benzo[a]anthracene		56	J	320	ug/Kg	8270C
Benzo[a]pyrene		20	J	320	ug/Kg	8270C
Benzo[b]fluoranthene		34	J	320	ug/Kg	8270C
Benzo[g,h,i]perylene		16	J	320	ug/Kg	8270C
Chrysene		100	J	320	ug/Kg	8270C
Dibenzofuran		340		320	ug/Kg	8270C
Fluoranthene		450		320	ug/Kg	8270C
Fluorene		890		320	ug/Kg	8270C
n-Nitrosodiphenylamine(as diphenylamine)		1800		320	ug/Kg	8270C
Phenanthrene		1600		320	ug/Kg	8270C
Pyrene		480		320	ug/Kg	8270C
280-43694-9	**#8**					
2-Methylnaphthalene		200	J	320	ug/Kg	8270C
Acenaphthene		670		320	ug/Kg	8270C
Benzo[a]anthracene		46	J	320	ug/Kg	8270C
Benzo[b]fluoranthene		31	J	320	ug/Kg	8270C
Chrysene		69	J	320	ug/Kg	8270C
Fluoranthene		330		320	ug/Kg	8270C
Fluorene		700		320	ug/Kg	8270C
n-Nitrosodiphenylamine(as diphenylamine)		1400		320	ug/Kg	8270C
Phenanthrene		1200		320	ug/Kg	8270C
Pyrene		370		320	ug/Kg	8270C
280-43694-10	**#9**					
2-Methylnaphthalene		2100	J	6400	ug/Kg	8270C
Acenaphthene		5200	J	6400	ug/Kg	8270C
Anthracene		5300	J	6400	ug/Kg	8270C
Chrysene		610	J	6400	ug/Kg	8270C
Dibenzofuran		2700	J	6400	ug/Kg	8270C
Fluoranthene		2700	J	6400	ug/Kg	8270C
Fluorene		5800	J	6400	ug/Kg	8270C
Naphthalene		980	J	6400	ug/Kg	8270C
Phenanthrene		11000		6400	ug/Kg	8270C
Pyrene		3100	J	6400	ug/Kg	8270C

SPLP SVOC Results, July 29, 2013 Sample

EXECUTIVE SUMMARY - Detections

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-44908-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-44908-1	**SPLP+8270**					
2-Methylnaphthalene		120	J	320	ug/Kg	8270C
Acenaphthene		570		320	ug/Kg	8270C
Benzo[a]anthracene		44	J	320	ug/Kg	8270C
Chrysene		59	J	320	ug/Kg	8270C
Fluoranthene		260	J	320	ug/Kg	8270C
Naphthalene		83	J	320	ug/Kg	8270C
Phenanthrene		1100		320	ug/Kg	8270C
Pyrene		440		320	ug/Kg	8270C
SPLP East						
Acenaphthene		11	J	19	ug/L	8270C
Fluorene		12	J	19	ug/L	8270C
Phenanthrene		16	J	19	ug/L	8270C
Fluoranthene		4.1	J	19	ug/L	8270C
Pyrene		6.0	J	48	ug/L	8270C

SVOC Results, Soil Sample, July 29, 2013

Analytical Data

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-44908-1

Client Sample ID: SPLP+8270

Lab Sample ID: 280-44908-1 Date Sampled: 07/29/2013 1430
Client Matrix: Solid Date Received: 07/30/2013 0915

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	280-185393	Instrument ID:	SMS_D
Prep Method:	3550C	Prep Batch:	280-185086	Lab File ID:	D9534.D
Dilution:	1.0			Initial Weight/Volume:	30.7 g
Analysis Date:	08/01/2013 1416			Final Weight/Volume:	1000 uL
Prep Date:	07/30/2013 1800			Injection Volume:	0.5 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
1,1'-Biphenyl		49	U	49	320
1,2,4,5-Tetrachlorobenzene		48	U	48	320
1,2,4-Trichlorobenzene		27	U	27	320
1,2-Dichlorobenzene		21	U	21	320
1,3-Dichlorobenzene		12	U	12	320
1,4-Dichlorobenzene		13	U	13	320
1,4-Dioxane		64	U	64	640
2,2'-oxybis[1-chloropropane]		22	U	22	320
2,3,4,6-Tetrachlorophenol		130	U	130	1600
2,4,5-Trichlorophenol		9.8	U	9.8	320
2,4,6-Trichlorophenol		9.8	U	9.8	320
2,4-Dichlorophenol		9.8	U	9.8	320
2,4-Dimethylphenol		64	U	64	320
2,4-Dinitrophenol		330	U	330	1600
2,4-Dinitrotoluene		64	U	64	320
2,6-Dinitrotoluene		27	U	27	320
2-Chloronaphthalene		9.8	U	9.8	320
2-Chlorophenol		21	U	21	320
2-Methylnaphthalene		120	J	19	320
2-Methylphenol		13	U	13	320
2-Nitroaniline		49	U	49	1600
2-Nitrophenol		9.8	U	9.8	320
3 & 4 Methylphenol		32	U	32	320
3,3'-Dichlorobenzidine		88	U	88	640
3-Nitroaniline		71	U	71	1600
4,6-Dinitro-2-methylphenol		320	U	320	1600
4-Bromophenyl phenyl ether		19	U	19	320
4-Chloro-3-methylphenol		64	U	64	320
4-Chloroaniline		80	U	80	320
4-Chlorophenyl phenyl ether		21	U	21	320
4-Nitroaniline		71	U	71	1600
4-Nitrophenol		95	U	95	1600
Acenaphthene		570		10	320
Acenaphthylene		17	U	17	320
Acetophenone		20	U	20	320
Anthracene		17	U	17	320
Atrazine		36	U	36	320
Benzaldehyde		65	U	65	320
Benzo[a]anthracene		44	J	20	320
Benzo[a]pyrene		20	U	20	320
Benzo[b]fluoranthene		26	U	26	320
Benzo[g,h,i]perylene		16	U	16	320
Benzo[k]fluoranthene		39	U	39	320
Bis(2-chloroethoxy)methane		22	U	22	320
Bis(2-chloroethyl)ether		16	U	16	320
Bis(2-ethylhexyl) phthalate		45	U	45	320

Analytical Data

Client: Posillico Dev Company at Harbor Isle LLC Job Number: 280-44908-1

Client Sample ID: **SPLP+8270**

Lab Sample ID: 280-44908-1 Date Sampled: 07/29/2013 1430
Client Matrix: Solid Date Received: 07/30/2013 0915

8270C Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C	Analysis Batch:	280-185393	Instrument ID:	SMS_D
Prep Method:	3550C	Prep Batch:	280-185086	Lab File ID:	D9534.D
Dilution:	1.0			Initial Weight/Volume:	30.7 g
Analysis Date:	08/01/2013 1416			Final Weight/Volume:	1000 uL
Prep Date:	07/30/2013 1800			Injection Volume:	0.5 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Butyl benzyl phthalate		42	U	42	320
Caprolactam		100	U	100	1600
Carbazole		35	U	35	320
Chrysene		59	J	26	320
Dibenz(a,h)anthracene		19	U	19	320
Dibenzofuran		20	U	20	320
Diethyl phthalate		25	U	25	640
Dimethyl phthalate		22	U	22	320
Di-n-butyl phthalate		28	U	28	320
Di-n-octyl phthalate		14	U	14	320
Fluoranthene		260	J	35	320
Fluorene		18	U	18	320
Hexachlorobenzene		28	U	28	320
Hexachlorobutadiene		9.8	U	9.8	320
Hexachlorocyclopentadiene		49	U	49	1600
Hexachloroethane		21	U	21	320
Indeno[1,2,3-cd]pyrene		21	U	21	320
Isophorone		17	U	17	320
Naphthalene		83	J	30	320
Nitrobenzene		21	U	21	320
N-Nitrosodi-n-propylamine		30	U	30	320
n-Nitrosodiphenylamine(as diphenylamine)		21	U	21	320
Pentachlorophenol		320	U	320	1600
Phenanthrene		1100		17	320
Phenol		18	U	18	320
Pyrene		440		12	320

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol	83		51 - 120
2-Fluorobiphenyl	75		50 - 120
2-Fluorophenol	76		53 - 120
Nitrobenzene-d5	71		50 - 120
Phenol-d5	82		52 - 120
Terphenyl-d14	86		55 - 120

Part 375-6.8(b) Soil Cleanup Objectives(ug/l)			
	Residential		**Restricted Residential**
2-Methylnaphthalene	NS		NS
Acenaphthene	100000		100000
Anthracene	100000		100000
Benzo[a]anthracene	1000		1000
Benzo[a]pyrene	1000		1000
Benzo[b]fluoranthene	1000		1000
Benzo[g,h,i]perylene	100000		100000
Chrysene	1000		1000
Chrysene	1000		1000
Dibenzofuran	NS		NS
Fluoranthene	100000		100000
Fluorene	100000		100000
n-Nitrosodiphenylamine (as diphenylamine)	NS		NS
Naphthalene	100000		100000
Phenanthrene	100000		100000
Pyrene	100000		100000

Conclusions

The results show that very few of the Part 375 chemicals were detected and the few that were found were at low concentrations, not exceeding the Residential and Restricted Residential standards.

The conclusion is that the petroleum has weathered over the years since it was released and no longer has the characteristics of fresh petroleum. The hydrocarbon chemicals have changed enough so that they aren't detected by the standard analytical methods. They are now detected as Tentatively-Identified Compounds (TICs).

The bench test shows that soil washing effectively reduces the TIC content to a point at which very little of the original and weathered petroleum remains after the soil goes through the process.

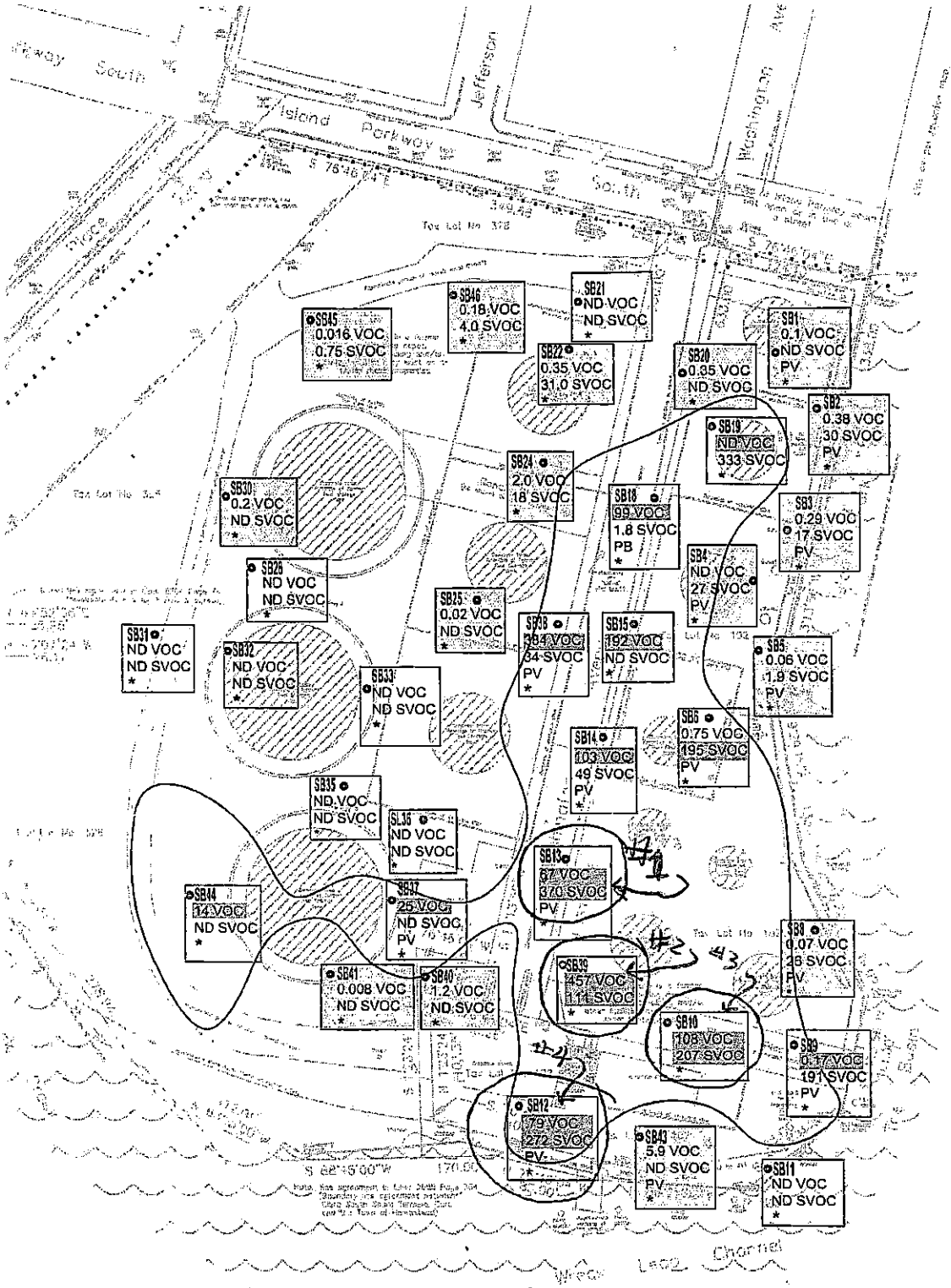
The weathered petroleum is now found in tarry particles and small chunks of a tarry material that are mostly removed during the soil washing process.

In addition, the SPLP test shows that the TIC detections in the washed soil do not accurately portray the ability of the weathered petroleum to move out of its tarry, immobile state. The washed-soil bench test results were obtained by extracting the SVOC chemicals with a solvent, which mischaracterizes how the SVOCs are found at the site.

The SPLP test extracts the SVOC chemicals using acidified water, which more closely replicates what happens at the site where groundwater and precipitation is slightly acidic. The SPLP results show that the tarry, weathered petroleum is practically immobile and will not appreciably dissolve in percolating water, nor flow under its own accord.

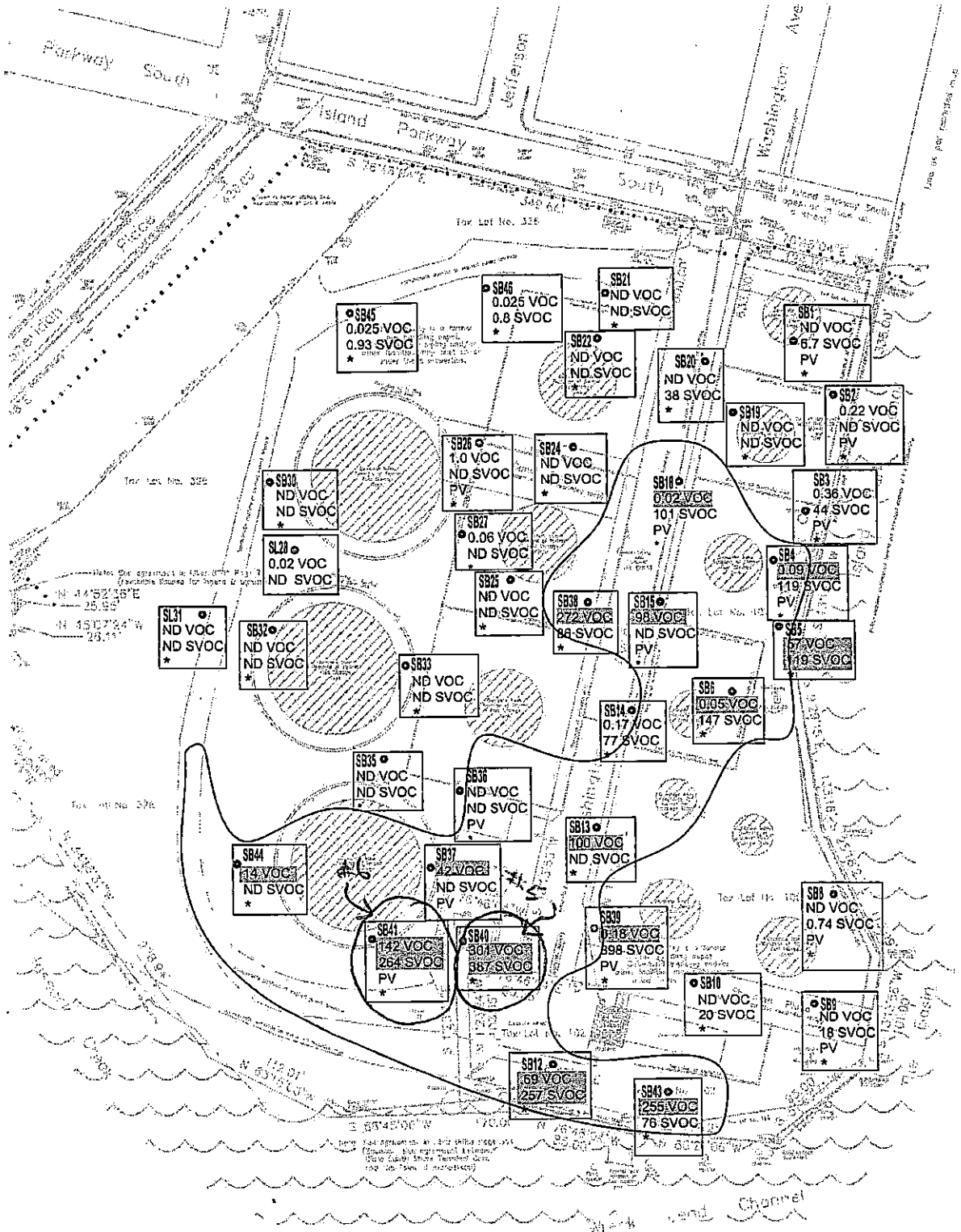
Therefore, the combination of adjusting the soil washing parameters along with the knowledge that the SVOCs are found in virtually inert fragments, should provide confidence that the soil washing process will result in a product that will be suitable for the restricted residential use proposed at the property.

Figures



6-in to 3-ft TIC content

escription	**Posillico Consulting** 1750 New Highway Farmingdale, NY 11735 (631) 249-1872	Posill

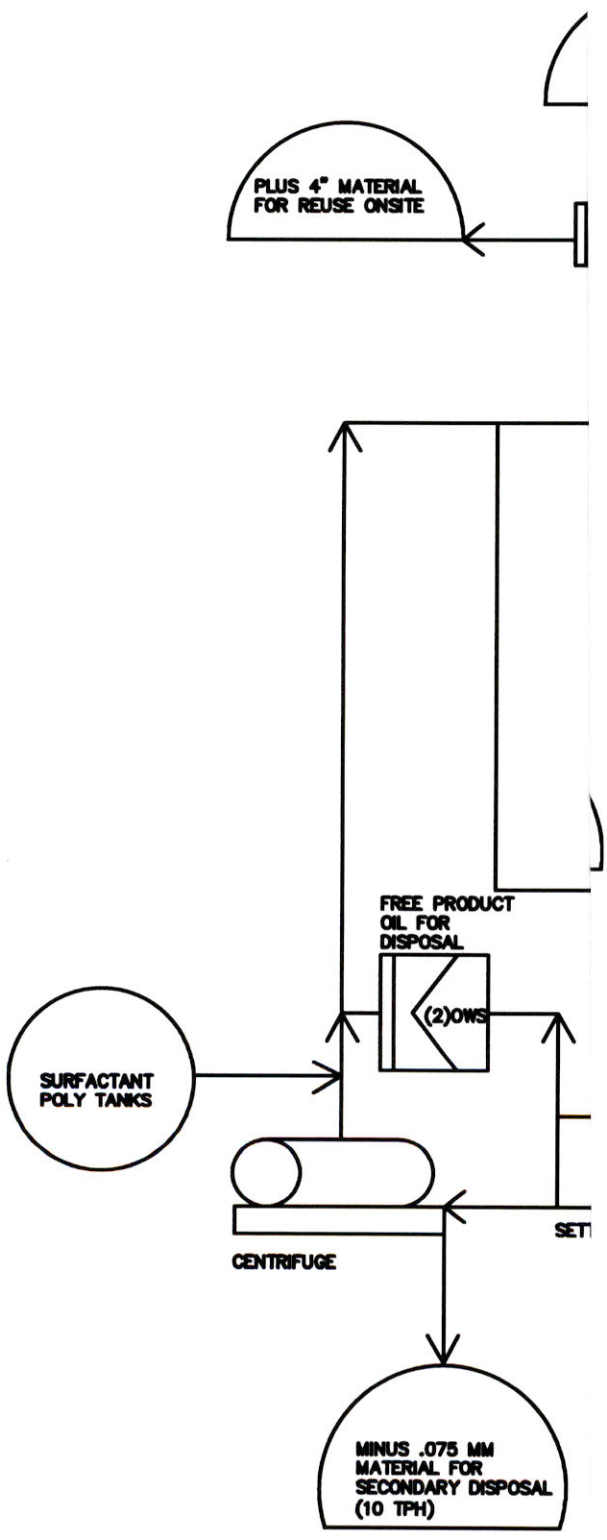


3-ft to 7-ft TIC content

escription

Posillico Consulting
1750 New Highway
Farmingdale, NY 11735
(631) 249-1872

Posill



Revisions/Issues

No	Date	By	Description
			COMMEN

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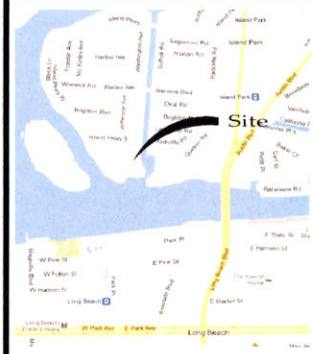
1750 New Highway
Farmingdale, NY 11735
(631) 249-1872



Stamp

Signature:_____ Date:_

Title

PROCESS FLOW DIAGRAM
SOIL WASHING PLANT

Project

PDC @ HARBOR ISLE
REMEDIATION

Date

JULY 24, 2013

Scale

AS NOTED

Appendices

1. ***Laboratory Reports and QA/QC Package for Baseline Characterization***
2. ***Laboratory Reports and QA/QC Package for Bench Test Samples***
3. ***Laboratory Reports and QA/QC Package for SPLP Test***
4. ***Soil Washing Plant (SWP) Process Description***